MATHS

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Solution To Exercise 3 1

1. Solve the following system of linear equations in three variables

$x + y + z = 5, 2x - y + z = 9, x - 2y + 3z = 16$

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2. Solve the following system of linear equations in three variables

$\frac{1}{x} - \frac{2}{y} + 4 = 0, \frac{1}{y} - \frac{1}{z} + 1 = 0, \frac{2}{z} + \frac{3}{x} = 14$

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3. Solve the following system of linear equations in three variables

$$x + 20 = \frac{3y}{2} + 10 = 2z + 5 = 110 - (y + z)$$

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4. Discuss the nature of solutions of the following system is equations

$$x + 2y - z = 6, \ -3x - 2y + 5z = \ -12, x - 2z = 3$$

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5. Discuss the nature of solutions of the following system is equations

$$2y + z = 3(-x + 1), \ -x + 3y - z = \ -4, 3x + 2y + z = \ -\frac{1}{2}$$

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6. Discuss the nature of solutions of the following system is equations

$$\frac{y+z}{4}=\frac{z+x}{3}=\frac{x+y}{2}, x+y+z=27$$

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7. Vani, her father and her grand father have an average age of 53. One-half of her grand father's age plus one-third of her father's age plus one fourth of Vani's age is 65. Four years ago if Vani's grandfather was four times as old as Vani then how old are they all now?

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8. The sum of the digits of a three-digit number is 11. If the digits are revesed, the new number is 46 more than five times the former number. If the hundreds digit plus twice the tens digit is equal to the units digits, then find the original three digit number?

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9. There are 12 pieces of five, ten and twenty rupee currrencies whose total value is ₹105. When first 2 sorts are interchanged in their numbers its value will be increased by ₹20. Find the number of currencies in each sort.

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Solution To Exercise 3 2

1. Find the GCD of the given polynomials

$x^4 + 3x^3 - x - 3, x^3 + x^2 - 5x + 3$

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2. Find the GCD of the given polynomials

$x^4 - 1, x^3 - 11x^2 + x - 11$

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3. Find the GCD of the given polynomials

$3x^4 + 6x^3 - 12x^2 - 24x, 4x^4 + 14x^3 + 8x^2 - 8x$

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4. Find the GCD of the given polynomials

$3x^3 + 3x^2 + 3x + 3, 6x^3 + 12x^2 + 6x + 12$

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5. Find the LCM of the given expressions.

$4x^2y, 8x^3y^2$

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6. Find the LCM of the given expressions.

$-9a^3b^2, 12a^2b^2c$

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7. Find the LCM of the given expressions.

$16m, \ -12m^2n^2, 8n^2$

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8. Find the LCM of the given expressions.

$p^2 - 3p + 2, p^2 - 4$

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9. Find the LCM of the given expressions.

$2x^2 - 5x - 3, 4x^2 - 36$

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10. Find the LCM of the given expressions.

$\left(2x^2 - 3xy\right)^2$, (4x-6y)^(3), 8x^(3)-27y^(3)`

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Solution To Exercise 3 3

1. Find the LCM and GCD for the following and verify that $f(x) \times g(x) = LCM \times GCD$

$21x^2y, 35xy^2$

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2. Find the LCM and GCD for the following and verify that $f(x) \times g(x) = LCM \times GCD$

$(x^3-1)(x+1), x^3+1$

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3. Find the LCM and GCD for the following and verify that $f(x) \times g(x) = LCM \times GCD$

$(x^2y+xy^2), (x^2+xy)$

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4. Find the LCM of each pair of the following polynomials

$a^2+4a-12, a^2-5a+6$ whose GCD is a-2

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5. Find the LCM of each pair of the following polynomials

$x^4-27a^3x, (x-3a)^2$ whose GCD is (x-3a)

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6. Find the GCD for each pair of the following polynomials

$12\left(x^4-x^3\right), 8\left(x^4-3x^3+2x^2\right)$ whose LCM is $24^3(x-1)(x-2)$

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7. Find the GCD for each pair of the following polynomials

$\left(x^3+y^3\right), \left(x^4+x^2y^2+y^4\right)$ whose LCM is $\left(x^3+y^3\right)\left(x^2+xy+y^2\right)$

