ĐỀ 1

EXAM MATH 8

Question 1:

If $x^3 + 2x^2 + kx + 2$ is divisible by $x - 1$ ***then k = …***

Question 2:

Given a square with the length of one side is 8 cm and a isosceles triangle with the length of its base is 12 cm. If the area of the square is equal to the area of the isosceles triangle then what is the length of the height of the isosceles triangle, in cm?

Answer: x = ... cm.

Question 3:

If $x = 2y$ then $\dfrac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}} = \cdots$.

Question 4:

Given $A = 9x^2 + 8 - 12x$ and $B = 2$.

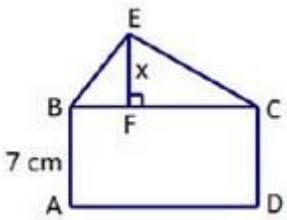
To compare: A ….. B.

Question 5: The triangle ABC has three bisectors AM, BN, CP of the angles at A,B,C, respectively.

Then the value of $\dfrac{AN}{CN}\times\dfrac{CM}{BM}\times\dfrac{BP}{AP}$ ***is …***

Question 6:

Given the rectangle ABCD and the triangle BEC. Find the value of x such that the ratio of the area of the rectangle to the area of the triangle BEC is 7:3.



Answer: x = ... cm.

Question 7:

A survey showed that of 120 secondary school students: 52 of them have a dog, 31 of them have a cat and 19 of them have both. How many of the 120 students have neither a dog nor a cat?

Answer: ..... students.

Question 8:

The number of the solutions of $x^4 + x^3 + 2x^2 + x + 1 = 0$ ***is .....***

Question 9:

Three children: Mark, Tom, Andy ate 23 cookies altogether. Tom ate more cookies than Andy, Mark. What is the smallest possible number of cookies that Tom ate?

Answer: The smallest possible number of cookies that Tom ate ***is .... cookies.***

Question 10:

The average of three numbers is 42. All three are whole positive number and are different from each other.

If the least number is 20, what could be the greatest possible number of the remaining two numbers?

Answer: .....

Question 11:

When the polynomial $f(x) = 3x^3 + 2x^2 + 5x + 1$ is divided by $g(x) = x + 1$, the remainder ***is .....***

Question 12:

If $\frac{1}{4}\frac{x^2-4}{x+2}=\frac{3x}{2}$ ***then x = ...***

Question 13:

Given that 75k is perfect cube, the least positive integer k ***is .....***

Question 14:

If n is a natural number such that n^2 - 5 is a square number, then ***n = ...***

Question 15:

On the number line, point A has coordinate -4 and point B has coordinate 6. If point C is the midpoint of AB, then its coordinate ***is .....***

Question 16:

The root of the equation $(x^2 - 1) = x - 1$ is ***x = ...***

Question 17:

If the sum of al interior angles in a convex polygon is 1080 degrees, then this polygon has ..... diagonals.

Question 18:

Given Fraction $\frac{x^2-4}{8x^2+5x-3}$. For what condition of x is the value of the fraction determined?

Answer: .....

Question 19:

Given Fraction $\frac{12}{8+x^3}-\frac{1}{x+2}$. Find the value of x that the value of fraction equals 1.

Answer: .....

Question 20:

Then lengths of the two sides of a parallelogram are 12cm and 18cm. The length of one of its altitudes is 16cm. Calculate the length of the other altitudes.

Answer: .....

Question 21:

Find the value of the constant m such that the polynomial $f(x) = x^3 - x + m$ is divisible by x + 2.

Answer: .....

Question 22:

$P=\frac{2x}{x^2+2x-3}+\frac{3x-1}{x-1}$ Find the value of x such that P = 3.

Answer: .....

Question 23:

If x = 3; y = -1 then $x^5 + 5x^4y + 10x^3y^2 + 10x^2y^3 + 5xy^4 + y^5$ = ...

Question 24:

The maximum value of $P=\frac{x^2+2x+1}{x^2+1}$ ***is .....***

Question 25:

Given the function $f(x) = \frac{1}{4}m(m+2)x^2+\frac{3}{2}mx+3$ with f(2) = -3. The greatest possible value of m ***is .....***

Question 26:

If a + 2b = 6 and ab = 4 then $\frac{4}{a}+\frac{2}{b}=$ .....

Question 27:

Simplify expressions: A = /-3x/+7x-4 when x < 0.

Answer: A = ...

Question 28:

Find the value of n such that A = n^3 - $2n^2$ + 2n - 4 is a prime number. The value of n is .....

Question 29:

Find the area of the trapezoid ABCD, BC // AD, AB = CD = 5cm, BC = 10cm, AD = 16cm.

The area of the trapezoid ABCD is .....cm^2.

Question 30:

Find the least possible value of A = $4x^2$ – x + 2017, where x varies in the set of positive real numbers. The least possible value of A is .....

Question 31:

For expressions A = $\left(\frac{2+x}{2-x}-\frac{4x^2}{x^2-4}-\frac{2-x}{2+x}\right):\frac{x^2-3x}{2x^2-x^3}$

a. To find the definite and reduced condition A

b. Find x to A > 0

c. Calculate A with $|x-7|=4$

Question 32:

For square ABCD. Take the M point next to the BD. From M perpendicular to AB, MF perpendicular to AD (point E of segment AB and point F of segment AD)

a. Prove that DE and CF are of equal length ?

b. The lines DE, BF, CM are concurrent ?

Question 33:

Let a, b, c be the length of three sides of a triangle. Please prove:

$$A=\frac{a}{b+c-a}+\frac{b}{c+a-b}+\frac{c}{a+b-c}\geq 3$$

ĐỀ 2
EXAM MATH : GRADE 8

Question 1:

If $a^{2000} + b^{2000} = a^{2001} + b^{2001} = a^{2002} + b^{2002}$(a and b are plus integers)

Then: $a^{2011} + b^{2011}$ = …

Answer:

Question 2:

Find x,y,z such that :

$$9x^2 + y^2 + 2z^2 – 18x + 4z - 6y + 20 = 0$$

Answer : (x;y;z)=

Question 3.

Find the minimum value ofexpression :

$$P=(x-1)(x+2)(x+3)(x+6)$$

Answer:

Question 4:

The maximum root of the equation (x+1)(x-2009)(x+2010)=0 is:
Answer:

Question 5:

The solution of the multiplication $(x-2)(x^2-3x+2)$ is a polynomialthen what is the power of x?
Answer:

Question 6:

Find the roots of the equation?

$$\frac{1}{x^2+9x+20}+\frac{1}{x^2+11x+30}+\frac{1}{x^2+13x+42}=\frac{1}{18}$$

Answer:

Question 7:

Find the integers a and b , givenA(x) = x^4-3x^3+ax+b is divisible by $B(x)=x^2-3x+4$
Answer;

Question 8:

Find the values of x:

$$\frac{x-241}{17}+\frac{x-220}{19}+\frac{x-195}{21}+\frac{x-166}{23}=10\,.$$

Answer:

Question 9:

Find the minimum value of $A=\frac{2010x+2680}{x^2+1}$.
Answer:

Question 10:

Given Δ ABC; AB = 3AC, Find the ratio of the altitude BH to CH

Question 11:

Givenxy = 11 and $x^2y + xy^2 + x + y = 120$. Find the value of $x^2 + y^2$
Answer:

Question 12:

Find the minimum value ofthe expression $M=x^2+y^2-xy-x+y+1$
Answer:

Question 13:

Given $4a^2 + b^2 = 5ab$ and $2a > b > 0$ .Calculate: $P=\frac{ab}{4a^2-b^2}$

Answer:

Question 14:

Find the minimum value of A=x(x-3)
Answer:

Question 15:

Find d in the division of expression $(x+2)(x+4)(x+6)(x+8)+2008$ by the polynomial $x^2+10x+21$
Answer:

Question 16:

The Ford car left Hanoi for Nghe An and the Audi car left Nghe An for Ha Noi at the same time. The ratio of their speeds (the Ford car to the Audi car) was 4 : 3. The Ford decreased its speed by 25% and the Audi car increased its speed by 25% after they had passed each other. When the Ford car reached Nghe An, the Audi car was still 20km away from Hanoi. The distance between Hanoi and Nghe An is ..... km.

Answer:

Question 17:

Find the minimum value of the expression: $\frac{2}{-4x^2+8x-5}$

Answer:

Question 18: GiveΔABC ,AB=6cm, AC=8cm, BC=10cm.

Then the length of the median line AM is

Answer:

Question 19:

Given rhombus with the length of AB is 5cm and the angle B is60^0 .The area of the rhombus is....

Answer

Question 20:

Give ΔABC, the area of ΔABC is 12 cm2 . N is the median point of BC.What is the area of ΔABN.

Answer:

Question 21:

The minimum root of the equation x3-6x2-25x-18=0 is x = ...?

Answer:

Question 22.

Let ABCD be a trapezoid with AB // CD, $\hat{A}$ = D = 90o and AB = AD = CD/2.

Find the measure of the angle BCD.

Answer: BCD = ...

Answer:

Question 23:

An isosceles trapezoid ABCD is shown in the following diagram. What is the area of the trapezoid ABCD?

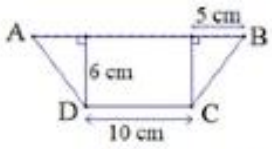


Figure is not drawn to scale.

Answer: The area of the trapezoid is .....cm^2.

Question 24:

Give a rectangular land such that ít length is twice as its width. If the width is decreased by 5m and the length is increased by 12 m the the area is increased by 10 square meters. The width id this land is ……m?

Answer:

Question 25:

Find the value of constant a such that the polynomial $x^4+5x^3+15x+a$ is divisible by x^2+3

Answer:

Question 26: The minimum root of the equation is x^2-4x-5 =0……..

Answer:

Question 27:

How many roots does the equation x3-8=3x(2-x) have?

Answer:

Question 28:

If the sum of all interior angles in a convex polygon is 1080 degrees, then this polygon has …… diagonals

Answer:

Question 29:

The length of two diagonal are 12 cm and 20 cm in turn. What are the sides of the rhombus.

Answer:

Question 30.

Let the rectangle ABCD , AB = 2/3BC and the area is 24cm2. What is the perimeter of the rectangle ABCD is:

Answer:

Question 31:

Given $a+b+c=0$ và $abc\neq 0$, calculate the value of the expression:

$$P=\frac{1}{b^2+c^2-a^2}+\frac{1}{a^2+c^2-b^2}+\frac{1}{a^2+b^2-c^2}$$

Question 32: Find the roots of the equation: $2x^2-5xy+3y^2=7$

Question 33: Prove that with all integer numberA = (x+y)(x+2y)(x+3y)(x+4y) + $y^4$is the square of the natural number.

ĐỀ 3

I. OBJECTIVE TEST:

Question 1: If polynomial $x^3 + 2x^2 + kx + 2$ is divisible by x - 1then k =?

Answer: k = ...

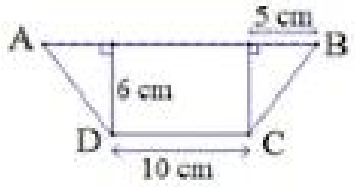
Question 2: If a + b = 3; $a^2 + b^2 = 7$ then $a^3 + b^3$ = ?

Answer: $a^3 + b^3$ = ...

Question 3: Find the value of k such that $x^3 + kx^2 + (4 - k)x - 35$ is divisible by x - 7.

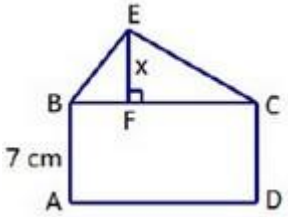
Answer:k =.....

Question 4: An isosceles trapezoid ABCD is shown in the following diagram. What is the area of the trapezoid ABCD?



Answer:.....

Question 5: Given the rectangle ABCD and the triangle BEC. Find the value of x such that the ratio of the area of the rectangle to the area of the triangle BEC is 7:3.



Answer: x = ...

Question 6: If x = 2y then $\dfrac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}}$

Answer:.....

Question 7: Let ABCD be a trapezoid with AB // CD, $\hat{A} = D = 90^o$ and AB = AD = CD/2. Find the measure of the angle BCD.

Answer:.....

Question 8: The triangle ABC has three bisectors AM, BN, CP of the angles at A, B, C respectively. Then the value of $\frac{AN}{CN} x \frac{CM}{BM} x \frac{BP}{AP}$ is …

Answer:.....

Question 9: The average of three numbers is 42. All three are whole positive number and are different from each other.
If the least number is 20, what could be the greatest possible number of the remaining two numbers?

Answer:.....

Question 10: If x - y - z = 0 and x + 2y - 10z = 0, $z \neq 0$ then the value of $B = \frac{2x^2 + 4xy}{y^2 + z^2}$ is .....

Answer:.....

Question 11: Given the equation (x - m)(m - 1) + (x - 1)(m + 1) = -2m. Find all values of m such that this equation has no solution.

Answer:.....

Question 12: Given the equation: $\frac{3}{x-3} - \frac{5}{x-5} = \frac{4}{x-4} - \frac{6}{x-6}$

The average (arithmetic mean) of all roots of this equation is ..... Write your answer by fraction in simplest form.

Answer:.....

Question 13: The Ford car left Hanoi for Nghe An and the Audi car left Nghe An for Ha Noi at the same time. The ratio of their speeds (the Ford car to the Audi car) was 4 : 3. The Ford decreased its speed by 25% and the Audi car increased its speed by 25% after they had passed each other.
When the Ford car reached Nghe An, the Audi car was still 20km away from Hanoi. The distance between Hanoi and Nghe An is ..... km.

Answer:.....

Question 14: 5 similar tables and 18 similar chair cost $594. The cost of one such table is the same as the cost of 3 such chairs. How much does each table cost? How much does each chair cost?

Answer:.....

Question 15: If 10 rabbits can be exchanged for 2 goats, 9 goats be exchanged for 3 cows, and 8 cows be exchanged for 2 horses. How many rabbits can 5 horses be exchanged for?

Answer:.....

Question 16: The result of polynomial analysis (x + 2) (x + 3) (x + 4) (x + 5) - 24 is called the factorial.

Answer:.....

Question 17: Assume that two numbers x and y satisfy: 2x + y = 6. Find the minimum value of expression $A = 4x^2 + y^2$

Answer:.....

Question 18: In the xy - plane, given three points A(-1; 2); B(-3; -1); D(6; 2). If ABCD is a parallelogram then C has coordinates

Answer:C.....

Question 19: If a and b are two non-zero distinct numbers such that $3a^2 + 4b^2 = 7ab$ then the value of the expression $E = \frac{a+2b}{3a-b}$ is .....

Answer:.....

Question 20: Given the rectangle whose perimeter is 24cm. If its length is decreased by 1cm and its width is increased by 1cm, then the area of the original rectanle is increased by $3cm^2$. Find the area of the original rectangle.

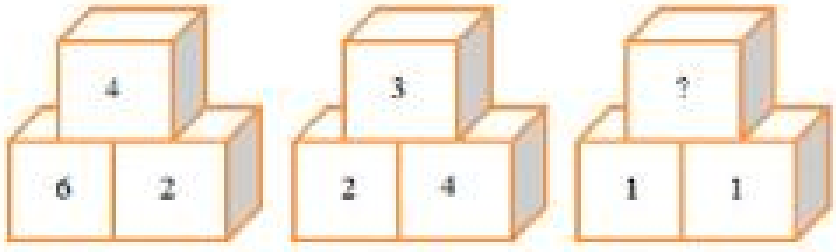
Answer:.....

