MATHS

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BASIC ALGEBRA

Worked Example

1. Solve $|3x + 14| = 2$

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2. Solve $3|x + 2| - 4 = 5$

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3. solve $|3x + 1| = |2x - 1|$

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4. solve $|a - 5| \leq 4f \text{ or } a$

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5. solve $\left|\frac{-3}{x+2}\right| > 1, x \neq -2$

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6. solve$7x + 50 \leq 2x + 75$

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7. Given that Total cost = fixed cost + Variable cost. (T=f+ nu). If the fixed cost isrs 250 and variable cost varies at the rate ofrs 5x. If a person wants the total cost to be below750 find x

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8. solve$7x - 21 \geq 0, 2x - 12 \leq 6$

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9. Mr. X wants to save rs 1000. He has alreadysavedrs 275. He wants to save the remaining amount within 5 days. What is the least amount to be saved per day to get his target?

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10. If alpha and beta are the roots of the equation $x^2 - ax + b = 0$,find

Q$(a)\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$

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11. If alpha and beta are the roots of the equation $x^2 - ax + b = 0$,find

Q(b) $\frac{1}{\alpha} + \frac{1}{\beta}$

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12. Find p if $x^2 - px + p = 0$ has equal roots

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13. solve $x^2 + 2|x - 1| = 1$

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14. Solve $4x^2 - 7x - 2 \leq 0$

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15. Solve $\sqrt{4x - 5} < x + 2$

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16. Solve $\sqrt{7 - 2x - x^2} = x + 1$

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17. Find a quadratic polynomialf (x) given that $f(-1) = 2, f(0) = 3, f(1) = 6$

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18. Find the roots of the polynomial equation $(x+2)^3(x-1)^2(x+1)=0$ and state their multiplicity

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19. Solve$x=\sqrt{3x+4}$

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20. The equations $x^2-4x+a=0$ and $x^2+bx+5=0$ have one root in common The other root of these

equations are integers in the ratio 3 : 5Find the common root

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21. Construct a cubic polynomial "having" "roots" $2, -3$ and 1 such "that" $f(0) = 6$

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22. Prove that $p + q = 0$ " if " $x^3 - 3px + 2q$" is divisible by" $(x + 1)^2$

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23. Find the value of k for which the sum of the squares of the reciprocals of the roots of $x^2 + kx + 9 = 0 is (2)$

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24. solve $\frac{2x+1}{x-2} < 3$

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25. solve $\frac{x^2-1}{x-2} > 0$

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26. Resolve into partial fractions $\frac{1}{(x+1)(x+2)(x+3)}$

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27. Resolve into partial fractions $\frac{2x+1}{(x-2)(x^2+1)}$

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28. Resolve into partial fractions $\frac{x}{(x-1)(x+1)^2}$

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29. Sketch the region represented by $x+y \leq 1$.

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30. Sketch the region represented by $y \geq 1$

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31. Simplify $\left(x^{a-b}\right)^{a+b} \cdot \left(x^{b-c}\right)^{b+c} \cdot \left(x^{c-a}\right)^{c+a}$

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32. Simplify $\frac{1}{\sqrt{3}+\sqrt{2}} + \frac{1}{\sqrt{3}-\sqrt{2}}$

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33. find the square rootof $11 + 6\sqrt{2}$

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34. If log(2)=0.30103 find the number of digits in 2^{100}

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35. If $\log 10^2 = 0.3010 \log 10^3 = 0.4772$ find $\log 10^{144}$

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36. Compute $\log_2(3).\log_{27}(128)$

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37. Find the logarithm of 324 to the base $3\sqrt{2}$

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38. If the logarithm of 1728 to the base a is 6 Find a

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39. Símplify $\log \frac{81}{16} + \log \frac{64}{27} + \log \frac{4}{48}$

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40. Show that $\log_a N + \log \frac{1}{a} N = 0$

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Solution To Exercise 2 1

1. Classify each element of $\left\{\sqrt{7}, \frac{-1}{4}, 0, 3.14, 4, \frac{22}{7}\right\}$ as a member of $\mathbb{N}, \mathbb{Q}, \mathbb{R}-\mathbb{Q}$ or $\mathbb{Z}$.