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8. Given the LCM and GCD of the two polynomials p(x) and q(x) find the unknownn polynomial in the following table

S. No	LCM	GCD	$p(x)$	$q(x)$
(i)	$a^3 - 10a^2 + 11a + 70$	$a - 7$	$a^2 - 12a + 35$	
(ii)	$(x^2 + y^2)(x^4 + x^2y^2 + y^4)$	$(x^2 - y^2)$		$(x^4 - y^4)(x^2 + y^2 - xy)$

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Solution To Exercise 3 4

1. Reduce each of the following retional expression to its lowest table form .

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

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2. Reduce each of the following retional expression to its lowest table form .

$$\frac{x^2 - 11x + 18}{x^2 - 4x + 4}$$

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3. Reduce each of the following retional expression to its lowest table form .

$$\frac{9x^2 + 81x}{x^3 + 8x^2 - 9x}$$

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4. Reduce each of the following retional expression to its lowest table form .

$$\frac{p^2 - 3p - 40}{2p^3 - 24p^2 + 64p}$$

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5. Find the excluded values, if any of the following expressions

$$\frac{y}{y^2 - 25}$$

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6. Find the excluded values, if any of the following expressions

$$\frac{t}{t^2 - 5t + 6}$$

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7. Find the excluded values, if any of the following expressions

$$\frac{x^2 + 6x + 8}{x^2 + x - 2}$$

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8. Find the excluded values, if any of the following expressions

$$\frac{x^3 - 27}{x^3 + x^2 - 6x}$$

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Solution To Exercise 3 5

1. Simplify

$$\frac{4x^2y}{2z^2} \times \frac{6xz^3}{20y^4}$$

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2. Simplify

$$\left(\frac{p^2 - 10p + 21}{p - 7} \times \frac{p^2 + p - 12}{(p - 3)^2}\right)$$

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3. Simplify

$$\frac{5t^3}{4t - 8} \times \frac{6t - 12}{10t}$$

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4. Simplify

$$\frac{x+2}{4y} \div \frac{x^2-x-6}{12y^2}$$

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5. Simplify:

$$\frac{x^3-y^3}{3x^2+9xy+6y^2} \times \frac{x^2+2xy+y^2}{x^2-y^2}$$

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6. Simplify

$$\frac{2a^2+5a+3}{2a^2+7a+6} \div \frac{a^2+6a+5}{-5a^2-35a-50}$$

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7. Simplify

$$\frac{b^2+3b-28}{b^2+4b+4} \div \frac{b^2-49}{b^2-5b-14}$$

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8. Simplify

$$\frac{x+2}{4y} \div \frac{x^2-x-6}{12y^2}$$

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9. Simplify

$$\frac{12t^2-22t+8}{3t} \div \frac{3t^2+2t-8}{2t^2+4t}$$

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10. If a polynomial $p(x) = x^2 - 5x - 14$ is divided by another polynomial q(x) we get $\frac{x-7}{x+2}$, find q(x).

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Solution To Exercise 3 6

1. Simplify

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

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2. Simplify

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

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3. Simplify

$$\frac{x^3}{x-y}+\frac{y^3}{y-x}$$

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4. Simplify

$$\frac{(2x+1)(x-2)}{x-4}-\frac{\left(2x^2-5x+2\right)}{x-4}$$

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5. Simplify

$$\frac{4x}{x^2-1}-\frac{x+1}{x-1}$$

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6. Subtract $\frac{1}{x^2+2}$ from $\frac{2x^3+x^2+3}{\left(x^2+2\right)^2}$

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7. Which rational expression should be subtracted from $\frac{x^2+6x+8}{x^3+8}$ to get $\frac{3}{x^2-2x+4}$.

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8. If $A=\frac{2x+1}{2x-1}, B=\frac{2x-1}{2x+1}$ find $\frac{1}{A-B}-\frac{2B}{A^2-B^2}$

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9. If $A=\frac{x}{x+1}, B=\frac{1}{x+1}, provet\hat{}((A+B)\hat{}(2)+(A-B)\hat{}(2))/(A\div B)=(2(x\hat{}(2)+1))/(x(x+1)\hat{}(2))`$

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10. Peri needs 4 hours to complete a work. His friend Yuvan needs 6 hours to complete the same work. How long will take to complete if

they work together?