Question 21: The triangle ABC has AB = 5cm, AC = 8cm, $\hat{A} = 60^o$ and the internal bisector AD (D ∈ BC). The length of BD is .....cm.

A. 35/13 B. 40/13 C. 20/7

D. 13/40

Question 22: What number should replace the question mark ?



Answer:.....

Question 23: Find the greatest interger number x such that the value of (3x - 2)/4 is greater than the value of (5x + 3)/5.

Answer: The greatest integer number x is .....

Question 24: How many sides does a polygon have if the number of its diagonals is as triple as the number of its sides?

Question 25: Find the positive value of k such that x = 2 is a root of the following equation: $x^2 - kx + k^2 - 4 = 0$.

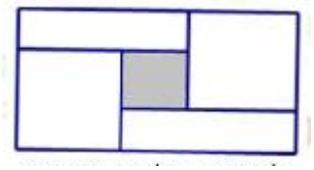
Answer: The positive value of k is .....

Question 26: If x, y, z satisfy these equations $yz = 3/2 - x^2/2$; $zx = 1/2 - y^2/2$ and $xy = 5/2 - z^2/2$ then the value of I x + y + z I is .....

Question 27: Find the remainder when (x + 2)(x + 3)(x + 4)(x + 5) + 2017 is divided by $x^2 + 7x + 11$.

Answer:.....

Question 28: A rectangle has a length of 60cm and a width of 30cm. It is cut into 2 indentical squares, 2 identical rectangles and a shaded small square. Find the area of the shaded square.



Answer:.....

Question 29: Let ABCD be the square with the side length 56cm. If E and F lie on CD, CB respectively such that CF = 14cm and EAF = 45° then CE = ...cm.

Question 30: Give the expression $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=0(x,y,z\neq 0)$. Expression Value: $A=\frac{yz}{x^2}+\frac{xz}{y^2}+\frac{xy}{z^2}$ is....

Answer:.....

II. The comment file:

Lesson 1: Solving Equations:

$$\left(\frac{1}{1.2.3}+\frac{1}{2.3.4}+...+\frac{1}{2005.2006.2007}\right).x=\left(1.2+2.3+3.4+...+2006.2007\right)$$

Lesson 2:

$Let\ A=\frac{1}{b^2+c^2-a^2}+\frac{1}{c^2+a^2-b^2}+\frac{1}{a^2+b^2-c^2}$. Shorten the expression A to know:

a + b + c = 0.

Lesson 3:

Given a square ABCD, M is an arbitrary point on the diagonal BD. The ME is perpendicular to AB, MF perpendicular to AD (E$\notin$ AB, F$\notin$ AD).

a) Prove $DE=CF$.

b) Prove three straight lines DE, BF, CM concurrency.

c) Determine the position of the M point for the AEMF quadrilateral with the largest area.

ĐỀ 4

Câu 1: Find x, given that $x^2-6x+9=0$

A. 2 B. 3 C. 4 D. 5

Câu 2: Find the value of x that $A=x^2-3x+5$ reaches the minmum value

A. $\frac{3}{2}$ B. $\frac{3}{4}$ C. $\frac{1}{2}$ D. $\frac{1}{4}$

Câu 3: a+2 is factor of:

A. a-2 B. a^2-2 C. a^3+2a^2 D. a^2-2a

Câu 4: The triangle ABC has three bisectors AM,BN, CP of the angles at A,B,C, respectively. Then the value of $AN/\ CN\times CM/\ BM\times BP/\ AP\ is\ \ldots$

A. 5 B. 2 C. $\frac{1}{2}$ D. 1

Câu 5: If x^3+2x^2+kx+2 is divisible by x - 1 then k = …

A. 5 B. 4 C. -5 D. -4

Câu 6: Given a square with the length of one side is 8 cm and a isosceles triangle with the length of its base is 12 cm. If the area of the square is equal to the area of the isosceles triangle then what is the length of the height of the isosceles triangle, in cm?

A. 32/3 B. 23/3 C. 16/3 D. 8/3

Câu 7: A survey showed that of 120 secondary school students: 52 of them have a dog, 31 of them have a cat and 19 of them have both.

How many of the 120 students have neither a dog nor a cat? Answer: {} students.

A. 55 B. 56 C. 57 D. 58

Câu 8: The number of the solutions of $x^4+x^3+2x^2+x+1=0$ is ....

A. 1 B. 3 C. 2 D. 0

Câu 9: Three children: Mark, Tom, Andy ate 23 cookies altogether. Tom ate more cookies than Andy, Mark. What is the smallest possible number of cookies that Tom ate?

Answer: The smallest possible number of cookies that Tom ate is {} cookies.

A. 10 B. 11 C. 9 D. 8

Câu 10: Let ABCD be a trapezoid with AB // CD, $\hat{A} = D = 90^0$ and AB = AD = CD/2. Find the measure of the angle BCD.

A. 45^0 B. 50^0 C. 60^0 D. 75^0

Câu 11: Assume that two numbers x and y satisfy: 2x + y = 6. Find the minimum value of expression A = $4x^2+y^2$

A. 18 B. 36 C. 6 D. 24

Câu 12: : Let ABC be a triangle with AB = 3cm, AC = 7cm. The internal bisector of the angle BAC intersects BC at D. The line passing through D and parallel to AC cuts AB at E. Find the measure of DE.

A. 20/10 B. 22/10 C. 21/10 D. 19/10

Câu 13: In the xy - plane, given three points A(-1; 2); B(-3; -1); D(6; 2). If ABCD is a parallelogram then C = ...

A. (-4; 1) B. (4; -1) C. (-4; 1) D. (-4; -1)

Câu 14: If a and b are two non-zero distinct numbers such that $3a^2+4b^2=7ab$ then the value of the expression $E=\frac{a+2b}{3a-b}$ is .....

A. 7/3 B. 3/2 C. 7/4 D. 10/9

Câu 15: Given the rectangle whose perimeter is 24cm. If its length is decreased by 1cm and its width is increased by 1cm, then the area of the original rectanle is increased by $3cm^2$. Find the area of the original rectangle.

A. $32cm^2$ B. $35cm^2$ C. $40cm^2$ D. $48cm^2$

Câu 16: The triangle ABC has AB = 5cm, AC = 8cm, $\hat{A}=60^0$ and the internal bisector AD (D ∈ BC). The length of BD is .....cm.

A. 35/13 B. 40/13 C. 20/7 D. 13/40

Câu 17: The smallest value of $A=\frac{x-y}{x^4+y^4+6}$ is .....

A. 1/6 B. 1/2 C. 1/4 D. -1/4

Câu 18: If all roots of the polynomial $P(x)=x^2+5x-1$ are also roots of the polynomial $Q(x)=x^3+ax^2+bx+c$ then the value of a + b + 6c is .....

A. 4 B. 8 C. -4 D. -5

Câu 19: Let ABC be an isoceles triangle (AB = AC) and its area is 501cm2 . BD is the internal bisector of the angle ABC (D ∈ AC), E is a point on the opposite ray of CA such that CE = CB. I is a point on BC such that CI = 1/2 BI. The line EI meets AB at K, BD meets KC at H. Find the area of the triangle AHC.

A. $200cm^2$ B. $250,5cm^2$ C. $167cm^2$ D. $176cm^2$

Câu 20: Given the rectangle ABCD and the triangle BEC. Find the value of x such that the ratio of the area of the rectangle to the area of the triangle BEC is 7:3.
Answer: x={} cm.

A. 7 B. 6 C. 8 D. 5

Câu 21: The unit digit of 3985^{1234} is

A. 4 B. 5 C. 0 D. 1

Câu 22: Find the value of $(x+y-1)^2$ if y=5x and $\frac{x+2}{y-5}=\frac{4}{5}, y\neq 5$

A. 119 B. 120 C. 121 D. 122

Câu 23: How many sides does a polygon have if the number of its diagonals is as triple as the number of its sides?

A. 8 B. 6 C. 10 D. 9

Câu 24: Let ABCD be the square with the side length 56cm. If E and F lie on CD, C respectively such that CF = 14cm and EAF = 45o then CE = ...cm.

A. 48 B. 45 D. 46 D. 54

Câu 25: The product of two consecutive number is 132. Their sum is:

A. 21 B. 23 C. 25 D. 27

Câu 26: In the trapezoid PQRS, the sides PQ and SR are parallel. Angle RSP is 120^0 and RS= SP= $\frac{1}{3}$PQ. What is size of the angle PQR

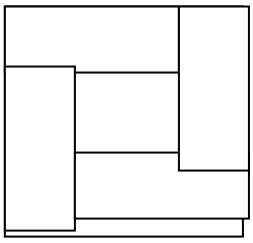
A. 15^0 B. $22,5^0$ C. 25^0 D. 30^0

Câu 27: If $x(y-2x+1) = -2x^2 + xy + 5$ then x=…

A. -2 B. 1 C. 2 D. 5

Câu 28: The digram shows four identical rectangles placed inside a square. The perimeter of each rectangle is 16cm. What is the perimeter of the large square.

A. 16 B. 20 C. 32 D. 24



Câu 29: Multiphy $(a+b+c)(a^2+b^2+c^2 - ab - bc - ca)$

A. $a^3+b^3+c^3 - abc$ C. $a^3+b^3+c^3$

B. $a^3+b^3+c^3 - 3abc$ D. $a^3+b^3+c^3+3abc$

Câu 30: The diagram shows a parallelogram ABCD which area S. The intersection point of the diagonals of the parallelogram is O. The point M is marked on DC. The intersection point of AM and BD is E and intersection point of AC and BM is F. The sum of the area of the triangles AED and BFC is 1/3S. What is the area of the quadrilateral EOFM, in terms of S.

A. 1/6S B. 1/8S C. 1/12S D. 1/14S

Câu 31: Find the integer a to $a^3 - 2a^2 + 7a - 7 \vdots a^2 + 3$

Câu 32: How many integers *a* satisfies $|2a+7|+|2a-1|=8$

Câu 33: The diagram shows a quadrilateral *ABCD* with $\angle CDA = ° 150$. The bisector of $\angle DAB$ is perpendicular to *BC* and the bisector of $\angle ABC$ is perpendicular to *CD*. What is the measure, in degrees, of $\angle BCD$?

ĐỀ 5

A) OBJECTIVE TEST

Ex1: If a + 2b = 6 and ab = 4 then 4/a + 2/b = ...

A.3 **B.4** **C.-3** **D.-4**

Ex 2: Find the least possible value of $A = 4x^2 - 3x + 1/4x + 2015$, where x varies in the set of positive real numbers. The least possible value of A is .....

A.-2015 **B.2015** **C.0** **D.-4**

Ex 3 Find the area of the trapezoid ABCD, BC // AD, AB = CD = 5cm, BC = 10cm, AD = 16cm.

The area of the trapezoid ABCD is .....cm^2.

A.52 **B.54** **C.55** **D.56**

Ex 4: In the xy - plane, given three points A(-1; 2); B(-1; 8); C(5; 8). If ABCD is a square then the coordinate of D is (.....). Write your answer with the semicolon between x- coordinate and y- coordinate

A.(5;-2) **B.(5;2)** **C.(-5;-2)** **D.(5;-2)**

Ex 5: Given the function $f(x) = 1/4 .m(m + 2)x^2 + 3/2. mx + 3$ with f(2) = -3.

The greatest possible value of m is .....

A.2 **B.-3** **C.-2** **D.3**

Ex 6: When the polynomial $f(x) = 3x^3 + 2x^2 + 5x + 1$ is divided by g(x) = x + 1, the remainder is .....

A.-3 **B.-4** **C.-2** **D.-5**

Ex 7: The number of ordered pairs (x; y) where x, y ∈ N* such that $x^2y^2 - 2(x + y)$ is perfect square is .....

A.-3 **B.2** **C.-2** **D.-3**

Ex 8: Find the positive value of k such that x = 2 is a root of the following equation: $x^2 - kx + k^2 - 4 = 0$. Answer: k=.....

A.5 **B.2** **C.7** **D.4**

Ex 9: Find the greatest interger number x such that the value of (3x - 2)/4 is greater than the value of (5x + 3)/5.

Answer: The greatest integer number x is .....

A.-5 **B.-6** **C.-7** **D.-4**

Ex 10: The maximum value of $P = \frac{x^2 + 2x + 1}{x^2 + 1}$ is .....

A.2 **B.3** **C.4** **D.5**

Ex 11: Given the function $f(x) = 1/4 .m(m + 2)x^2 + 3/2. mx + 3$ with f(2) = -3. The greatest possible value of m is .....

A.-3 **B.-4** **C.-2** **D.-5**

Ex 12: Let ABCD be a trapezoid with AB // CD, Â = D = 90° and AB = AD = CD/2.

Find the measure of the angle BCD.

Answer: BCD = ...°.

A.45 **B.50** **C.30** **D.55**

Ex 13: Let ABCD.A'B'C'D' be a cube with AC' = √3cm. Find the total surface area of this cube.

Answer: .....cm^2.

A.3 **B.4** **C.6** **D.5**

Ex 14: Bottle A contains 15% syrup. Bottle B contains 40% syrup. When these 2 bottles of syrup are mixed, the syrup content is 30% and the total volume is 600ml. How much syrup is in the bottle A at first?

Answer: .....ml.

A.240 **B.245** **C.266** **D.225**

Ex 15: Let ABCD be a trapezoid with AB // CD, Â = D = 90° and AB = AD = CD/2.

Find the measure of the angle BCD.

Answer: BCD = ...°.

A.45 **B.40** **C.55** **D.50**

Ex 16: If a + b = 3, $a^2 + b^2 = 7$ then $a^3 + b^3$ = ...

Answer: .....

A.16 **B.17** **C.18** **D.19**

Ex17: Find the value of k such that $x^3 + kx^2 + (4 - k)x - 35$ is divisible by x - 7.

Answer: k = ...

A.-6 **B.-7** **C.-8** **D.-9**

Ex 18: The number of the solutions of $x^4 + x^3 + 2x^2 + x + 1 = 0$ is .....

A.0 **B.-1** **C.-2** **D.1**

Ex 19: If $x^3 + 2x^2 + kx + 2$ is divisible by $x - 1$ then $k = \cdots$.

A.-3 **B.-4** **C.-2** **D.-5**

Ex 20: Given two numbers x, y such that $(4y^2 - 12y + 25)(4x^2 + 6x + 4) = 28$

The ratio of y to x is .....

A.-2 **B.-3** **C.-4** **D.-5**

Ex 21: A triangle ABC has Â = 120° and the bisector AD (D ∈ BC). If AB = 40cm, AD = 30cm, then AC = ... cm.

A.130 **B.120** **C.135** **D.125**

Ex 22: The root of the equation $Ix^2 - 1I = x - 1$ is x = ...

A.3 **B.-3** **C.1** **D.-1**

Ex 23: If n is a natural number such that $n^2 - 5$ is a square number, then n = ...

A.3 **B.4** **C.5** **D.6**

Ex 24: In ΔABC, $ABC = 48^0$; $DAB = 18^0$, AB < BC, D∈ BC: CD= AB. Find the value represented by ACB?