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2. Prove that $\sqrt{3}$ is an irrational number. (Hint: Follow the method that we have used to prove $\sqrt{2} \notin \mathbb{Q}$.)

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3. Are there two distinct irrational numbers such that their difference is a rational number? Justify

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4. Find two irrational numbers such that their sum is a rational number. Can you find two irrational numbers whose product is a rational number.

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5. Find a positive number smaller than $\frac{1}{2^{1000}}$ Justify

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Solution To Exercise 2 2

1. Solve for x

$|3 - x| < 7$

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2. Solve for x

$|4x - 5| \geq -2$

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3. Solve for x

$\left|3 - \frac{3}{4}x\right| \leq \frac{1}{4}$

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4. Solve for x

$|x| - 10 < -3$

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5. Solve $\frac{1}{|2x-1|} < 6$ and express the solution using the interval notation.

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6. Solve $-3|x| + 5 \leq -2$ and graph the solution set in a number line.

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7. Solve $2|x + 1| - 6 \leq 7$ and graph the solution set in a number line.

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8. Solve: $\frac{1}{5}|10x - 2| < 1$.

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9. Solve: $|5x - 12| < -2$.

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Solution To Exercise 2 3

1. Represent the following inequalities in the interval notation:

$x \geq -1$ and $x < 4$

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2. Represent the following inequalities in the interval notation:

$x \leq 5$ and $x \geq -3$

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3. Represent the following inequalities in the interval notation:

$x < -1$ or $x < 3$

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4. Represent the following inequalities in the interval notation

Q$-2x > 0$

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5. Represent the following inequalities in the interval notation

Q$3x - 4 < 11$

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6. Solve $23x < 100$ when

x is a natural number

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7. Solve $23x < 100$ when

x is a integer

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8. Solve $-2x \geq 9$ when

x is a real number

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9. Solve -2x $\geq$ 9 when

x is a real number

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10. Solve -2x $\geq$ 9 when

x is a natural number.

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11. Solve:

$$\frac{3(x-2)}{5} \leq \frac{5(2-x)}{3}$$

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12. Solve:

$$\frac{5-x}{3} < \frac{x}{2} - 4$$

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13. To secure A grade one must obtain an average of 90 marks or more in 5 subjects each of maximum 100 marks. If one scored 84,87,95,91 in first four subjects, what is the minimum mark one scored in the fifth subject to get A grade in the course?

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14. A manufacturer has 600 litres of a 12 percent solution of acid. How many litres of a 30 percent acid solution must be added to it so that the acid contect in the resulting mixture will be more than 15 percent but less than 18 percent?

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15. Find all pairs of consecutive odd natural numbers both of which are larger than 10 and their sum is less than 40.

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16. A model rocket is launched from the ground. The height 'h' reached by the rocket after t seconds from lift off is

given by h(t) = $-5t^2 + 100t, 0 \leq t \leq 20$. At what time the rocket is 495 feet above the ground?

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17. A plumber can be paid according to the following schemes, In the first scheme he will be paid rupees 500 plus rupees 70 per hour, and in the second scheme he will paid 120 rupees per hour. If he works x hours. Then for what value of x does the first scheme give better wages?

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18. A and B are working on similar jobs but their annual salaries differ by more than ₹ 6000. if B earns rupees 27000

per month, then what are the possibilities of A`s salary per month?

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Solution To Exercise 2 4

1. Construct a quadratic equation with roots 7 and -3.

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2. A quadratic polynomial has one of its zeros as $1 + \sqrt{5}$ and it satisfies p(1) = 2. find the quadratic polynomial.

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3. If α and β are the roots of the quadratic equation $x^2 + \sqrt{2x} + 3 = 0$. Form a quadratic polynomial with zeros $\frac{1}{\alpha}, \frac{1}{\beta}$.

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4. If one root $k(x-1)^2 = 5x - 7$ is double the other root, show that k = 2 or - 25.