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11. Iniya bought 50 kg of fruits consisting of apples and bananas. She paid twice as much per kg for the apple as she did for the banana. If Iniya bought ₹1800 worth of apples and ₹600 worth bananas, then how many kg of each fruits did she buy?

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Solution To Exercise 3 7

1. Find the square root of the following rational expressions.

$$\frac{400x^4y^{12}z^{16}}{100x^8y^4z^4}$$

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2. Find the square root of the following rational expressions.

$$\frac{7x^2 + 2\sqrt{14}x + 2}{x^2 - \frac{1}{2}x + \frac{1}{16}}$$

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3. Find the square root of the following rational expressions.

$$\frac{121(a+b)^8(x+y)^8(b-c)^8}{81(b-c)^4(a-b)^{12}(b-c)^4}$$

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4. Find the square root of the following

$$4x^2 + 20x + 25$$

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5. Find the square root of the following

$$9x^2 - 24xy + 30xz - 40yz + 25z^2 + 16y^2$$

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6. Find the square root of the following

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

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7. Find the square root of the following

$$\left(4x^2-9x+2\right)\left(7x^2-13x-2\right)\left(28x^2-3x-1\right)$$

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8. Find the square root of the following

$$\left(2x^2+\frac{17}{6}x+1\right)\left(\frac{3}{2}x^2+4x+2\right)\left(\frac{4}{3}x^2+\frac{11}{3}x+2\right)$$

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Solution To Exercise 3 8

1. Find the square root of the following polynomials by division method

$x^4 - 12x^3 + 42x^2 - 36x + 9$

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2. Find the square root of the following polynomials by division method

$37x^2 - 28x^3 + 4x^4 + 42x + 9$

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3. Find the square root of the following polynomials by division method

$16x^4 + 8x^2 + 1$

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4. Find the square root of the following polynomials by division method

$121x^4 - 198x^3 - 183x^2 + 216x + 144$

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5. Find the square root of the expressions

$\frac{x^2}{y^2} - 10\frac{x}{y} + 27 - 10\frac{y}{x} + \frac{y^2}{x^2}$

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6. Find the values of a and b if the following polynomials are perfect squares

$4x^4 - 12x^3 + 37x^2 + bx + a$

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7. Find the values of a and b if the following polynomials are perfect squares

$ax^4 + bx^3 + 361ax^2 + 220x + 100$

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8. Find the values of m and n if the following expression are perfect squares.

$\frac{1}{x^4} - \frac{6}{x^3} + \frac{13}{x^2} + \frac{m}{x} + n$

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9. Find the values of m and n if the following expression are perfect squares.

$x^4 - 8x^3 + mx^2 + nx + 16$

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Solution To Exercise 3 9

1. Determine the quadratic equations, whose sum and product of roots are

$-9, 20$

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2. Determine the quadratic equations, whose sum and product of roots are

$\frac{5}{3}, 4$

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3. Determine the quadratic equations, whose sum and product of roots are

$\frac{-3}{2}, -1$

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4. Determine the quadratic equations, whose sum and product of roots are

$-(2-a)^2, (a+5)^2$

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5. Find the sum and product of the roots for each of the following quadratic equations

$x^2 + 3x - 28 = 0$

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6. Find the sum and product of the roots for each of the following quadratic equations

$x^2 + 3x - 28 = 0$

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7. Find the sum and product of the roots for each of the following quadratic equations

$3 + \frac{1}{a} = \frac{10}{a^2}$

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8. Find the sum and product of the roots for each of the following quadratic equations

$3y^2 - y - 4 = 0$

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Solution To Exercise 3 10

1. Solve the following quadratic equations by factorization method.

$4x^2 - 7x - 2 = 0$

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2. Solve the following quadratic equations by factorization method.

$3\left(p^2 - 6\right) = p(p + 5)$

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3. Solve the following quadratic equations by factorization method.

$\sqrt{a(a - 7)} = 3\sqrt{2}$

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4. Solve the following quadratic equations by factorization method.