A.4 **B.45** **C.48** **D.50**

Ex 25: The perimeter of the parallelogram ABCD is 80 cm, AE= 9 cm and AF= 7 cm; AE ⊥ BC; AF ⊥ CD. Find the area of the parallelogram?

A. 157,2cm^2 **B.157,3cm^2** **C. 157,4cm^2** **D.157,5cm^2**

Ex 26: Trapezoid ABCD with AB = 8 cm bottom edge , the bottom edge CD = 12cm . M points on the line AB so that the line DM divided into two parts trapezoid has an area equal. Find length BM

A.2,4cm **B.2,5cm** **C.2,6cm** **D.2,7cm**

Ex 27:

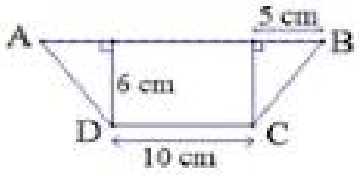


Figure is not drawn to scale.

Answer: The area of the trapezoid is .....cm^2.

A.60 **B.30** **C.45** **D.90**

Ex 28: The route AB is 60km long. At 7a.m, one motorbike travels from A to B with a constant speed. When this motorbike reaches B, it returns to A immediately with the speed increased by 10km/h and reaches A at 10.30 a.m. The original speed of this motorbike is ..... km/h.

A.60 **B.30** **C.45** **D.90**

Ex 29: Find the interger part of $\dfrac{1}{\frac{1}{80}+\frac{1}{81}+\frac{1}{82}+\frac{1}{83}+\frac{1}{84}}$

A.15 **B.16** **C.17** **D.18**

Ex 30: Find the value of x such that:

$$x-\frac{1-\frac{3}{2}x}{4}=\frac{2-\frac{1}{4}x}{5}+2$$

Answer: x = ...

- **A.** 106/57 **B.** 106/56 **C.** 106/55 **D.** 106/54

B) ESSAY

Ex 31: Solve the equation

$$\frac{1}{x^2+9x+20}+\frac{1}{x^2+11x+30}+\frac{1}{x^2+13x+42}=\frac{1}{18}$$

Ex 32: Let a, b, c be three sides of a triangle. Prove that:

$$A = \frac{a}{b+c-a}+\frac{b}{a+c-b}+\frac{c}{a+b-c}\geq 3$$

Ex 33: Find integers a and b for polynomials $A(x) = x^4 - 3x^3 + ax + b$ divided into polynomials $B(x) = x^2 - 3x + 4$

ĐỀ 7

English math exam grade 8

I. Objective test

Question 1: Find polynomials A, know that $\frac{4x^2-16}{x^2+2x}=\frac{A}{x}$

Question 2: Polynomial analysis A(x)= $x^4-14x^3+71x^2-154x+120$ is into Factors

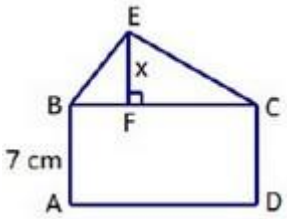
Question 3: Find all negative integers x to (x^2 +7) divisibility (x-2)

Question 4: The smallest value of the expression $E=\frac{-5}{x^2-4x+7}$

Question 5: If $x^3 + 2x^2 + kx + 2$ is divisible by $x - 1$ then $k = \cdots$.

Question 6: If $x = 2y$ then $\frac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}} = \cdots$.

Question 7: Given the rectangle ABCD and the triangle BEC. Find the value of x such that the ratio of the area of the rectangle to the area of the triangle BEC is 7:3.



Question 8: Find the remainder when (x + 2)(x + 3)(x + 4)(x + 5) + 2017 is divided by x^2 + 7x + 11.

Question 9: Find the integer x so that the value of $P=\frac{x^2+x}{x^2+x+1}$ equals the integer value

Question 10: If a + b = 3, $a^2 + b^2 = 7$ then $a^3 + b^3$ = ...

Question 11: Find the value of x such that:

$$x-\frac{1-\frac{3}{2}x}{4}=\frac{2-\frac{1}{4}x}{5}+2$$

Question 12: Let ABCD be a trapezoid with AB // CD, Â = D = 90^o and AB = AD = CD/2.Find the measure of the angle BCD.

Question 13: How many polygons have edges to the diagonal of 35?

Question 14: A polygon is the sum of the angles in the figure 1080^0 . How many polygons are there?

Question 15: Find the pair of negative integers (x; y) : $6x^2+5y^2=74$

Question 16: Find the value of x (with x <0) so that the expression
P= (x-1)(x+2)(x+3)(x+6) reaches the smallest value.

Question 17: For the triangle ABC with elevation AH, Hx is the angle of diffraction of the angle AHB and Hy is the angle of diffusion of the angle AHC. The AD is perpendicular to Hx at D, AE is perpendicular to Hy at E. What is the quadrilateral ADHE?

Question 18: Find the natural number n to $-7x^{n+1}y^6$ divisibility $4x^5y^n$

Question 19: Find the remainder of division 2^{100} for 9.

Question 20: Find the two digits of the end of 3^{999}

Question 21: Sum the angles of an n-side polygon minus its A-angle by 570^0. Find n

Question 22: Determine the rational numbers a and b so that polynomial x^3 +ax+b is divisible by polynomial x^2 +x-2

Question 23: For 3x- y =3z và 2x+ y=7z. Calculate the value of the expression

M= $\frac{x^2-2xy}{x^2+y^2}(x\neq 0; y\neq 0)$

Question 24: If $g(x)=(2x+1)^2$ and $f(x)=2x-1$ then $f(g(3))$=?

Question 25: If $x+y=1$ and $x^2+y^2=2$ then x^4+y^4=?

Question 26: Let x^2 -21x -100= (x+a)(x+b). Find the value of $|a-b|$

Question 27: The two diagonals of a diamond are 8cm and 10cm. What is the value of the diamond?

Question 28: Find x to P = $\frac{x^2-1}{x^2+1}$ to reach the smallest value

Question 29: Find the condition of x so that the value of $\frac{x^2-10x+25}{x^2-5x}$ is determined.

Question 30: Find the integer n so that n^5+1 is divisible by n^3+1.

II. Self-reflection exercises

Question 31: Find the integer x so that A= x^2+x+6 is the prime number

Question 32: Give A = $\frac{x-y}{1+xy}$; B= $\frac{y-z}{1+yz}$; C= $\frac{z-x}{1+xz}$. Proof A+B+C =A.B.C

Question 33: Give $\frac{M}{x+1}+\frac{N}{x-2}=\frac{32x-19}{x^2-x-2}=\frac{32x-19}{(x+1)(x-2)}$ .Find M.N?

ĐỀ 8

Question 1: If $\frac{2}{3x+1}-\frac{4}{6x-5}=\frac{A}{(6x-5)(3x+1)}$ then A = ……

Question 2: The maximum value of $12x+9-9x^2$ is……..

Question 3:**Result of** $1999^2-1998^2+1997^2-1996^2+...+3^2-2^2+1^2$ **is**…….

Question 4:Let a, b **and** c **be positive integers. The sum of 160 and the square of** a **is equal the sum of 5 and the square of** b. **The sum of 320 and the square of** a **is equal to the sum of 5 and the square of** c,a *is*…….

Question 5:When a particular six-digit number is multiplied by 2, 3, 4, 5 and 6 respectively, each of the products is still a six-digit number with the same digits as the original number but in a different order. The original number is…….

Question 6:The unit digit of 17^{2000} **is**…….

Question 7: Let p **and** q **be two unequal prime numbers such that** $p+q=192$. If $2p-q$ **is as large as possible. The is the value of** $p\times q$ **is**…….

Question 8.Find all integers n **such that** $1+2+....+n$ **is equal to a 3-digit number with identical digits. The integer** n **is**…….

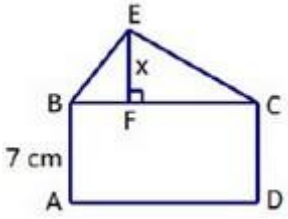
Question 9: The triangle ABC has three bisectors AM, BN, CP of the angles at A,B,C, respectively.

Then the value of $\frac{AN}{CN}\times\frac{CM}{BM}\times\frac{BP}{AP}$ ***is …***

Question 10: Given the rectangle ABCD and the triangle BEC. Find the value of x such that the ratio of the area of the rectangle to the area of the triangle BEC is 7:3.

Answer: x = ... cm.

Question 11:



A survey showed that of 120 secondary school students: 52 of them have a dog, 31 of them have a cat and 19 of them have both.How many of the 120 students have neither a dog nor a cat?

Answer: ..... students.

Question 12:

The number of the solutions of $x^4 + x^3 + 2x^2 + x + 1 = 0$ ***is .....***

Question 13:

Three children: Mark, Tom, Andy ate 23 cookies altogether. Tom ate more cookies than Andy, Mark. What is the smallest possible number of cookies that Tom ate?

Answer: The smallest possible number of cookies that Tom ate ***is .... cookies.***

Question 14:

The average of three numbers is 42. All three are whole positive number and are different from each other.

If the least number is 20, what could be the greatest possible number of the remaining two numbers?

Answer: .....

Question 15: Suppose that $x^2 + y^2 = 80$ and $xy = 32$ (x,y <0) .Find the value of $x + y$

Answer: .....

Question 16: If $x^3 + 2x^2 + kx + 2$ is divisible by $x - 1$ then k =?

Answer: .....

Question 17: If $x = 2y$ then $\dfrac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}} = \cdots$.

Answer: .....

Question 18: If a-b=7 then a(a+2)+b(b-2)-2ab = ⋯.

Answer: .....

Question 19: Given $A = 9x^2 + 8 - 12x$ and $B = 2$. To compare: $A \ldots B$.

Answer: .....

Question 20: If x - y = 4; x.y = 3. Then $(x + y)^2$ =……..

Answer: .....

Question 21: For square ABCD, call M, N, P, Q in turn as the midpoint of AB, BC, CD, DA, the quadrilateral MNPQ is:……..

Answer: .....

Question 22:

If $f(x) = x + 2x^2 - 3x^3 - 4x^4 + 5x^5 + 6x^6 - 7x^7 - 8x^8 + ... + 2009x^{2009} + 2010x^{2010} - 2011x^{2011} - 2012x^{2012}$ divide by $g(x) = x - 1$then surplus ……..

Answer: .....

Question 23: The smallest value of the following expression M= $6x + x^2$ is:……..

Question 24:The rectangle has a width of 3 times, the length of the rectangle unchangedis the area of the rectangle…..times

Answer: .....

Question 25:For the parallelogram ABCD, there is a CD = 2AD. Let M be the midpoint of the CD edge. Then the AMB angular measurement is:…….

Answer: .....

Question 26:The value of algeraic expression: $2-(-2)^{-2}$ is …….

Answer: .....

Question 27:***Ha did three works spending the same time without the rest. She began the first work at 13p.m and finished the second one at 14:40 p.m. The time of the third one is***……

Answer: .....

Question 28:***Let a, b, c be different numbers having one digit number. The greatest value of the sum of the roots (x-a)(x-b) + (x-b)(x-c)=0 is……..***

Answer: .....

Question 29:***The sum of the 2 plus numbers equal miltiplied by 5 their differences. The ratio between the large number and the small number is…….***

Answer: .....

Question 30:***Let 2 integers x and y, with x > y > 0 such that x + y + xy = 80. The value of x is……..***

Answer: .....

Question 31: Prove that the sum of any five consecutive perfect squares must not be a perfect square.

Question 32: In right-angled triangle ABC at C,the point E lies on BC such that AC = BE, D lies on AB such that DE $\perp$ BC. Given that DE + BC = 2 and BD = 1, find ABC .

Question 33:

Let a, b, c be the length of three sides of a triangle. Please prove:

$$A=\frac{a}{b+c-a}+\frac{b}{c+a-b}+\frac{c}{a+b-c}\geq 3$$

ĐỀ 9

I. Complete the answer

Ex1: If $x^3 + 2x^2 + kx + 2$ is divisible by $x - 1$ then $k = \cdots$.

Ex 2: If $x = 2y$ then $\frac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}} = \cdots$.

Ex 3: If a-b=7 then a(a+2)+b(b-2)-2ab = ⋯.

Ex 4: Given $A = 9x^2 + 8 - 12x$ and $B = 2$. To compare: $A \ldots B$.

Ex 5: If x - y = 4; x.y = 3. Then $(x + y)^2$ = ……..

Ex 6: For square ABCD, call M, N, P, Q in turn as the midpoint of AB, BC, CD, DA, the quadrilateral MNPQ is:……..

Ex 7:

If $f(x)=x+2x^2-3x^3-4x^4+5x^5+6x^6-7x^7-8x^8+...+2009x^{2009}+2010x^{2010}-2011x^{2011}-2012x^{2012}$ divide by $g(x)=x-1$ then surplus ……..

Ex 8: The smallest value of the following expression M= $6x + x^2$ is:……..

Ex 9: The rectangle has a width of 3 times, the length of the rectangle unchangedis the area of the rectangle….. times

Ex 10: For the parallelogram ABCD, there is a CD = 2AD. Let M be the midpoint of the CD edge. Then the AMB angular measurement is:…….

Ex 11: A rhombus with diagonals by 6cm and 8cm, the circumference is……..

Ex 12: Compact expression $(6x + 1)^2 + (6x – 1)^2 – 2(1 + 6x)(6x – 1)$ is…….

Ex 13: Compact expression $\left(\frac{2}{x-2}-\frac{2}{x+2}\right).\frac{x^2+4x+4}{8}$ is……..

Ex 14: Given $M=\frac{2015-2014}{2015+2014}$ and N = $\frac{2015^2-2014^2}{2015^2+2014^2}$. To compare: M …N.

Ex 15: Polynomial analysis $x^2 – 2xy + y^2 – 1$ into the prime factor……

Ex 16: If a = 101 then $a^3 – 1 + 3a – 3a^2$ is:……..

Ex 17: The greatest value of the expression Q = $4x – x^2 + 1$ is.....

Ex 18:

Compact expression $\frac{1}{a-b}+\frac{1}{a+b}+\frac{2a}{a^2+b^2}+\frac{4a^3}{a^4+b^4}+\frac{8a^7}{a^8+b^8}$ is …….

Ex 19: If $x=\frac{a}{b+c}=\frac{b}{c+a}=\frac{c}{a+b}(a,b,c\neq 0)$ then x = ⋯

Ex 20: If $a+b+c=0$ then $C=a^3+b^3+c\left(a^2+b^2\right)-abc$ = ⋯

Ex 21: Calculate the diagonal number of a 13-polygon is……

Ex 22: A square is the number of squares of a natural number. Do the following sums be a local number? A = $1^3+2^3+3^3+4^3$ ……..

Ex 23: If $1^2+2^2+3^2+...+10^2=385$ then $100^2+200^2+300^2+...+1000^2$ = ……

Ex 24: Calculates the area of an ABCD if $AC=10cm;AB=13cm$ …….

Ex 25: If x = 16 then A = $x^4-17x^3+17x^2-17x+2010$ .....

Ex 26: Polynomial analysis $2x^4 – x^2 – 1$ into the prime factor …….

Ex 27: Find x so that the value of the argument is zero $\frac{x^2-9x+8}{x^3-1}$ ……..