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5. If the difference of the roots of the equation $2x^2 - (a+1)$x + a -1 = 0 ` is equal to their product, then prove that a = 2.

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6. Find the condition that one of the roots of $ax^2 + bx + c$ may be

(i) negative of the other,

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7. Find the condition that one of the roots of$ax^2 + bx + c$ may be

Q (ii) thrice the other

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8. If the equations $x^2 - ax + b = 0$ and $x^2 - ex + f = 0$ have one root in common and if the second equation has equal roots, then prove that ae = 2 (b + f).

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9. Discuss the nature of roots of

$-x^2 + 3x + 1 = 0$

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10. Discuss the nature of roots of

$4x^2 - x - 2$

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11. Discuss the nature of roots of

$9x^2 + 5x = 0.$

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Solution To Exercise 2 8

1. Find the condition that one of the roots of $ax^2 + bx + c$ may be

(iii)reciprocal of the other.

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2. Write f(x) = $x^2 + 5x + 4$ in completed square form.

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3. Find all values of x for which $\frac{x^3(x-1)}{(x-2)} > 0.$

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4. Find all values of x that satisfies the inequality $\frac{2x-3}{(x-2)(x-4)} < 0.$

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5. Solve: $\frac{x^2-4}{x^2-2x-15} \leq 0.$

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Solution To Exercise 2 5

1. Without sketching the graphs, find whether the graphs of the following functions will intersect the x-axis and if so in how many points.

y = $x^2 + x + 2$,

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2. Solve $2x^2 + x - 15 \leq 0$.

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3. Solve $-x^2 + 3x - 2 \leq 0$.

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Solution To Exercise 2 6

1. Without sketching the graphs, find whether the graphs of the following functions will intersect the x-axis and if so in how many points.

y = $x^2 - 3x - 7$

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2. Find the zeros of the polynomial function f(x) =$4x^2 - 25$.

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3. If x = -2 is one root of $x^3 - x^2 - 17x = 22$. Then find the other roots of the equation.

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4. Find the real root of x^4 = 16

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5. Solve: $(2x + 1)^2 - (3x + 2)^2$ = 0

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Solution To Exercise 2 7

1. Without sketching the graphs, find whether the graphs of the following functions will intersect the x-axis and if so in how many points.

$y = x^2 + 6x + 9$

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2. Factorize $x^4 + 1$ (Hint: try completing the square.)

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3. If $x^2 +$ x + 1 is a factor of the polynomial $3x^3 + 8x^2 + 8x + a$, then find the value of a.

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Solution To Exercise 2 9

1. Resolve the following rational expressions into partial fractions.(1) $\frac{1}{x^2-(a^2)}$

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2. $\frac{3x+1}{(x-2)(x+1)}$

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3. Resolve the following rational expression into partial fractions.

$$\frac{x}{(x^2+1)(x-1)(x+2)}$$

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4. Solve: $\frac{1}{x^2-1}$

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5. Solve: $\int \frac{dx}{x^4-1}$

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6. Resolve the following rational expression into partial fractions.

$$\frac{(x-1)^2}{x^3+x}$$

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7. Resolve the following rational expression into partial fractions.

$$\frac{x^2+x+1}{x^2-5x+6}$$

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8. Resolve the following rational expression into partial fractions.

$$\frac{x^3+2x+1}{x^2+5x+6}$$

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9. Resolve the following rational expression into partial fractions.

$$\frac{x+12}{(x+1)^2(x-2)}$$

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10. Resolve the following rational expression into partial fractions.

$$\frac{6x^2-x+1}{x^3+x^2+x+1}$$

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11. Resolve the following rational expression into partial fractions.

$$\frac{2x^2 + 5x - 11}{x^2 + 2x - 3}$$

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12. Resolve the following rational expression into partial fractions.

$$\frac{7 + x}{(1 + x)(1 + x^2)}$$

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Solution To Exercise 2 10

1. Determine the region in the plane determined by the inequalities.

$x \leq 3y, x \geq y$

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2. $2x + 3y \leq 35, y \geq 2, x \geq 5$

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3. $2x + 3y \leq 6, x + 4y \leq 4, x \geq 0, y \geq 0$