Ex 28: The smallest value of the following expression *(x-1)(x-3) +11 is*.....

Ex 29: If x + y + z = 0 then $A=\left(1+\frac{x}{y}\right)\left(1+\frac{y}{z}\right)\left(1+\frac{z}{x}\right)$ = ……

Ex 30: Any polygon has diagonal lines equal to the number of edges? ……

II. Answer Ex in English

Ex 31: Let triangle ABC (AB <AC), elevation AH. Let D, E, F be the midpoints of AB, AC, BC.

a) What is the BDEF quadrilateral? Why ?

b) Prove that the DEFH quadrilateral is a trapezoid

Ex 32: The smallest value of the following expression M= $6x + x^2$

Ex 33: For x - y = 4; x.y = 3. Calculate the value of the expression $(x + y)^2$

Solusion:

ĐỀ 10

I. Quiz: Complete the answers in the following sentences

Question 1: The value of $a^3+b^3+c^3$ if a+b+c=0 and abc=-3

Answer:

Question 2: Find the digit of the unit of the number $(15+2)^{2002}$

Answer:

Question 3: For x+y=1. Calculate the value of the expression $3(x^2+y^2) -2(x^3+y^3)$

Answer:

Question 4:Polynomial analysis follows into the factorial x^5+x+1

Answer :

Question 5: Solve the equation $x^3-6x^2+11x-6=0$

Answer: :

Question 6: Find the positive integer value of n to 3^n-1 divisible by 8

Answer:

Question 7: Determine the rational numbers p and q for polynomials x^3+px+q divided by polynomials x^2-2x-3

Answer:

Question 8: For quadrilateral ABCD. M and N are mid-points of the lines AD and BC respectively. Given that the area of ABCD is 2000 cm^2 and the of the shaded region ANCM=x cm^2, find the value of x

Answer:

Question 9: 888 numbers are placed along the circumference of a circle. When any five adjacent numbers are added , the total is always 40. Find the difference between the largest and the smallest of these numbers.

Answer:

Question 10: Given that N=2.2.2.2…2.5.5…5 (There are 2009 digits 2, 2000 digits 5). Find the numbers of digits in N

Answer:

Question 11: The trapezoid ABCD (AB // DC) has AD = BC. Know BD = 7cm and $A\hat{B}D = 45^0$, calculate trapezoidal area.

Answer:

Question 12: Calculate $1^3+2^3+3^3+4^3+5^3+...+20^3+21^3$

Answer :

Question 13: Polynomial f (x) if divided by x-2, the balance is equal to 3; If divided by x-3 then the remainder is equal to 4. Find the remainder of the polynomial f (x) for (x-2) (x-3).

Answer:

Question 14: Shorten the division: $A=\dfrac{x^3-7x+6}{x^3+5x^2-2x-24}$

Answer:

Question 15: Find the numbers a and b so that $\dfrac{17x+18}{3x^2+x-14}=\dfrac{a}{x-2}+\dfrac{b}{3x+7}$

Answer:

Question 16: Given a + b + c = 0 and a, b, c are both different.

$$D=\frac{2ab}{a^2+(b+c)(b-c)}+\frac{2bc}{b^2+(c+a)(c-a)}+\frac{2ca}{c^2+(a+b)(a-b)}$$

Answer:

Question 17: For$(a+b+c)^2=a^2+b^2+c^2$ and a.b.c $\neq 0$

Calculate $M=\frac{bc}{a^2}+\frac{ac}{b^2}+\frac{ab}{c^2}$

Answer:

Question 18: For abc=1. Compact expression

$E=\frac{a}{ab+a+1}+\frac{b}{bc+b+1}+\frac{c}{ac+c+1}$

Answer: E= 1

Question 19: ABCD is a parallelogram BE=EC and BC=2AB and $B\hat{A}D=60^0$ Then $A\hat{E}D=?$

Answer:

Câu 20: Given a sequence including 8 numbers á follows

3; 8; 23; 68; 203; 608; x; y . What is the velue of y-x

Answer:

Question 21: How many N axes have symmetry axes?

Answers:

Question 22: Find the sum of the polynomial coefficients received after the brackets in the expression$A(x)=(3-4x+x^2)^{2004}(3+4x+x^2)^{2005}$

Answer:

Question 23: Find the smallest value of$A=x(x-3)(x-4)(x-7)$

Answer:

Question 24: Find the smallest value of A=$|x-1|+|x-7|+|x-9|$

Answer:

Question 25: The diagonal length of two diagonal lines is 12cm and 16cm respectively. The length of the diamond is

Answer :

Question 26: In the following quadrilateral: The rectangle, rectangle, square, trapezoid. What shape is 4-axis symmetry?

Answer:

Question 27: True or False: The center of a triangle is the center of symmetry of that triangle.

Answer:

Question 28: In the square ABCD gives an O point such thatOCD corner

Answer :

Question 29: Calculate the value of the expression $A=\frac{2a-b}{3a-b}+\frac{5b-a}{3a+b}$ know $10a^2-3b^2+5ab=0$

Answer :

Question 30: Equation $(3x-2)^3-(x-3)^3=(2x+1)^3$ Find the equations of the above

Answer :

II.Essay

Problem 1: Find the numbers x, y, z know: $x^2+y^2+z^2=xy+yz+zx$ and $x^{2015}+y^{2015}+z^{2015}=9^{1008}$

Lesson 2: Let x, y be nonnegative real numbers $x^2-2xy+x-2y\leq 0$. Calculates the maximum value of the expression $M=x^2-5y^2+3x$

Lesson 3: Let x + y + z = 0 Prove that $2\left(x^5+y^5+z^2\right)=5xyz(x^2+y^2+z^2)$

ĐỀ 11

Problem 1.

Result of $1999^2 - 1998^2 + 1997^2 - 1996^2 + ... + 3^2 - 2^2 + 1^2$ is…….

Problem 2.

Let ***a, b*** and ***c*** be positive integers. The sum of 160 and the square of ***a*** is equal the sum of 5 and the square of ***b.*** The sum of 320 and the square of ***a*** is equal to the sum of 5 and the square of ***c, a*** **is**…….

Problem 3.

When a particular six-digit number is multiplied by 2, 3, 4, 5 and 6 respectively, each of the products is still a six-digit number with the same digits as the original number but in a different order. The original number is…….

Problem 4.

The unit digit of 17^{2000} is…….

Problem 5.

Let ***p*** and ***q*** be two unequal prime numbers such that $p + q = 192.$ If $2p - q$ is as large as possible. The is the value of $p \times q$ is…….

Problem 6.

Find all integers ***n*** such that $1 + 2 + ... + n$ is equal to a 3-digit number with identical digits. The integer *n* is…….

Problem 7.

Each of the numbers 2, 3, 4, 5, 6, 7, 8 and 9 is used once to fill in one of the boxes in the diagram below to make the equation correct. Of the three fractions being added

$$\frac{1}{\square \times \square} + \frac{\square}{\square \times \square} + \frac{\square}{\square \times \square} = 1$$

The value of the largest one is…….

Problem 8.

Simplify as a fraction in lowest terms

$$\frac{\left(2^4+2^2+1\right)\left(4^4+4^2+1\right)\left(6^4+6^2+1\right)\left(8^4+8^2+1\right)\left(10^4+10^2+1\right)}{\left(3^4+3^2+1\right)\left(5^4+5^2+1\right)\left(7^4+7^2+1\right)\left(9^4+9^2+1\right)\left(11^4+11^2+1\right)}$$

Result is…….

Problem 9.

How many factors of $N = 1^9 \times 2^8 \times 3^7 \times 4^6 \times 5^5 \times 6^4 \times 7^3 \times 8^2 \times 9^1$ **are perfect squares ?**

…….

Problem 10.

The fraction $\frac{1}{4}$ **has an interesting property. The numerator is a single-digit number 1 and the denominator is a larger single-digit number 4. If we add the digit 6 after the digit 1 in the numerator** *n* **times and add the digit 6 before the digit 4 in the denominator** *n* **times also, the fraction** $\frac{166...6}{66...64} = \frac{1}{4}$ **has the same value. Determine all other fractions with this property, except that the added digit does not have to be 6:** …….

Problem 11.

Let *a* be a positive number such that $a^2+\frac{1}{a^2}=5$. The value of $a^3+\frac{1}{a^3}$ is…….

Problem 12.

Suppose that $\frac{x}{a}=\frac{y}{b}=\frac{z}{c}$, where a,b,c,x,y and z are non-zero numbers. The value of $\frac{xyz(a+b)(b+c)(c+a)}{abc(x+y)(y+z)(z+x)}$ is…….

Problem 13.

Let a, *b* and *c* be real numbers such that $a+b+c=11$ and $\frac{1}{a+b}+\frac{1}{b+c}+\frac{1}{c+a}=\frac{13}{17}$.

The value of $\frac{a}{b+c}+\frac{b}{c+a}+\frac{c}{a+b}$ is…….

Problem 14.

Three avenues, of respective widths 15 m, 14 m and 13 m, converge on Red Triangle in the outskirt of Moscow. Traffic is regulated by three swinging gates hinged at the junction points of the three avenues. As shown in the diagram below, the gates at A and B close off one avenue while the gate at C is pushed aside to allow traffic between the other two avenues through the Red Triangle. Calculate the lengths, in m, of the three gates if each pair closes off one avenue exactly.

Problem 15.

In triangle ABC, $BC = AC$ and $BCA = 90^0$. D and E are points on AC and AB respectively such that $AD = AE$ and $2CD = BE$. Let P be the point of intersection of BD with the bisector of CAB. Determine PCB…….

Problem 16.

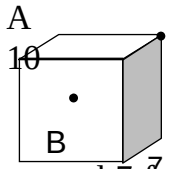
The side lengths, in cm, of a right triangle are relatively prime integers. The line joining its centroid and its incentre is perpendicular to one of the sides. The minimum perimeter, in cm, of such a triangle is…….

Problem 17.

In triangle ABC, $A = 40^0$ and $B = 60^0$. The bisector of A cuts BC at D, and F is the on AB such that $ADF = 30^0$. The measure, in degrees, of DFC is…….

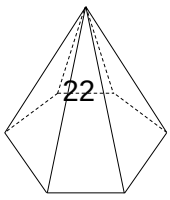
Problem 18.

10 cm A rectangular box is 7 cm 10 cm. Point A is a vertex, and point B is the center of the front face as shown. Find the number of centimeters in the <u>shortest</u> distance from A to B along the surface of the box.



Problem 19.

The pyramid shown has 7 vertices, 12 edges, and 7 faces (one of which is a hexagon). At least one of the edges on each of the faces is to be colored red. The least number of edges colored red will be:….



Problem 20.
A rug is in the shape of an equilateral triangle with sides of length 20 feet. The rug is entirely composed of 100 equilateral triangular patches with sides of length 2 feet. Of the smaller patches have one or more of their sides on the perimeter of the large rug the amount of is: …….

Problem 21.

An animal shelter consists of five cages in a row, labeled from left to right as shown in the diagram below. There is one animal in each cage.

Red Wolf	Silver Lion	Brown Fox	White Cow	Gray Horse

The five animals are indeed a wolf, a lion, a fox, a cow and a horse, and their colours are indeed red, silver, brown, white and gray. However, none of the labels matches any of the animals. Moreover, no animal is in or next to a cage whose label either matches its type or its colour. If the horse is not in the middle cage, the colour of the horse is…….

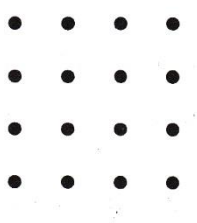
Problem 22.

Jo tells Kate that the product of three positive integers is 36. Jo also tells her what the sum of the three numbers is, but Kate still does not know what the three numbers are. The sum of the three numbers is…….

Problem 23. Squares are formed by the the grid lines in the diagram below is:

Problem 24.
The diagram below shows the street map of a city. If three police officers are to be positioned at street corners so that any point on any street can be seen by at least one officer, the letter codes of these street corners are…….

Problem 25.
You are given sixteen dots in a 4x4 array as shown
in the diagram below. You are trying to choose n of these points without any three forming the vertices of an isosceles triangle.
The largest possible value of *n* is…….



Problem 26.
The value of algeraic expression: $2-(-2)^{-2}$ is …….

Problem 27.
Ha did three works spending the same time without the rest. She began the first work at 13p.m and finished the second one at 14:40 p.m. The time of the third one is…….

Problem 28.

Let a, b, c be different numbers having one digit number. The greatest value of the sum of the roots (x-a)(x-b) + (x-b)(x-c)=0 is……..

Problem 29.

The sum of the 2 plus numbers equal miltiplied by 5 their differences. The ratio between the large number and the small number is…….

Problem 30.

Let 2 integers x and y, with x > y > 0 such that x + y + xy = 80. The value of x is……..

Self-reflection exercises

Problem 1: Analysis the polynomial below into the factors:

a) $x^7 + x^2 + 1$

b) $x(x + 4)(x + 6)(x + 10) + 128$

Problem 2: a. Prove $A = 1^3 + 2^3 + 3^3 + ...+ 100^3$ devides perfectly $B = 1 + 2 + 3 + ... + 100$.

b. Let numbers $A = \underbrace{11.....11}_{2m}$; $B = \underbrace{11.....11}_{m+1}$; $C = \underbrace{66.....66}_{m}$ CMR: A + B + C + 8 are perfect squares.

Problem 3: Let the parallelogram ABCD, straight line on A taking in turn cuts BD, BC, DC in the order of E, K, G. Prove:

a) $AE^2 = EK. EG$

b) $\frac{1}{AE} = \frac{1}{AK} + \frac{1}{AG}$

-------- The end -------

ĐỀ 13

I. AN OBJECTIVE TEST

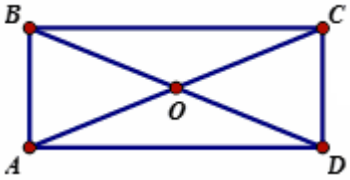
Question 1: Find the value of $E = (31x^2 – 21 + 4x^5 – 3x^3 – 4x^4) : (x^3 – x^2 + 7)$ with $x = -\frac{1}{2}$

Answer:

Question 2: Calculate $(x^3 – 3x^2 + 3x – 1) : (x^2 + 1 – 2x)$

Answer:

Question 3: In the left figure, AB = 8, BC = 15. Find the perimater of BOC .



Answer:

Question 4: What is the value of a + b if $–x^5 + x^4 – ax^3 – x^2 + x + b$ is divisible by $1 + x^3$?

Answer:

Question 5: Find the value of $A = (-75x^{17}y^{37}z^{43}) : (25z^{43}x^{17}y^{37})$ with $x = -\frac{123}{125}, y = -\frac{2015}{2016}$ and $z = \frac{-2016}{2016}$.

Answer:

Question 6: Given a right triangle ($\hat{A} = 90^0$) and the median line AM = 7, then BC = ?

Answer:

Question 7: Given a rectangle with the area of the rectangle is $70cm^2$ and its length is longer than its width by 3 cm. Find the perimeter of the rectangle.

Answer:

Question 8: Find the value of x such that $\frac{\frac{1}{x}+\frac{1}{x+1}}{\frac{1}{x}-\frac{1}{x+1}} = 3\ (x \neq 0; -1$

Answer:

Question 9: Suppose that $x^2 + y^2 = 80$ and $xy = 32$ (x,y < 0). Find the value of x + y.

Answer:

Question 10: Given a rhombus ABCD with BC = 35 and the ratio of AC to BD is 0.75. Calculate BD.

Answer:

Question 11: The minimum value of $P = 2x^2 + 3x - 5$

Answer:

Question 12: Given $A = \frac{1}{x+3}$; $B = \frac{x-2}{x^2+3x}$. Calculate B – A

Answer:

Question 13: Find the value of $\frac{5(xy)^8 - 4x^9y^8}{x^7y^8}$ with x = 5 and y = - 2015

Answer:

Question 14: Given a triangle with the sides are in the ratio of 5:13:12 and the perimeter of its is 160. What is the area of the triangle?

Answer:

Question 15: The area of a rectangle is 50. If its width is increasing to two times and its length is decreasing to four times. Find the area of the rectangle.

Answer:

Question 16: Given A = 2x(3x – 1) – 3x(x + 5) + 2x – 2. Find the value of x such that A reaches the minimum value.

Answer:

Question 17: Find the value of x such that $(x + 7)^3 + (x - 4)^3 + (2x + 3)^2 = 0$

Answer:

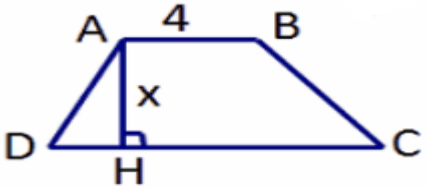
Question 18: Find the value of x such that $\frac{1}{x(x+1)} + \frac{1}{(x+1)(x+2)} + \frac{1}{x+2} = \frac{1}{7}$

Answer:

Question 19: Find the remainder of the division $(x^4 - 4 - 2x^2 + x) : (x^2 + 1)$

Answer:

Question 20: The trapezoid ABCD has the area 35. If the ratio of AB to DC is 2:5, what is the value of x?



Answer:

Question 21: Find the greatest value of x such that $\frac{2x-3}{x} = \frac{1}{x-2}\ (x \neq 0; 2)$

Answer:

Question 22: Given a rhombus ABCD with $\widehat{D} = 60^0$ and BD = 12. AP ⊥ DC and AQ ⊥ BC. Find the length of AP

Answer:

Question 23: A quadrilateral ABCD, the angles A, C, D, B are in the ratio of 3:2:5:2. What is the measure of the largest angle?

Answer:

Question 24: Given a rectangle ABCD, the height AH of the triangle ABD and DH = 3, HB = 4. What is the area of the rectangle ABCD?

Answer:

Question 25: Given H = $\frac{7}{4x^2-2x+1}$. Find the value of x such that H reaches the maximum value.

Answer:

Question 26: B = $\frac{2x^3-7x^2+8x-3}{x^2+11x-21}$. Find the integer value of x such that B is equal to 0.

Answer:

Question 27: The area of a rectangle is 84. If the width is unchanged and the length is decreasing to 4 times, then the new area of the rectangle?

Answer:

Question 28: Given an isosceles triangle ABC ($\hat{A} = 90^0$) and H is a point on the hypotenuse. From H, we draw two lines that are perpendicular to AB, AC at M, N respectively. What is the perimeter of the quadrilateral AMHN if AB = 8?

Answer:

Question 29: A quadrilateral ABCD with AD = AB, CD = CB, $\hat{A} = 73^0, \hat{C} = 59^0$. What is the measure of the angle at B?

Answer:

Question 30: Calculate A = $30^2 - 29^2 + 28^2 - 27^2 + \ldots + 2^2 - 1^2$

Answer:

II. SELF – REFLECTION EXCERCISES

Question 31: Given the expression:

$$P = \frac{2x^5 - x^4 - 2x + 1}{4x^2 - 1} + \frac{8x^2 - 4x + 2}{8x^3 + 1}$$

a. Simplify the expression P.

b. Find the values of x to P = 6.

Question 32:

a. Given $x^2 + x = 1$. Calculate the value of the expression $Q = x^6 + 2x^5 + 2x^4 + 2x^3 + 2x^2 + 2x + 1$.

b. Fractorise the following polynominal: $x^2 + 6xy + 5y^2 - 5y - x$.

Question 33:

a. Given trapezoid ABCD is perpendicular at A and D. Known CD = 2AB = 2AD and BC = $a\sqrt{2}$. Calculate the area of the trapezoid ABCD, in terms of *a*.

b. Find the minimum of the expression:

$A = (x - 1)(2x-1)(2x^2 - 3x - 1) + 2017$

ĐỀ 14

Ex 1..If the quadrilateral ABCD exists $\frac{A}{6}=\frac{B}{5}=\frac{C}{4}=\frac{D}{3}$ by: C =?

Answer

Ex2.Compact expression: $(3x+7)(3x-7)+(4x-1)^2-25(x+1)^2-25$ We are:

Answer

Ex3.A square has a circumference of 12cm. The diagonal of the square is:

Answer

Ex 4. Polynomial analysis $27x^3 + y^6$ into the kernel is:

Answer

Ex 5. For square ABCD, M is the point on the diagonal of AC. Let E, F denote the projection of M on AB, AD. What is the AEMF quadrilateral:

Answer

Ex 6. The common form of the three subcategories: $\frac{-5}{6x^{2013}y^5};\frac{-2013}{9x^2y^{2014}};\frac{-2014}{15xy}$ was:

Answer

Ex 7, Earn $x^2(5x^3 - x - \frac{1}{2})$ by:

Answer

Ex 8. Let x - y = 4; x.y = 3. The value of the expression $(x + y)^2$ is:

Answer

Ex 9. The value of the expression $x^2 - y^2 - 2y - 1$ at x = 93, y = 6 is:

Answer

Ex 10. The division $((x^2 - 5x + 6)) : (x - 2)$ results in:

Answer

Ex 11. The rectangle has a length that is 3 times the width of the rectangle:

Answer

Ex 12. For quadrilateral ABCD. Let M, N, P, Q be the midpoints of AB, BC, CD, DA. What is the MNPQ Quadrangle? Why ?

Answer

Ex13. The polynomial analysis follows the factorial result: $a(x^2 + 1) – x(a^2 + 1)$.

E

Answer

$$A = (\frac{2+x}{2-x} - \frac{4x^2}{x^2-4} - \frac{2-x}{2+x}) : (\frac{x^2-3x}{2x^2-x^3})$$

Answer

Ex 15.Find a polynomial $x^3 + 12x + a$ divisor for the common $x + 2$:

Answer

Ex 16. The result of the subtraction is $\frac{7x^2-14x+7}{9x^4-9}$

Answer

Ex 17. Polynomial M in equality $\frac{x^2-2}{x+1} = \frac{M}{2x+2}$

Answer

Ex 18 . For $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=0(x,y,z\neq 0)$. Calculated $\frac{yz}{x^2}+\frac{xz}{y^2}+\frac{xy}{z^2}=$

Answer

Ex 19 Find the smallest value of the expression $A = x^2 - 2xy + 6y^2 – 12x + 2y + 45$

Answer

Ex 20 For square ABCD. Let E be a point on the BC edge. Through E Axillers Ax perpendicular to AE. Ax cut the CD at F. AI midpoint of triangular AEF cut CD at K . Straight through E parallel with AB cutting AI in G What is the EGKF quadrilateral?

Answer

Ex 21. Compact expression $A = \frac{1}{2.5} + \frac{1}{5.8} + \frac{1}{8.11} + \ldots\ldots\ldots + \frac{1}{(3n+2)(3n+5)}$:

Answer

Ex 22. The integer values of x so that the expression has integer value. $\frac{7}{x^2 - x + 1}$

Answer

Ex 23 . Find three consecutive natural numbers that know that if the sum of three of the two numbers is 242.

Answer

Ex 24. Let a> b> 0 compare two numbers x, y with: $x = \frac{1+a}{1+a+a^2}$; $y = \frac{1+b}{1+b+b^2}$

Answer

Ex 25. On the AB side in the square ABCD the triangle AFB is balanced, the top F has a bottom angle of 15^0. What is the triangle triangle CFD?

Answer

Ex 26. Correct the squares of two odd natural numbers consecutively by 40 when the two numbers are

Answer

Ex 27.For trapezium ABCD (AD // BC) there are two diagonals, intersect at O. Calculating the triangle area ABO knows the area of the triangle BOC is 169 cm^2 and the area of triangle AOD is 196 cm^2.

Answer

Ex 28. Given two numbers x, y satisfy the condition 3x + y = 1.
Find the minimum value of the expression $A = 3x^2 + y^2$

Answer

Ex 29. Find the positive integer n so that $n^5 + 1$ is divisible by $n^3 + 1$..

Answer

Ex 30. For the triangle ABC, the lines AK and BD intersect at G. Draw the HE and HF midpoints of AC and BC. Then BG = ... HE and AG = ... HF.

Answer

ESSAY

Lesson 1

Lesson 1 Give the expression

$$A = \left(\frac{x^2}{x^3-4x}+\frac{6}{6-3x}+\frac{1}{x+2}\right):\left(x-2+\frac{10-x^2}{x+2}\right)$$

a. Find set A: shorten A?

b. Find the value of x when A = 2

For the value of x then A <0

c. The integer value of x to A has the integer value

Lesson 2

Take the square at A and point H on BC. Let E, F denote the symmetry of H through AB and AC respectively

a. CMR: E, A, H straight

b. CMR: BEFC is trapezoid, can find the position of H to BEFC become a square trapezoid, rectangular shape, not rectangular.

c. Determine the position of H to the EHF triangle with the largest area?

Lesson 3

Prove that $x^5 – x + 2$ is not a prime number for every x

ĐỀ 15

I. AN OBJECTIVE TEST

Question 1: Fractorise the following polynominals

$A = 2x^2 + 3x – 27$

Answer:

Question 2: The degree measures of the angles of a triangle are in the ratio 4 : 5 : 9. What is the degree measure of the smallest angle of the triangle?

Answer:

Question 3: Find the positive value of x such that $x(x + 2) – 3(2 + x) = 0$

Answer:

Question 4: Find the condition of x so that the value of the following expression is determined.

$$A = \left(\frac{2+x}{2-x}-\frac{4x^2}{x^2-4}-\frac{2-x}{2+x}\right):\left(\frac{x^2-3x}{2x^2-x^3}\right)$$

Answer:

Question 5: Fractorise the following polynominals

$A = x^2 – 2xy + y^2 + 4x – 4y – 5$

Answer:

Question 6: Half of the perimeter of a rectangular school yard is 0.24km. The width is of the length. Find the area of the yard in square meters?

Answer:

Question 7: Given $A = 4n^2 + 11n + 4$, $B = 4n – 1$. Find the least value of n such that A is divisible by B.

Answer:

Question 8: Given a rectangle with the area is 54 and its width is shorter than its length by 3. Find the perimeter of the rectangle.

Answer:

Question 9: Given B = $(-128x^{12}y^9z^{23}) : (4x^4y^3z^7)^3$. Find the value of B with $x = -\frac{2017}{57842}; y = \frac{2018}{-37281}; z = -\frac{128}{64}$

Answer:

Question 10: A quadrilateral ABCD, $AC \perp BD$ and AC = 8cm, BD = 10cm. The points M, N, P, Q are the midpoint of AB, BC, CD, AD, respectively. What is the area of MNPQ, in cm^2?

Answer:

Question 11: Given square with the length of one side is 8 and an isosceles triangle with the length of its base is 12. If the area of the square is equal to the area of the isosceles triangle, then what is the length of the height of the isosceles triangle?

Answer:

Question 12: Given an isosceles trapezoid ABCD (AB//CD), AC is perpendicular to BD and the length of the height of the ABCD is 7cm. What is the area of the isosceles trapezoid ABCD, in cm^2?

Answer:

Question 13: Find the value of *n* such that A = $n^3 - 2n^2 + 2n - 4$ is a prime number. Find the value of *n*.

Answer:

Question 14: Find the remainder of the division $(x^3 - 12 + 5x - 3x^2) : (x - 3)$.

Answer:

Question 15: Given a rectangle and the area of it is 32 cm^2. Find the new area when the length is decreasing to 2 times and the width is unchanged.

Answer:

Question 16: Given A = 2x(3x – 1) – 3x(x + 5) + 2x – 2. Find the value of x such that A reaches the minimum value.

Answer:

Question 17: Given a right triangle ABC ($\hat{A} = 90^0, AB < AC$) and M, N, P are the midpoint of AC, AB, BC respectively. Then what is the shape of AMPN?

Answer:

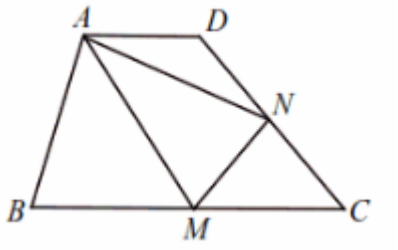
Question 18: Three children: Mark, Tom, Andy ate 23 cookies altogether. Tom ate more cookies than Andy, Mark. What is the smallest possible number of cookies that Tom ate?

Answer:

Question 19: In a rhombus of area 60 cm^2, the ratio between two diagonals is 2 : 5. The perimeter of the rhombus is $\sqrt{m}\,cm$. What is the value of m?

Answer:

Question 20: In the trapezoid ABCD, the points M and N are the midpoints of the sides BC and CD, respectively.



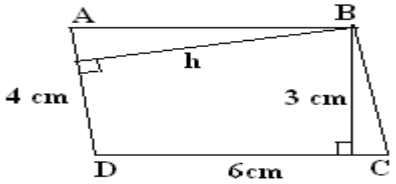
The area of ABCD is 32cm^2 and the length of AD is $\frac{1}{3}$ of the length of BC. What is the area of the triangle AMN, in cm^2?

Answer:

Question 21: The perimeter of a rectangle is 34 cm. If its length is increasing 5 cm and its width is increasing 3 cm then the area is increasing 80 cm^2. Find the original area of the rectangle, in cm^2.

Answer:

Question 22: The two sides of the parallelogram ABCD are 6cm and 4cm. The height corresponding to the base CD is 3cm, as shown in figure. Find the height corresponding to the base AD.



Answer:

Question 23: Find the value of m ($m \in Z$) such that $35m^2 + 21m$ is not divisible by $5m + 3$

Answer:

Question 24: Given M = x(6x + 19) and N = 2x + 7. Find the least value of x such that M is divisible by N.

Answer:

Question 25: Given that $a^2 + b^2 = 1$; $c^2 + d^2 = 1$ and $ac + bd = 0$. Find $ab + cd$.

Answer:

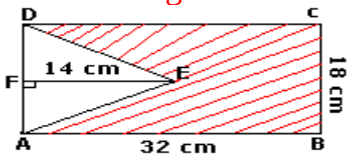
Question 26: Given a rectangular land such that its length is twice as its width. If the width is decreased by 5m and the length is increased by 12m then the area is increased by 10 square meters. Find the width of this land.

Answer:

Question 27: The triangle ABC has AB = 24cm. If D is on the line segment AC such that $\widehat{ABC} = \widehat{BDC}$ and AD = 7cm, DC = 9cm. Calculate the length of the side BD.