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4. $x - 2y \geq 0, 2x - y \leq -2, x \geq 0, y \geq 0$

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Solution To Exercise 2 11

1. Simplify:

$(125)^{\frac{2}{3}}$

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2. Simplify:

$16^{-\frac{3}{4}}$

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3. Simplify:

$(1000)^{\frac{-2}{3}}$

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4. Simplify:

$$\frac{(27)^{\frac{-2}{3}}}{(27)^{\frac{-1}{3}}}$$

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5. Evaluate $\left(\left[(256)^{\frac{-1}{2}}\right]^{\frac{-1}{4}}\right)^{3}$

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6. If $\left(x^{+\frac{1}{2}}+x^{-\frac{1}{2}}\right)^2=\frac{9}{2}$, then find the value of $\left(x^{\frac{1}{2}}-x^{-\frac{1}{2}}\right)$ for $x>1$.

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7. Simplify and hence find the value of n: $\frac{3^{2n}9^2 3^{-n}}{3^{3n}}$ = 27

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8. Find the radius of the spherical tank whose volume is $\frac{32\pi}{3}$ units.

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9. Simplify by rationalising the denominator. $\frac{7+\sqrt{6}}{3-\sqrt{2}}$.

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10. Simplify

$$\frac{1}{3-\sqrt{8}}-\frac{1}{\sqrt{8}-\sqrt{7}}+\frac{1}{\sqrt{7}-\sqrt{6}}-\frac{1}{\sqrt{6}-\sqrt{5}}+\frac{1}{\sqrt{5}-2}$$

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11. If x = $\sqrt{2}+\sqrt{3}$ find $\frac{x^2+1}{x^2-2}$.

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Solution To Exercise 2 12

1. Simplify:

$\left(3^{-6}\right)^{\frac{1}{3}}$

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2. Let b $>$ 0 and b $\neq$ 1. Express y = b^x in logarithmic form. Also state the domain and range of the logarithmic function.

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3. Compute $\log_9^{27} - \log_{27}^9$

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4. solve : $\log_8 x + \log_4 x + \log_2 x = 11.$

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5. solve : $\log_4 2^{8x} = 2^{\log_2^8}$

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6. If $a^2 + b^2 = 7ab$, show that $\log\left(\frac{a+b}{3}\right) = \frac{1}{2}$ (log a + log b).

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7. Prove $\log\frac{a^2}{ba} + \log\left(\frac{b^2}{ab}\right) = 0$

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8. Prove that $\log 2 + 16\log\frac{16}{15} + 12\log\ \frac{25}{24} + 7\log\frac{81}{80} = 1$.

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9. Prove that $\log_{a^2} a\ \ \log_{b^2} b \log_{c^2} c = \frac{1}{8}$.

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10. Prove log a + log a^2 + log a^3 +.....+ log a^n

$= \frac{n(n+1)}{2}$ log a

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11. If $\frac{\log x}{y-z} = \frac{\log y}{z-x} = \frac{\log z}{x-y}$, then prove that xyz = 1.

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12. Solve: $\log_2 x - 3\log_{\frac{1}{2}} x = 6$

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13. Solve $\log_{5-x}\left(x^2 - 6x + 65\right) = 2.$

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Solution To Exercise 2 13

1. If $|x + 2| \leq 9$, then x belongs to

A. $(-\infty, -7)$

B. $)[-11, 7]$

C. $(-\infty, -7) \text{cup} [11, \infty)$

D. (-11,7)

Answer: B

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2. Given that x, y and b are real numbers $x < y$, $b > 0$, then

A. $xb < yb$

B. $xb > yb$

C. $xb > yb$

D. *[Math Processing Error]*

Answer: A

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3. If $\frac{|x-2|}{x-2} \geq 0$, then x belongs to

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4. The solution of 5x -1 $<$ 24 and 5x + 1 $>$ -24 is

A. .$(4, 5)$

B. $(-5, -4)$

C. $(-5, 5)$

D. $(-5, 4)$

Answer: C

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5. The solution set of the following inequality $|x-1| \leq |x-3|$ is

A. $[0, 2]$

B. $[2, \infty)$

C. $(0, 2)$

D. $(-\infty, 2)$

Answer: B

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6. The value of $\log_{\sqrt{2}}^{512}$ is

A. 16

B. 18

C. 9

D. 12

Answer: B

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7. The value of $\log_3 \frac{1}{81}$ is

A. (-2)

B. (-8)

C. (-4)

D. (-9)

Answer: C

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8. If $\log_{\sqrt{x}} 0.25 = 4$, then the value of x is

A. 0.5

B. 2.5

C. 1.5

D. 1.25

Answer: A

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9. The value of $\log_a b \log_b c \log_c$ a is

A. 2

B. 1

C. 3

D. 4

Answer: B

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10. If 3 is the logarithm of 343, then the base is

A. 5

B. 7

C. 6

D. 9

Answer: B

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11. Find a so that the sum and product of the roots of the equation $2x^2 + (a-3)x + 3a - 5 = 0$ are equal is

A. 1

B. 2

C. 0

D. 4

Answer: B

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12. If a and b are the roots of the equation $x^2 - kx + 16 = 0$ and satisfy $a^2 + b^2 = 32,$ then the

value of k is

A. $k = 10$

B. $k = -8$

C. $k = = -8, 8$

D. $k = 6`$

Answer: C

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13. The number of solutions of $x^2 + |x - 1| = 1$ is

A. 1

B. 0

C. 2

D. 3

Answer: C

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14. The equation whose roots are numerically equal but opposite in sign to the roots of $3x^2 - 5x - 7 = 0$ is

A. $3x^2 - 5x - 7 = 0$

B. $3x^2 + 5x - 7 = 0$

C. $3x^2 - 5x + 7 = 0$

D. $3x^2 + x - 7$

Answer: B

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15. If 8 and 2 are the roots of x^2 + ax + c = 0 and 3,3 are the roots of x^2+ dx + b = 0, then the roots of the equation $x^2 + ax + b = 0$ are

A. 1,2

B. $-1, 1$

C. 9,1

D. $-1, 2$

Answer: C

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16. If a and b are the real roots of the equation x^2- kx + c = 0, then the distance between the points (a, 0) and (b, 0) is

A. $\sqrt{k^2 - 4c}$

B. $\sqrt{4k^2 - c}$

C. $\sqrt{4c - k^2}$

D. $\sqrt{k - 8c}$

Answer: A

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17. If $\frac{kx}{(x+2)(x-1)} = \frac{2}{x+2} + \frac{1}{x-1}$, then the value of k is

A. 1

B. 2

C. 3

D. 4

Answer: C

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18. If $\frac{1-2x}{3+2x-x^2} = \frac{A}{3-x} + \frac{B}{x+1}$,then the value of A + B is

A. $\frac{-1}{2}$

B. $-\frac{2}{3}$

C. $\frac{1}{2}$

D. $\frac{2}{3}$

Answer: A

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19. The number of roots of $(x+3)^4 + (x+5)^4 = 16$ is

A. 4

B. 2

C. 3

D. 0

Answer: A

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20. The value of $\log_3 11.\ \log_{11} 13.\ \log_{13} 15.\ \log_{15} 27.\ \log_{27} 81$ is

A. 1

B. 2

C. 3

D. 4

Answer: D

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Problems For Practice I Answer The Following Questions

1. Solve $|3x - 4| = |x - 2|$

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2. Solve $2|x + 3| - 5 \leq 7$ and graph the solution set in a number line

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3. Solve $\frac{1}{|3x - 2|} < 2$ and express using interval notation

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4. Solve the linear inequalities$2x - 4 \geq 0, 3x + 9 \leq 3$

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5. A and B spend monthly such that the difference between their spending is rs 600 monthly. If A spends 24,000 per annum what are two possibilities for B's spending?