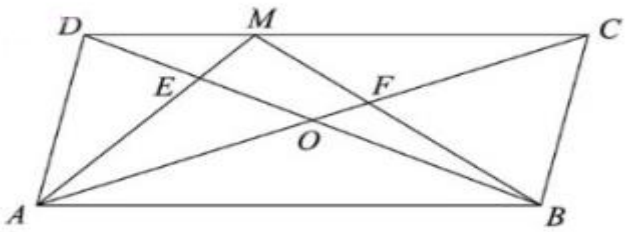
Answer:

Question 28: ABCD is a rectangle with dimensions 32 m by 18 m. ADE is a triangle such that EF ⊥ AD and EF = 14 cm. Calculate the area of the shaded region.



Answer:

Question 29: The diagram shows a parallelogram ABCD with area S. The intersection point of the diagonals of the parallelogram is O. The point M is marked on DC. The intersection point of AM and BD is E and the intersection point of AC and BM is F. The sum of the areas of the triangles AED and BFC is $\frac{1}{3}S$. What is the area of the quadrilateral EOFM, in terms of S?



Answer:

Question 30: Find the minimum value of the following expression:

$$A = x^4 + 2x^3 + 3x^2 + 2x + 1$$

Answer:

II. SELF – REFLECTION EXCERCISES

Question 31: Given the expression:

$$A = \left(\frac{x+1}{x-1} - \frac{x-1}{x+1} - \frac{x^2-4x-1}{1-x^2}\right).\frac{x+2014}{x+1} \text{ (with } x \neq 0; x \neq 1; x \neq -1)$$

a. Simplify the expression A.

b. Find the integral value of x in order to A has the integral value.

Question 32:

a. Find three positive numbers a, b, c satisfied $\frac{a^2+7}{4} = \frac{b^2+6}{5} = \frac{c^2+3}{6}$ and $a^2 + 2c^2 = 3b^2 + 19$

b. Find the minimum value of the following expression:

$$A = x^4 + 2x^3 + 3x^2 + 2x + 1$$

Question 33:

a. Given the any point M in the interior of the square ABCD have the side length that equals 1. Prove that:

$$MA^2 + MB^2 + MC^2 + MD^2 \geq 2$$

b. Fractorise the following polynominals

$$x^4 + 2018x^2 + 2017x + 2018$$

ĐỀ 16

Grade: 8

Time: 120’

I.Objective test. (150 points)

Question 1: Simplify this expression

$(x+2)^2 – x^2 + 3x – 7 = ...$

Question 2: Calculate the value of P = 2y +x if x +y = 15 and x – y = 3. P = ...

Question 3: A train leaves New York at 11: 12, going 50 km/h, bound for Philadelphia, **which is 90 km away.** Tt will arrive at ...pm.

Question 4: Calculate the value of $T = x^2 – xy + 2014x – 2014y + 2$ if x = - 2014 and y = 2013. T = ...

Question 5: Let ABCD be a trapezoid with AB // CD, $\hat{A} = D = 90^o$ and AB = AD = CD/2. The measure of the angle BCD is _____

Question 6: Let ABCD.A'B'C'D' be a cube with AC' = √3cm. The total surface area of this cube is _____

Question 7: Bottle A contains 15% syrup. Bottle B contains 40% syrup. When these 2 bottles of syrup are mixed, the syrup content is 30% and the total volume is 600ml. How much syrup is in the bottle A at first?
The bottle A at first is _____

Question 8: Let ABC be a triangle with AB = 3cm, AC = 7cm. The internal bisector of the angle BAC intersects BC at D. The line passing through D and parallel to AC cuts AB at E. The measure of DEis _____

Question 9: If x - y - z = 0 and x + 2y - 10z = 0, $z \neq 0$ then the value of

$$B = \frac{2x^2 + 4xy}{y^2 + z^2}$$

is _____

Question 10: Given the equation (x - m)(m - 1) + (x - 1)(m + 1) = -2m. Find all values of m such that this equation has no solution.
All values of m are _____

Question 11: Let ABCD be a trapezoid with bases AB, CD and O be the intersection of AC and BD. If the areas of triangle OAB, triangle OCD are $16cm^2$, $40cm^2$ respectively and M is the midpoint of BD, then the area of the triangle AMD is _____cm^2.

Question 12: Given the equation:

$$\frac{3}{x-3} - \frac{5}{x-5} = \frac{4}{x-4} - \frac{6}{x-6}$$

The average (arithmetic mean) of all roots of this equation is_____ Write your answer by fraction in simplest form

Question 13: The Ford car left Hanoi for Nghe An and the Audi car left Nghe An for Ha Noi at the same time. The ratio of their speeds (the Ford car to the Audi car) was 4 : 3. The Ford decreased its speed by 25% and the Audi car increased its speed by 25% after they had passed each other.
When the Ford car reached Nghe An, the Audi car was still 20km away from Hanoi. The distance between Hanoi and Nghe An is_____km.

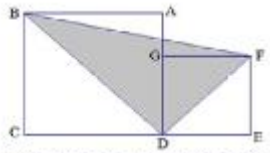
Question 14: Suppose that the polynomial $f(x) = x^5 - x^4 - 4x^3 + 2x^2 + 4x + 1$ has 5 solutions x_1; x_2; x_3; x_4; x_5. The other polynomial $k(x) = x^2 - 4$. Find the value of $P = k(x_1) \times k(x_2) \times k(x_3) \times k(x_4) \times k(x_5)$
The value of $P = k(x_1) \times k(x_2) \times k(x_3) \times k(x_4) \times k(x_5)$ is _____

Question 15: The smallest value of $A = \frac{x-y}{x^4 + y^4 + 6}$ is _____ Write your answer by decimal in simplest form.

Question 16: Assume that two numbers x and y satisfy: 2x + y = 6. The minimum value of expression $A = 4x^2 + y^2$ is _____

Question 17: ABCD is a square of side length 5cm. DEFG is a square of side length 3cm such that E lies on the extension of CD and G lies on AD.

The area, in cm^2, of triangle BDF is _____



Question 18: In the xy - plane, given three points A(-1; 2); B(-3; -1); D(6; 2). If ABCD is a parallelogram then C = _____

Question 19: If a and b are two non-zero distinct numbers such that $3a^2 + 4b^2 = 7ab$ then the value of the expression $E = \frac{a+2b}{3a-b}$ is _____

Question 20: Given the rectangle whose perimeter is 24cm. If its length is decreased by 1cm and its width is increased by 1cm, then the area of the original rectanle is increased by $3cm^2$. The area of the original rectangle is _____

Question 21: The triangle ABC has AB = 5cm, AC = 8cm, $\hat{A}$ = 60o and the internal bisector AD (D ∈ BC). The length of BD is _____cm.

Question 22: If all roots of the polynomial $P(x) = x^2 + 5x - 1$ are also roots of the polynomial $Q(x) = x^3 + ax^2 + bx + c$ then the value of a + b + 6c is _____

Question 23: Let ABC be an isoceles triangle (AB = AC) and its area is $501cm^2$. BD is the internal bisector of the angle ABC (D ∈ AC), E is a point on the opposite ray of CA such that CE = CB. I is a point on BC such that CI = 1/2 BI. The line EI meets AB at K, BD meets KC at H. The area of the triangle AHC is _____

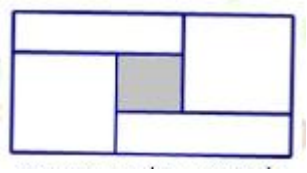
Question 24: The number of roots of the equation $lx^3 – 8l = 16 - 2x^3$ is _____

Question 25: Find the greatest interger number x such that the value of (3x - 2)/4 is greater than the value of (5x + 3)/5.
Answer: The greatest integer number x is _____

Question 26: If x, y, z satisfy these equations $yz = 3/2 - x^2/2$; $zx = 1/2 - y^2/2$ and $xy = 5/2 - z^2/2$ then the value of lx + y + zl is _____

Question 27: Find the remainder when (x + 2)(x + 3)(x + 4)(x + 5) + 2017 is divided by $x^2 + 7x + 11$.
Answer: _____

Question 28: A rectangle has a length of 60cm and a width of 30cm. It is cut into 2 indentical squares, 2 identical rectangles and a shaded small square. Find the area of the shaded square.
The area of the shaded square is _____



Question 29: The number of ordered pairs (x; y) where x, y ∈ N* such that $x^2y^2 - 2(x + y)$ is perfect square is _____

Question 30: Let ABCD be the square with the side length 56cm. If E and F lie on CD, C respectively such that CF = 14cm and EAF = 45o then CE = _____ cm.

II.Self-reflection exercises(150 points)

Question31 (100 points)

a) Prove that: $x^2 - x + \frac{3}{4} > 0$ for every value of x

b) Find $x \in Z$ to $2x^2 + x - 18$divisible by $x - 3$

Question32 (50 points)

Let abc= 1. Prove that: $\frac{a}{ab+a+1} + \frac{b}{bc+b+1} + \frac{c}{ac+c+1} = 1$

Question33 (150 points)

Let triangle ABC square at A (AB < AC). Let I be the midpoint of the BCedge. Through Idraw IM perpendicular to ABat M and IN perpendicular to AC at N.

a) Prove that the rectangle AMIN is rectangular.

b) Let D be the point of symmetry of I through N. Prove the ADCI quadrilateral is a diamond.

c) Straight lineBN cut DC in K. Prove that $\frac{DK}{DC} = \frac{1}{3}$

ĐỀ 17

A. MULTIPLE-CHOICE QUESTIONS

Question 1:

If a + b = 3, $a^2 + b^2 = 7$ then $a^3 + b^3$ = ...

Answer: .....

Question 2:

Find the value of k such that $x^3 + kx^2 + (4 - k)x - 35$ is divisible by x - 7.

Answer: k = ...

Question 3:

An isosceles trapezoid ABCD is shown in the following diagram. What is the area of the trapezoid ABCD?

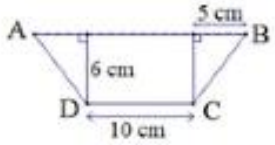


Figure is not drawn to scale.

Answer: The area of the trapezoid is .....cm^2.

Question 4:

Find the value of x such that:

$$x-\frac{1-\frac{3}{2}x}{4}=\frac{2-\frac{1}{4}x}{5}+2$$

Answer: x = ...

Write your answer by fraction in simplest form

Question 5:

Let ABCD be a trapezoid with AB // CD, Â = D = 90^o and AB = AD = CD/2.

Find the measure of the angle BCD.

Answer: BCD = ...^{o}.

Question 6:

Let ABCD.A'B'C'D' be a cube with AC' = √3cm. Find the total surface area of this cube.

Answer: .....cm^2.

Question 7:

A number of students from Fibonacci Middle School are talking part in a community service project.The ratio of 8th-graders to 6th-graders is 5 : 3, and the ratio of 8th-graders to 7th-graders is 8 : 5. What is the smallest number of students that could be participating in the project?

Answer:……

Question 8:

Let ABC be a triangle with AB = 3cm, AC = 7cm. The internal bisector of the angle BAC intersects BC at D. The line passing through D and parallel to AC cuts AB at E. Find the measure of DE.

Answer: DE = ...cm.

Write your answer by fraction in simplest form

Question 9:

If x - y - z = 0 and x + 2y - 10z = 0, z ≠ 0 then the value of $B=\frac{2x^2+4xy}{y^2+z^2}$ is?

Answer:……..

Question 10:

Given the equation (x - m)(m - 1) + (x - 1)(m + 1) = -2m.

Find all values of m such that this equation has no solution.

Answer: m = ...

Question 11:

Let ABCD be a trapezoid with bases AB, CD and O be the intersection of AC and BD. If the areas of triangle OAB, triangle OCD are 16cm^2, 40cm^{2}respectively and M is the midpoint of BD, then the area of the triangle AMD is?

Answer: .....cm^2.

Question 12:

Given the equation: $\frac{3}{x-3}-\frac{5}{x-5}=\frac{4}{x-4}-\frac{6}{x-6}$

The average (arithmetic mean) of all roots of this equation is .....

Write your answer by decimal in simplest form

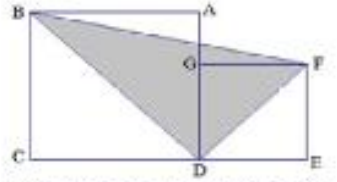
Answer:……..

Question 13:

There are four more girls than boys in Mr.Raub's class of 28 students. What is the ratio of number of girls to the number of boys in her class?
Answer:……

Question 14:
The first AMC 8 was given in 1985 and it has been given annually since that time. Samantha turned 12 years old the year that she took the seventh AMC 8. In what year was she born?
Answer:…….

Question 15:
The smallest value of $A=\frac{x-y}{x^4+y^4+6}$ is?
Write your answer by decimal in simplest form
Answer:……
Question 16:
Assume that two numbers x and y satisfy: 2x + y = 6.
Find the minimum value of expression $A = 4x^2 + y^2$
Answer:…….
Question 17:
ABCD is a square of side length 5cm. DEFG is a square of side length 3cm such that E lies on the extension of CD and G lies on AD. Find the area, in cm^2, of triangle BDF.



Answer:…….
Question 18:
If a and b are two non-zero distinct numbers such that $3a^2 + 4b^2 = 7ab$ then the value of the expression $E=\frac{a+2b}{3a-b}$ is .....
Answer:…….
Question 19:
The triangle ABC has AB = 5cm, AC = 8cm, $\hat{A} = 60^o$ and the internal bisector AD (D ∈ BC). The length of BD is .....cm.
Answer:…….
Question 20:
The number of roots of the equation $Ix^3 - 8I = 16 - 2x^3$ is .....
Answer:……
Question 21:
Find the greatest interger number x such that the value of (3x - 2)/4 is greater than the value of (5x + 3)/5.
Answer: The greatest integer number x is .....
Question 22:
How many sides does a polygon have if the number of its diagonals is as triple as the number of its sides?
Answer: The number of its sides is .....
Question 23:
Find the positive value of k such that x = 2 is a root of the following equation:

$x^2 - kx + k^2 - 4 = 0$
Answer: k = ...
Question 24:
Find the remainder when :
$(x + 2)(x + 3)(x + 4)(x + 5) + 2017$ is divided by $x^2 + 7x + 11$.
Answer: The remainder is .....
Question 25:
Let ABCD be the square with the side length 56cm. If E and F lie on CD, C respectively such that CF = 14cm and EAF = 45^o then CE = ...cm.
Answer:……
Question 26:
Six rectangles each with a common base width of 2 have lengths of:
1,4,9,16,25 and 36. What is the sum of the areas of the six rectangles?
Answer:……..
Question 27:
What is the value of 4 . (-1+2-3+4-5+6-7+…+1000)?
Answer: …….
Question 28:
What is the ratio of the least common multiple of 180 and 594 to the greatest common factor of 180 and 594?
Answer:…….
Question 29:
The sum of six consecutive positive integers is 2013. What is the largest of these six integer?
Answer:……
Question 30:
Rectangle ABCD and right triangle DCE have the same area. They are joined to form a trapezoid, as shown. What is DE?
Answer:……
B. SESSION PART
Question 31: Minh had a week to read a book for a school assignment. She read an average of 36 pages per day for the first three days and an average of 44 pages per day for the next three days. She then finished the book by reading 10 pages on the last day. How pages were in the book?
Question 32: In △ABC, D is a point on side AC such that BD = DC and $\overset{\frown}{BCD}$ measures 70°. What is the degree measure of $\overset{\frown}{ADB}$?
Question 33: A 2-digit number is such that the pruduct of the digits plus the sum of the digits is equal to the number. What is the units digit of the number?