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6. sovle$\frac{6 - x}{3} < \frac{x}{4} - 1$

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7. If the roots of a quadratic equation is $\left(1-\sqrt{6}\right)$ find the quadratic equation

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8. If a and beta are the roots of the equation $\left(x^2-2x+3=0\right)$ from the equation where roots equation is are

Q $\frac{1}{\alpha}$ and $\frac{1}{\beta}$

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9. If α and β are the roots of the equation $\left(x^2-2x+3=0\right)$ from the equation where roots

equation is are

Q $\frac{a^2}{\beta^2}$

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10. If a and beta are the roots of the equation $\left(x^2 - 2x + 3 = 0\right)$ from the equation where roots equation is are

Q $\frac{1}{\alpha^2}$ and $\frac{1}{\beta^2}$

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11. Draw the graph of$y = x^2 - 3x - 4$, find its line of symmetry, vertex, x intercepts

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12. Solve: $\sqrt{x} + 5 < x - 2$

Solve $\sqrt{-x^2 + 4x + 5} = x - 2$

$2x^2 - x + 15 < 0$

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13. If x = 1 is one root of the equation

$x^3 - 6x^2 + 11x - 6 = 0,$ find the other roots.

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14. Determine the region in the plane determined by the inequalities.

$2x + 3y \leq 6, x + 4y \leq 4, x \geq 0, y \geq 0.$

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15. Rationalize the denominator $\frac{1}{\sqrt{5} + \sqrt{4}}$

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16. Find the square root of $9 - 4\sqrt{5}$

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17. If $x = \sqrt{3} + \sqrt{5}$ find $\frac{x^2 + (1)}{x^2 - 2}$

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18. solve : $\log_8 x + \log_4 x + \log_2 x = 11.$

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19. Prove that $x^{\frac{b-c}{bc}} x^{\frac{c-a}{ca}} x^{\frac{a-b}{ab}} = 1$

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20. If $\log 10^2 = .3010, \log 10^3 = .4771$ find $\log_{10} 36$

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21. Solve $\sqrt{x^2+1}$ = x-5`

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22. Prove: $x^{\log\left(\frac{b}{c}\right)} x^{\log\left(\frac{c}{a}\right)} x^{\log\left(\frac{a}{b}\right)} = 1$

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23. Show that $\log_a \mathrm{N} + \log \frac{1}{a} N = 0$

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24. Resolve with partial fractions $\frac{1}{(x-1)(x+2)}$

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25. If alpha and β are the roots of ar$ax^2 + bx + c = 0$ from the equation where roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$

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Problems For Practice I Choose The Correct Option For The Following Mcq

1. Solve 2|x - 5|+ 5 = 21

A. $x = 13 \text{ or } 3$

B. $x = -13 \text{ or } -3$

C. $x = 13 \text{ or } -3$

D. $x = -13 \text{ or } 3$

Answer: C

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2. $x \leq 6$ and $x \geq -2$ is given by interval notation as

A. [-2,6]

B. [-2,6)

C. (-2,6]

D. (-2,6)

Answer: A

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3. A cubic equation has roots 2 and $1+\sqrt{3}$ Then its equation is

A. x^3-6x^2+2x+4

B. x^3+6x^2-2x+4

C. x^3-6x^2-2x-4

D. x^3+6x^2-2x-4

Answer: A

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4. If $x^2-6x+k=0$ has equal roots the value of k is

A. 12

B. 3

C. 9

D. -9

Answer: C

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5. The solution set for the inequality $2x^2 + 5x - 3$ is

A. $\left[-3, \frac{-1}{2}\right.$

B. $\left[-3, \frac{-1}{2}\right.$

C. $\left[-3, \frac{-1}{2}\right.$

D. $\left[-3, \frac{-1}{2}\right.$

Answer: D

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6. If a and b are the roots of the equation $x^2 - kx + 9 = 0$ and satisfy$a^2 + b^2 = 18$ then the value of k is

A. 3

B. -6

C. (-6,6)

D. 2

Answer: C

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7. The solution set of the following inequality $|x-1| \leq |x-3|$ is

A. $(-1, \infty)$

B. $(-\infty)$

C. $-1 \leq x \leq 3$

D. none of these

Answer: A

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8. $\sqrt{p}$ (where p is a prime number) is

A. imaginary number

B. rational number

C. irrational number

D. none of these

Answer: C

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9. $\log_2 4 + \log_4 4 + \log_{16} 4$ is equal to

A. $\frac{2}{9}$

B. $\frac{9}{2}$

C. $\frac{2}{7}$

D. $\frac{7}{2}$

Answer: D

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10. $\left(x^8y^4\right)^{\frac{1}{4}}$

A. $\left|x^2y\right|$

B. $x^2|y|$

C. $\left|x^2\right|y$

D. $\left|\frac{x^2}{y}\right|$

Answer: B

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11. Match the following

11.	If α and β are the roots of $2x^2+5x+x=0$ then value of $\frac{1}{\alpha}+\frac{1}{\beta}$ is	(a) 0
12.	$\sqrt{7-4\sqrt{3}}$ is	(b) $\sqrt{15}-\sqrt{10}$
13.	$\log_a x+\log_{\frac{1}{a}} x$ is	(c) $8/3$
14.	$\log_2 8-\log_8 2$ is	(d) -5
15.	Rationalise the denominator $\frac{\sqrt{5}}{\sqrt{3}+\sqrt{2}}$	(e) $2-\sqrt{3}$

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12. Find the incorrect statement in the following.

A. $\frac{a^x}{a^y}=a^{x-y}$

B. $\log_a m^n = n \log_a m$

C. if the discriminant of $ax^2 + bx + c = 0$ is zero the roots are imaginary

D. $\log_x x = 1$

Answer: C

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13. Find the incorrect statement in the following

A. $F \text{ or } a, b, c \in R, a(b + c) = ab + ac$

B.

$Ifa, b \in R \text{ and } a < bthena + C < b + cf \text{ or } allc \in R$

C. $Ifa, b \in R$ and $a < bthenax < bxf$ or $allx > 0$

D. $\sqrt{2}$ is a rational number

Answer: D

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14. Find the correct statement in the following

A. $\frac{24}{7} \in R - Q$

B. sqrt3 is a irrational number

C. $Ifa, b \in R$ and $a < bthenax > bxf$ or $allx > 0$

D. $a^x . a^y = a^{x \cdot y}$

Answer: B

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15. Find the correct statement in the following

A. $\log_a m - \log_a n = \log(m - n)$

B. $a^{m^n} = a^{m \cdot n}$

C. The equation $x^2 + x + 1 = 0$ has equal roots

D. $x^4 - 16 = 0$has two real roots

Answer: B

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16. Find the incorrect statement in the following

A. If x, y inR, then Ix + y| = |x| +|y|

B. For any x, y in R, |xy|=[xl |y|

C. |(x)/(y)|=|(x)|/|(y)| For all x, y in R and yne0

D. If x, y in R, Ix| +|y| = |x -y|

Answer: D

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17. Find the odd one out The inequalities $-3x > 0$ or $3x - 4 < 11$ is represented in interval notation as

A. $(-\infty, -5)$

B. $(5, \infty)$

C. (0,5)

D. (-5,0)

Answer: A

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18. Find the odd one out with respect to root of

A. $x^2 - 4x + 4 = 0$

B. $x^2 - 6x + 9 = 0$

C. $x^2 - 8x + 16 = 0$

D. $x^2 - 5x + 6 = 0$

Answer: D

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19. Find the odd one out from the following

A. 3

B. (-5)

C. $\frac{7}{2}$

D. $\sqrt{2}$

Answer: D

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20. Assertion: The equation$x^2 + |x - 1| = 1$two solutions.

Reason:$|x| = x \quad \text{if} \quad x \leq 0$=x if x lt 0

A. Reason is correct explanation to Assertion

B. Reason is not correct explanation to

C. Assertion and Reason are not true

D. Reason is true but Assertin not true

Answer: A

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21. Assertion: The equation $ax^2 + bx + c = 0$has two roots.