ĐỀ 18

Ex 1: Simplify :$x^{n-1}(x+y)-y(x^{n-1}+ y^{n-1})$
A. $x^n – y^n$ B. $(x+y)(x^n - y^n)$ C. $x^{n-1}+ y^{n-1}$ D. x+y
Answer:

Ex2:If$x^3 + 2x^2 + kx + 2$ is divisible by x - 1 then k = …
A. -5 B. -10 C.-15 D. 5
Answer:

Ex3:Ifx = 3y then $\frac{\frac{1}{x}+\frac{1}{y}}{\frac{1}{x}-\frac{1}{y}}$

A. -2 B. 2 C. 4 D. -4

Answer:

Ex 4:The number of the solutions of $x^4 + x^3 + 2x^2 + x + 1 = 0$ is .....

A. 1 B. 0 C. 2 D. 4

Answer:

Ex5: If $a + b = 3$, $a^2 + b^2 = 7$ then $a^3 + b^3$= .....

A. 18 B. -18 C. -42 D. 42

Answer:

Ex6: Find the value of k such that $x^3 + kx^2 + (4 - k)x - 35$ is divisible by $x - 7$.

A. -8 B. 8 C. 4 D. -4

Answer:

Ex 7: Find the remainder when $(x + 2)(x + 3)(x + 4)(x + 5) + 2017$ is divided by $x^2 + 7x + 11$.

Answer:

Ex8: If $a^2 + ab = 90$ and $a+b = 30$ then b-a =….

Answer:

Ex9:Given a square with the length of one side is 8 cm and a isosceles triangle with the length of its base is 12 cm. If the area of the square is equal to the area of the isosceles triangle then what is the length of the height of the isosceles triangle, in cm?

A. 23/3B. 32/3C. 16/3D. 8/3

Answer:

Ex10: The smallest value of $A=\frac{x-y}{x^4+y^4+6}$ is ..... Write your answer by decimal in simplest form

Answer:

Ex11: Assume that two numbers x and y satisfy: $2x + y = 6$. Find the minimum value of expression $A = 4x^2 + y^2$

A. -18 B. 36 C. 18 D. 24

Answer:

Ex 12: If all roots of the polynomial $P(x) = x^2 + 5x - 1$ are also roots of the polynomial $Q(x) = x^3 + ax^2 + bx + c$ then the value of $a + b + 6c$ is .....

A. -4 B. 8 C. 4 D. -8

Answer:

Ex 13: The number of ordered pairs (x; y) where $x, y \in N^*$ such that $x^2y^2 - 2(x + y)$ is perfect square is .....

Answer:

Ex 14: Find the value of x such that: $x - \frac{1-\frac{3}{2}x}{4} = \frac{2-\frac{1}{4}x}{5} + 2$

Answer:

Ex 15: Solve the equation: $|x - 3| = 9 - 2x$

A.S={-6} B.S={6}C.S={4; 6} D.S={4}

The average (arithmetic mean) of all roots of this equation is ..... Write your answer by fraction in simplest form

Answer:

Ex16: The residue of division $x^2 - 4x + 5 = 0$ for $x - 3$ is r = ...

Answer:

Ex17:In the Oxy - plane, given three points A(-1; 2); B(-3; -1); D(6; 2). If ABCD is a parallelogram then C = ...

A. (-4; 1) B. (4; -1)

C. (-4; 1) D. (-4; -1)

Answer:

Ex18:Given trapezoid ABCD (AB// CD) with $\hat{A} - \hat{D} = 20^o$, $\hat{B} = 2\hat{C}$. Calculate the angles of trapezoid.

Answer:

Ex19: Two diagonals of a rhombus equal 8cm and 10cm. Which of the following values matches the side of the rhombus.

A. 6cm B. $\sqrt{41}$ cm C. $\sqrt{164}$ cm D.9cm

Answer:

Ex20: Calculate the surface area of a right prism whole base is a right triangle, with sizes given in figure is 3cm, 4cm, 9cm.

Answer:

Ex21:Find the area of a rhrombus whose side equals 6cm and one of its angles measure 60^o

Answer:

Ex22: Fill in the banks of the following sentences.

It is given that the sum of the angles of a n- sided polygon is $A_1 + A_2 + ... + A_n = (n-2)180^\circ$. So the sum of the angles of a 7- sided polygon is….

Answer:

Ex23:This year, Mom's age is triple Phuowng's. To Phuong calculation, in 13 years, Mon's age is only double Phuong's. How old is Phuong this year?

Answer:

Ex24: A regular square pyramid has the length of the lateral side equal to 25cm, the base being a square ABCD with side equal to 30cm. Calculate the surface area of the pyramid.

Answer:

Ex25: Given a rhombus and a square with the same perimeter. Which figure has larger area?

Answer:

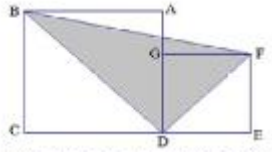
Ex26: Let ABCD.A'B'C'D' be a cube with AC' = $\sqrt{3}$ cm. Find the total surface area of this cube.

Answer:

Ex27: Pyramid S.ABCD has four faces that are equal equilateral triangles. H is the center of the circumscribed circle about the equilateral triangle ABC, the radius of the circle HC=R = $\sqrt{3}$ (cm). Given AB= R$\sqrt{3}$ (cm), calculate the lateral area of the pyramid.

Answer:

Ex28: ABCD is a square of side length 5cm. DEFG is a square of side length 3cm such that E lies on the extension of CD and G lies on AD. Find the area, in cm2, of triangle BDF.



A. 25 B. 15 C. 20 D. 17

Answer:

Ex29: From a square piece of tole has side a+b, a mechanic cut off a square piece with side a- b (given a> b). How much is the area of the rest figure? Does this area depend on the cutting position?

Answer:

Ex30: Given the equation (x - m)(2m - 1) + (x - 1)(2m + 1) = -2m. Find all values of m such that this equation has no solution.

Answer:

Ex31: a) Given expression $\frac{xP}{x+P}-\frac{yP}{y-P}$. Substitute P with $P=\frac{xy}{x-y}$ in the given expression then simplify it.

b) Given expression $\frac{P^2Q^2}{P^2-Q^2}$. Substitute P with $P=\frac{2xy}{x^2-y^2}$ and $Q=\frac{2xy}{x^2+y^2}$ in the given expression then simplify it.

Ex32:Given triangle ABC with D a point between B and C. Through D draw lines parallel to AB and AC, they intersect AC and AB respectively at E and F.

a) What figure is quadrilateral AEDF?
b) What is the position of D on BC for AEDF to be a square?
c) If ABC is right at A, then what figure is quadrilateral AEDF? What is the position of D on BC for AEDF to be a square?

Ex33:Ms. An deposited x thousand dong to saving fund with montly interest rate of a % compounded montly (a is given in advence)

a) Write expression representing

+) The interest of the first month

+) The amount of money (both principal and interest) at the end of the month.

b) Let the interest rate be 1.2% and the total interest of the first two months be 48.288 thousand dong, how much money did Ms. An deposit?

Solusion

ĐỀ 19

I.Objective test. (150 points)

Question 1: If $a + b = 3$, $a^2 + b^2 = 7$ then $a^3 + b^3 =$ _____

Question 2: Find the value of k such that $x^3 + kx^2 + (4 - k)x - 35$ is divisible by $x - 7$.
The value of k is_____

Question 3: An isosceles trapezoid ABCD is shown in the following diagram. What is the area of the trapezoid ABCD?

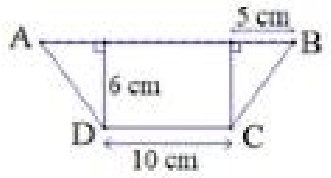


Figure is not drawn to scale. The area of the trapezoid ABCD is _____

Question 4: Find the value of x such that:

$$x-\frac{1-\frac{3}{2}x}{4}=\frac{2-\frac{1}{4}x}{5}+2$$

The value of x is _____

Question 5: Let ABCD be a trapezoid with AB // CD, $\hat{A} = D = 90^o$ and AB = AD = CD/2. The measure of the angle BCD is _____

Question 6: Let ABCD.A'B'C'D' be a cube with $AC' = \sqrt{3}$cm. The total surface area of this cube is _____

Question 7: Bottle A contains 15% syrup. Bottle B contains 40% syrup. When these 2 bottles of syrup are mixed, the syrup content is 30% and the total volume is 600ml. How much syrup is in the bottle A at first?
The bottle A at first is _____

Question 8: Let ABC be a triangle with AB = 3cm, AC = 7cm. The internal bisector of the angle BAC intersects BC at D. The line passing through D and parallel to AC cuts AB at E. The measure of DE is _____

Question 9: If $x - y - z = 0$ and $x + 2y - 10z = 0$, $z \neq 0$ then the value of

$$B=\frac{2x^2+4xy}{y^2+z^2}$$

is _____

Question 10: Given the equation $(x - m)(m - 1) + (x - 1)(m + 1) = -2m$. Find all values of m such that this equation has no solution.
All values of m are _____

Question 11: Let ABCD be a trapezoid with bases AB, CD and O be the intersection of AC and BD. If the areas of triangle OAB, triangle OCD are $16cm^2$, $40cm^2$ respectively and M is the midpoint of BD, then the area of the triangle AMD is _____cm^2.

Question 12: Given the equation:

$$\frac{3}{x-3}-\frac{5}{x-5}=\frac{4}{x-4}-\frac{6}{x-6}$$

The average (arithmetic mean) of all roots of this equation is_____ Write your answer by fraction in simplest form

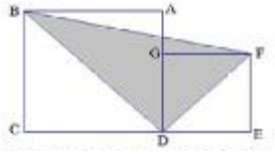
Question 13: The Ford car left Hanoi for Nghe An and the Audi car left Nghe An for Ha Noi at the same time. The ratio of their speeds (the Ford car to the Audi car) was 4 : 3. The Ford decreased its speed by 25% and the Audi car increased its speed by 25% after they had passed each other.
When the Ford car reached Nghe An, the Audi car was still 20km away from Hanoi. The distance between Hanoi and Nghe An is_____km.

Question 14: Suppose that the polynomial $f(x) = x^5 - x^4 - 4x^3 + 2x^2 + 4x + 1$ has 5 solutions x_1; x_2; x_3; x_4; x_5. The other polynomial $k(x) = x^2 - 4$. Find the value of $P = k(x_1) \times k(x_2) \times k(x_3) \times k(x_4) \times k(x_5)$
The value of $P = k(x_1) \times k(x_2) \times k(x_3) \times k(x_4) \times k(x_5)$ is _____

Question 15: The smallest value of $A=\frac{x-y}{x^4+y^4+6}$ is _____ Write your answer by decimal in simplest form.

Question 16: Assume that two numbers x and y satisfy: $2x + y = 6$. The minimum value of expression $A = 4x^2 + y^2$ is _____

Question 17: ABCD is a square of side length 5cm. DEFG is a square of side length 3cm such that E lies on the extension of CD and G lies on AD.
The area, in cm^2, of triangle BDF is _____



Question 18: In the xy - plane, given three points A(-1; 2); B(-3; -1); D(6; 2). If ABCD is a parallelogram then C = _____
Question 19: If a and b are two non-zero distinct numbers such that $3a^2 + 4b^2 = 7ab$ then the value of the expression $E=\frac{a+2b}{3a-b}$ is _____

Question 20: Given the rectangle whose perimeter is 24cm. If its length is decreased by 1cm and its width is increased by 1cm, then the area of the original rectanle is increased by $3cm^2$. The area of the original rectangle is _____

Question 21: The triangle ABC has AB = 5cm, AC = 8cm, $\hat{A} = 60^o$ and the internal bisector AD ($D \in BC$). The length of BD is _____cm.

Question 22: If all roots of the polynomial $P(x) = x^2 + 5x - 1$ are also roots of the polynomial $Q(x) = x^3 + ax^2 + bx + c$ then the value of $a + b + 6c$ is _____

Question 23: Let ABC be an isoceles triangle (AB = AC) and its area is $501cm^2$. BD is the internal bisector of the angle ABC ($D \in AC$), E is a point on the opposite ray of CA such that CE = CB. I is a point on BC such that CI = 1/2 BI. The line EI meets AB at K, BD meets KC at H. The area of the triangle AHC is _____

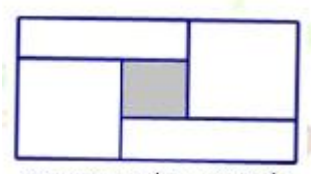
Question 24: The number of roots of the equation $|x^3 - 8| = 16 - 2x^3$ is _____

Question 25: Find the greatest interger number x such that the value of (3x - 2)/4 is greater than the value of (5x + 3)/5.
Answer: The greatest integer number x is _____

Question 26: If x, y, z satisfy these equations $yz = 3/2 - x^2/2$; $zx = 1/2 - y^2/2$ and $xy = 5/2 - z^2/2$ then the value of $|x + y + z|$ is _____

Question 27: Find the remainder when $(x + 2)(x + 3)(x + 4)(x + 5) + 2017$ is divided by $x^2 + 7x + 11$.
Answer: _____

Question 28: A rectangle has a length of 60cm and a width of 30cm. It is cut into 2 indentical squares, 2 identical rectangles and a shaded small square. Find the area of the shaded square.
The area of the shaded square is _____



Question 29: The number of ordered pairs (x; y) where $x, y \in N^*$ such that $x^2y^2 - 2(x + y)$ is perfect square is _____

Question 30: Let ABCD be the square with the side length 56cm. If E and F lie on CD, C respectively such that CF = 14cm and EAF = 45o then CE = _____ cm.

II.Self-reflection exercises (150 points)

Question 31 (100 points)

a) Prove that: $x^2 - x + \frac{3}{4} > 0$ for every value of x

b) Find $x \in Z$ to $2x^2 + x - 18$ divisible by $x - 3$

Question 32 (50 points)

Let abc= 1. Prove that : $\frac{a}{ab+a+1} + \frac{b}{bc+b+1} + \frac{c}{ac+c+1} = 1$

Question 33 (150 points)

Let triangle ABC square at A (AB < AC). Let I be the midpoint of the BC edge. Through I draw IM perpendicular to AB at M and IN perpendicular to AC at N.

a) Prove that the rectangle AMIN is rectangular.

b) Let D be the point of symmetry of I through N. Prove the ADCI quadrilateral is a diamond.

c) Straight line BN cut DC in K. Prove that $\frac{DK}{DC} = \frac{1}{3}$

ĐỀ 20

Ex 1: How many number are there in the following number sequence?

1.11, 1.12, 1.13,....., 9.98, 9.99

Answer:

Ex 2: The average of 10 consecutive odd number is 100. What is the greatest number among the 10 number?

Answer:

Ex 3: How many 5 - digit numbers are multiples of 5 and 8?

Answer:

Ex 4: If the average of 32, 24 and x is 30, find x ?

Answer:

Ex 5: Jim wants to make cupcakes for his family. The recipe requires $4\frac{2}{3}$ cups of flour 3 cupcakes. His famyy 12 people. How much flour will jim need?