Reason: $ax^2 + bx + c = 0$ can be written as $(x - \alpha)(x - \beta) = 0$ for some α and β

A. Reason is correct and so Assertion is correct

B. Reason is correct and so Assertion is not correct.

C. Both Assertion and Reason are incorrect

D. There is no link between Assertion and Reason.

Answer: A

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22. Given $\left|\frac{3}{x-4}\right| > 1$ then

A. $x \in (\infty, 3)$

B. $x \in (4, \infty)$

C. $x \in (1, 7)$

D. $x \in (2, 3) \cup (4, 6)$

Answer: D

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23. If alpha and β are the roots of $2x^2 - 3x - 4 = 0$ find the value of $2\alpha^2 + \beta^2$

A. $\frac{41}{4}$

B. $\frac{\sqrt{41}}{2}$

C. 0

D. none of these

Answer: B::D

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24. If a and beta are the roots of$2x^2 + 4x + 5 = 0$ the equation where roots are 2alpha and 2betai

A. $4x^2 + 4x + 5 = 0$

B. $2x^2 + 4x + 50 = 0$

C. $x^2 + 4x + 5 = 0$

D. $x^2 + 4x + 10 = 0$

Answer: D

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25. The minimum point of $y = x^2 - 4x - 5$ is

A. (2, -9)

B. (-2,-9)

C. (-2,9)

D. (4, 5)

Answer: A

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26. The condition that the equation $ax^2 + bx + c = 0$may have one root is the double the other is

A. $2b^2 = 9ac$

B. $b^2 = ac$

C. $b^2 = 4ac$

D. $9b^2 = 2ac$

Answer: A

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27. Solve $\sqrt{7 + 6x - x^2} = x + 1$

A. :(1,-3)

B. $(3, -1)$

C. (1,-1)

D. (3,-3)

Answer: B

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28. Solve $3x^2 + 5x - 2 \leq 0$

A. $\left(2, \frac{1}{3}\right)$

B. $\left[-2, \frac{1}{3}\right]$

C. $\left(-2, \frac{1}{3}\right)$

D. $\left(2, \frac{-1}{3}\right)$

Answer: B

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29. The zero of the polynomial function $f(x) = 9x^2 - 16$ are

A. (9,16)

B. (3,4)

C. $\left(\frac{4}{3}, \frac{-4}{3}\right)$

D. $\left(\frac{3}{4}, \frac{3}{4}\right)$

Answer: C

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30. The value of a when $x^2 + 2x + a$ is divided by (x - 1), the remainder is 1, is

A. -1

B. 1

C. 2

D. -2

Answer: A

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31. Find the other root of $x^2 - 4x + 1 = 0$ given that $2 + \sqrt{3}$ is a root:

A. $\sqrt{3} + 2$

B. $\sqrt{3} - \sqrt{2}$

C. $2 - \sqrt{3}$

D. $\sqrt{3}-2$

Answer: C

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32. If $\frac{x}{x^2-5x+6}=\frac{A}{x-2}+\frac{B}{x-3}$ then value of A is

A. 2

B. 0

C. 3

D. -2

Answer: D

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33. $\sqrt[4]{-2^4} \times (1000)^{\frac{1}{3}}$ is

A. 20

B. -20

C. 2^{10}

D. 100

Answer: B

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34. If $\frac{1}{\sqrt{3}+\sqrt{2}} = \sqrt{3} + \alpha$ then α is

A. $\sqrt{2}$

B. $-\sqrt{2}$

C. $\sqrt{\frac{3}{2}}$

D. $\frac{\sqrt{3}}{3}$

Answer: B

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35. . Logarithm of 144 to the base $2\sqrt{3}$ is

A. 2

B. 3

C. 4

D. 5

Answer: C

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36. . Logarithm of 144 to the base $2\sqrt{3}$ is

A. 5

B. 2

C. 4

D. 3

Answer: C

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37. Given

$x^2 - 8x + 64 = 0$ has equal roots

$\log_a^m + \log_a^n = \log_a^{m+n}$

$e^{x-y} = \left(\frac{e^x}{e^y}\right)$

If x, y in R |x + y| = |x – y| then xy = 1 Find which two are correct in the above

A. (i) and (ii) are correct

B. (i) and (ii) are correct

C. (i) and (iii) are correct

D. (i) and (iv) are correct

Answer: C

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