Answer:

Ex 6: A triangle has 3 angles: the fist, the second and the third. The fist angle is 66^0 and the second angle is twice as much as the third angle. Find the measure of the second and third angle.

Answer:

Ex 7: The maximum value of $\frac{3}{27-12x+4x^2}$

Answer:

Ex 8: The maximum value of $x^2 - 4x + y^2 + 6y + 9$

Answer:

Ex 9: David had \$100 more than Allen at first. After David's money had decreased by \$120 and Allen's money had increased by \$200, Allen had 3 times as much money as David. What was the total amount of money they had at first?

Answer:

Ex 10: The area of an equilateral triangle is $8\sqrt{12}cm^2$. What is the perimeter of the triangle?

Answer:

Ex 11: Fill in the blank with the suitable sign (>; =; ...)

A = $201^2 - 201.102 + 51^2$ and B= $63^2 + 87^2 + 87.126$

To compare : A….B

Answer:

Ex 12: Given a triangle with the sides are in the ratio of 5: 4: 3 and the perimeter of it is 36. What is the area of the triangle?

Answer:

Ex 13: An equilateral triangle with the measure of its side is 6 cm. The area of the triangle is $\sqrt{m}$ cm^2. The value of m is...

Answer:

Ex 14: Given a rectangle and the area of it is $32cm^2$
when the length is decreasing to 2 times and the width is unchanged then new area of it is……

Answer:

Ex 15: Find the maximum value of B = $\frac{8}{2x(x+y)+13-6x+y2}$

Answer:

Ex 16: The sum of two numbers is 168. The sum of $\frac{1}{8}$ of the smaller and $\frac{3}{4}$ of the greater number is 76. Find the difference between the two numbers.

Answer:

Ex 17: Given an isosceles triangle ABC ($A=90^0$)and H is a point on the hypotenuse. From H, we draw two lines that are perpendicular to AB, AC, at M, N respectively. What is the perimeter of quadrilateral AMHN if AB = 8 cm?

Answer:

Ex 18: Given a rectangle ABCD, the height AH of the triangle ABD and DH = 3, HB=4. what is the area of the rectangle ABCD?

Answer:

Ex 19: A quadrilateral ABCD with AD=AB, CD=CB, $A=73^0$, $C=59^0$. what is the measure oF the angle at B?

Answer:

Ex 20: Find the missing number in the following number sequence:

1, 4, 10, 22, 46,…., 190

Answer:

Ex 21: Given an expession A= $2x^4 - 3x^2 + 1$. Find the value of A with $|x| = 2$

Answer:

Ex 22: Find the value of $\frac{1}{2017}+\frac{2}{2017}+.....+\frac{2015}{2017}+\frac{2016}{2017}$

Answer:

Ex 23: An equilateral triangle the height line that is 8. What is the area of this equilateral triangle?

Answer:

Ex 24: Given a triangle with the sides are in the ration of 5:13:12 and the perimeter of its is 180 cm. What is the area of the triangle?

Answer:

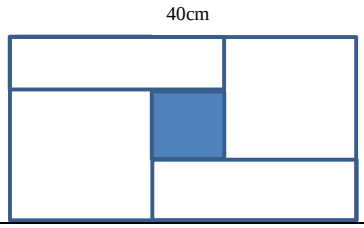
Ex 25: The perimeter of the parallelogram ABCD is 80 cm, AE= 9 cm and AF= 7 cm; AE ⊥ BC; AF ⊥ CD. Find the area of the parallelogram?

Answer:

Ex 26: Alice's house number is a 4- digit number. When she moves the first digit to the ones place, she notices that the new 4- digit number is bigger than her house number by 4707. What is her house number?

Answer:

Ex 27: A rectangle has a length of 40 cm and a beadth of 20 cm. It is cut into identical squares, 2 identical rectangles and a shaded small square. Find the area of the shaded square.



Answer:

Ex 28: A rectangle with the area is 48 cm^2. Find the new area of it when the width is increasting to 2 times and the length is unchanged.

Answer:

Ex 29: Find the averager of the 13 consecutive integers starting at 11.

Answer:

Ex 30: The common denominator of $\frac{-3}{x^2+2+3x}$ and $\frac{5}{6+x^2+5x}$ is….

Answer:

Ex 31: Find the remainder in the division of the following numbers for 7

a) $22^{22} + 55^{55}$ b) $2016^{2017} + 2017^{2018}$

Ex 32: Let xy + yz + zx = 1. Find the smallest value of $x^4 + y^4 + z^4$

Ex 33: For $xAy \neq 180^0$. On Ax take 6 other points A, on the other five points A. In the above 12 points (including point A), two points are joined by a straight line.
How many triangles are the three vertices in 12 points?

Solusion

ĐỀ 21

For questions 1 to 30, write you result on the exam paper

Question 1. How many zeros are there in the last digits of the following number $P = 11.12.13...88.89?$

Question 2. Write 2013 as a sum of *m* prime number. The smallest value of *m* is?

Question 3. How many natural numbers *n* are there so that $n^2 + 2014$ is perfect square?

Question 4. Given the right triangle ABC, $C = 90^0, A = 30^0$, D is the mid-point of AB and $DE \perp AB(E \in AC), AE = 4cm.$ Find BC.

Question 5. Find x, given that $x^2 - 20x + 100 = 0.$

Question 6. Given the funtion $f(x) = x^3 - 1$. Find the value of *f(-1)?*

Question 7: The minium value of $x^2 - x + 2$ is?

Question 8: The maximum value of $\frac{34}{4} - \frac{9}{5}x^2$ is?

Question 9: The number of solutions to the polynomial x^8+8 is?

Question 10: The minium value of $|5x-7|+5,25.4$ is?

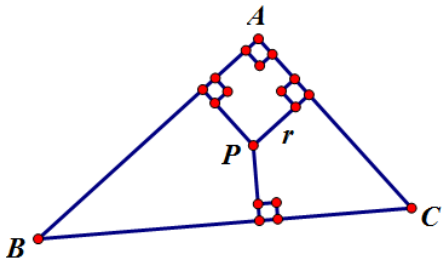
Question 11: Let M be ponit inside the rectangle ABCD that $MA=3cm, MB=2cm, MC=1cm.$ Find the value of MD^2.

Question 12: Given that $f(x)=x^4-ax^3+b$ is divisible by $g(x)=x^2-1$. Find $a+b$.

Question 13: The positive value of x such that $3x^2-7=101$?

Question 14: Given two funtions $f(x)=x^2+x$ and $g(x)=x^2-x+8$. Find the value of m such that $f(m)=g(m)$?

Question 15 . P is equidistant to AB, AC and BC. AB=12 and AC=5. Find r?



Question 16. Find the remainder when 38^{10} divided by 13.

Question 17. Find the smallest value of $A=(x+3y-5)^2-6xy+27$.

Question 18. A triangle has three angles: the first, second ans third angle. The first angle is 66^0 and the second angle is twice the third angle. Find the measure of the sencond angle.

Question 19. Given a polynomial $P(x)=2x^2+3x^3+4x^4+5x^5+...+2017x^{2017}+2018x^{2018}$. The value *P(x)* where *x= -1* is?

Question 20: Given a rectangle ABCD with AC=5cm. What is the length of the segment BD?

Question 21. Given that $a^2-b^2=1$. Evaluate $A=2(a^6-b^6)-3(a^4+b^4)$

Question 22. Given **that** $P=\dfrac{xy}{x^2+y^2}=\dfrac{5}{8}$. Evaluate $P=\dfrac{x^2+2xy+y^2}{x^2-2xy+y^2}$

Question 23. Four apples cost 5$. The cost six dozen apples is?

Question 24. Five similar tables and 18 similar chair cost $594. The cost of one such table is the same as the cost of 3 such chairs. How much does each table cost? How much does each table cost?

Question 25. The smallest value of the funtion

$$f(x)=|x|+\left|\frac{1-2018x}{2018-x}\right|, \text{ where } -1\le x\le 1.$$

Question 26. How many axes of symmetry does the segment AB have?

Question 27. How many axes of symmetry does the uppercase letter A have?

Question 28. Given parallelogram ABCD with BD=9cm. Let I,K be respectively the midpoint of CD,AB. Diagonal BD intersect AI, CK resoectively at M and N. What is the length of MN?

Question 29. In ΔABC, $ABC=48^0$; $DAB=18^0$, AB < BC, D$\in$ BC: CD= AB. Find the value represented by ACB?

Question 30. Determine the integer part of A, where

$$A=\frac{1}{672}+\frac{1}{673}+...+\frac{1}{2014}.$$

For questions 31 to 33, write you answers on the exam paper

Question 31. For every *n= 2, 3, …,* we put

$$A_n=(1-\frac{1}{1+2}).(1-\frac{1}{1+2+3})...(1-\frac{1}{1+2+3+...+n}).$$

Determine all positive integer $n(n \geq 2)$ such that $\frac{1}{A_n}$ is an integer.

Question 32. Find all pairs of integer *(x,y)* satisfying the condition

$$12x^2 + 6xy + 3y^2 = 28(x + y).$$

Question 33. Let *ABC* be a triangle. Let *D, E* be the point out side of the triangle so that *AD=AB, AC=AE* and $DAB = EAC = 90^0$. Let *F* same side of the line *BC* with *A* so that *FB=FC* and $BFC = 90^0$. Prove that triangle *DEF* is right-isoceles triangle.

The end.

ĐỀ 22

GOOD STUDENT CONTEST SCHOOL YEAR 2017 -2018

TIME: 120 MINUTES

EX1: Increasing the area of the square to 4 times then you have to

A. Decrease its side to 4 times
B. Increase its side to 4 times
C. Increase its side to 2 times
D. Decrease its side to 2 times

EX2: Given $A = 2x^2 - 4x + y^2 - 2xy + 7$. Find the sum of x and y such that A reaches the minimum value.

EX 3: If a+b=3; $a^2 + b^2 = 7$ then $a^3 + b^3 = ...$

EX4: Find the value of k such that $x^3 + kx^2 + (4 - k)x + 1$ is divisible by x+1

EX5: If x-y-z=0 and x+2y-10z=0, $z \neq 0$ then the value of $B = \frac{2x^2 + 4xy}{y^2 + z^2}$ is

EX6: In a triangle of area 100 cm^2, the ratio between the length of one side and corresponding height
is 1: 2. What is the length of the height , it m? (Write your answer by decimal in simplest form)

EX7: Give $A = \frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + ... + \frac{1}{100.101}$; $B = \frac{1}{2^2} + \frac{1}{3^2} + ... + \frac{1}{101^2}$

Compare A….B

EX8: In the xy – plane, given three point A(-1;2), B(-3; 1), D(6;2). If ABCD is parallelogram then C=

EX9: Given $P(x) = \left(x^2 - \frac{1}{2}x - \frac{1}{2}\right)^{2008}$. If $P(x) = a_{2016}x^{2016} + a_{2015}x^{2015} + ... + a_1x + a_0$ then the value of the sum $a_0 + a_1 + ... + a_{2016}$

EX10: Let ABCD be a trapezoid with AB//CD; $\angle A = \angle D = 90^0$ and AB=AD=CD:2
Find the measure of the angle BCD

EX11: If x+y=6 and $x^3 + x^2y = 24$ then $x+y-x^2$=?

EX12: Find the interger part of $\frac{1}{\frac{1}{80} + \frac{1}{81} + \frac{1}{82} + \frac{1}{83} + \frac{1}{84}}$

EX13: ABCD is a rectangle. If its perimeter is 34 cm^2 and AB-BC=5cm then the area of ABCD is…cm^2

EX14: 12 pens and 5 pencils cost 46 dollars; 4 pens cost 12 dollars. How much does one pencil cost?

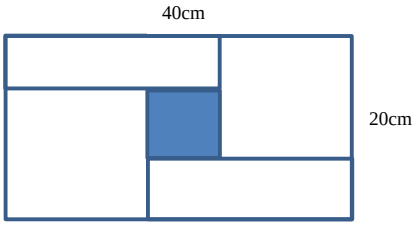
EX15: If $f(x)=x^2+(x-2)^2+2(x-1)^2$ then the smallest value of f(x) is…

EX 16: Given a square ABCD with the length of one side is 8. Let M be any point on CD such that DM=x. If the ratio between the area of triangle ADM and the area of the square ABCD is 3:8 then x=….

EX 17: Given three consecutive even natural numbers, which have the product of last two numbers is 80 greater than the product of first two numbers.
Find the largest number.

EX18: Given triangle ABC , $\angle A=90^0$; AB= x-2; AC=2x+1. If the area of this triangle is 26 then what is the value of x?

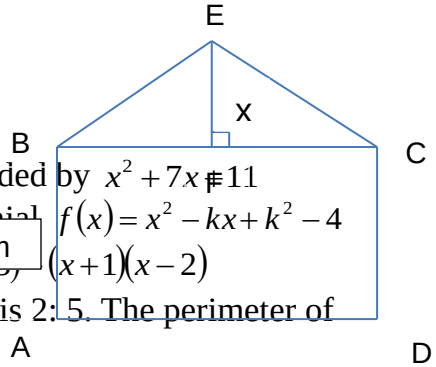
EX19: A rectangle has a length of 40 cm and a beadth of 20 cm. It is cut into identical squares, 2 identical rectangles and a shaded small square. Find the area of the shaded square



EX20: The perimeter of the parallelogram ABCD is 80 cm, AE ⊥ BC; AF ⊥ CD ; AE= 9 cm and AF= 7 cm; Find the area of the parallelogram

EX21 There are 160 white and blue balls, 180 blue and yellow balls, and 170 white and yellow balls. Find the number of each colour of balls?

EX22: Given the rectangle ABCD and the triangle BEC.
Find the value of x such that the ratio of the area of the rectangle to the area of the triangle BEC is 7:3



EX23: Find the remainder when (x+2)(x+3)(x+4)(x+5)+2017 is divided by $x^2+7x+11$

EX24: Find the positive value of k such that x=2 is a root of polynomial $f(x)=x^2-kx+k^2-4$

EX25: Find the sum of the roots of the polynomial $f(x)=(x+1)(2x-3)(x+1)(x-2)$

EX26: In a rhombus of area 60 cm^2, the ratio between two diagonals is 2: 5. The perimeter of the rhombus is $\sqrt{m}$ cm. What is the value of m?

EX27: Given $A=9x^2+8-12x$ and B=2. Compare A and B.

EX28: If $f(x)=2x^2-5x-4$ and $g(x)=2x(x-3)$. Find a so that $f(a)=g(a)$

EX29: If $x^2+2xy=21$ and 4y+2x=14 then x=

EX30: EFGH is rectangle. If its area is 72 cm^2 and EF= 2GF then EF=…

EX31: Assume the two numbers x and y satisfy 2x+y=6. Find the minimum value of expression $A=4x^2+y^2$

EX32: If 10 rabbits can be exchanged for 2 goats, 9 goats be exchanged for 3 cows, and 8 cows be exchanged for horses, how many rabbits can 5 horses be exchanged for?

EX33: Find the polynomial $f(x)$ such that when $f(x)$ divided x-3 then remainder is 7, that $f(x)$ divided x-2 then remainder is 5, that $f(x)$ divided (x-2)(x-3) result is 3x and remainder .