$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

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5. Solve the following quadratic equations by factorization method.

$$2x^2 - x + \frac{1}{8} = 0$$

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6. The number of volleyball games that must be scheduled in a league with n teams is given by $G(n) = \frac{n^2 - n}{2}$ where each team plays with every other team exactly once. A league scheledules 15 games. How many teams are in the league?

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Solution To Exercise 3 11

1. Solve the following quadratic equation by completing the square method

$9x^2 - 12x + 4 = 0$

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2. Solve the following quadratic equation by completing the square method

$\frac{5x + 7}{x - 1} = 3x + 2$

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3. Solve the following quadratic equation by formula method

$2x^2 - 5x + 2 = 0$

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4. Solve the following quadratic equation by formula method

$\sqrt{2}f^2 - 6f + 2\sqrt{2}$

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5. Solve the following quadratic equations by formula method

$3y^2 - 20y - 23 = 0$

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6. Solve the following quadratic equation by formula method

$36y^2 - 12ay + \left(a^2 - b^2\right) = 0$

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7. A ball rolls down a slope and travels a distance $d = t^2 - 0.75t$ feet in t seconds. Find the time when the distance traveled by the ball is

11.25feet.

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Solution To Exercise 3 12

1. If the difference between a number and its reciprocal is $\frac{24}{5}$, find the number.

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2. A garden measuring 12m by 16m is to have wide installed all the way around so that it incease the total area of $285m^2$. What is the width of the pathway?

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3. A bus covers a distance of 90km at a unform speed. Had the speed been 15km/hour more it would have taken 30 minutes less for the journey. Find the original speed of the bus.

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4. A girl is twice as old as her sister. Five years hence, the product of their ages (in years) will be 375. Find their present ages.

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5. A pole has to be erected at a point on the boundary of a circular ground of diameter 20m in such a way that the difference of its distance form two diameterically opposite fixed gates P and Q on the boundary is 4 m. Is it possible to do so? If answer is yes at what distance from the two gates should the pole be erected?

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6. From a group of black bees $2x^2$, square root of half of the group went to a tree. Again eightninth of th ebess went to the same tree. The remaining two got caught up in a fragrant lotus. How many bees were there in total?

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7. Music is been played in two opposite galleries with certain group of people. In the first gallery a group of 4 singers were singing and in the second gallery 9 singers were singing. The two galleries are separate by the distance of 70m. Where should a person stand for hearing the same intensity of the singers voice? (Hit: The ratio of the sound intensity is equal to square of the ratio of their corresponding distances).

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8. There is a square field whose side is 10 m. A square flower bed is prepared in its centre leaving a gravel path all round the flower bed. The total cost of the laying the flower bed and gravelling the path at ₹3 and ₹4 per square metre respectively is ₹364. Find the width of the gravel path.

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9. Two woman together took 100 eggs to a market, one had more than the other. Both sold tham for the same sum of the money. The first then said to the second, "If 1 had your eggs, I would have earned ₹15", to which the second replied: "If 1 had your eggs, I would have earned ₹ $6\frac{2}{3}$?. How many eggs did each had in the beginning?

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10. The hypotenuse of a right angled triangle is 25cm an dits perimeter 56 cm. Find the length of the smallest side.

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Solution To Exercise 3 13

1. Determine the nature of the roots for the following quadratic equations

$15x^2 + 11x + 2 = 0$

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2. Determine the nature of the roots for the following quadratic equations

$x^2 - x - 1 = 0$

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3. Determine the nature of the roots for the following quadratic equations

$\sqrt{2}t^2 - 3t + 3\sqrt{2} = 0$

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4. Determine the nature of the roots for the following quadratic equations

$9y^2 - 6\sqrt{2}y + 2 = 0$

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5. Determine the nature of the roots for the following quadratic equations

$9a^2b^2x^2 - 24abcdx + 16c^2d^2 = 0, a \neq 0, b \neq 0$

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6. Find the value of 'k' for which the roots of the following equations are real and equal

$(5k-6)x^2+2kx+1=0$

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7. Find the value of 'k' for which the roots of the following equations are real and equal

$kx^2+(6k+2)x+16=0$

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8. If the roots of $(a-b)x^2+(b-c)x+(c-a)=0$ are real and equal, then prove that b, a, c are in arithmetic progression.

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9. If a, b are real then show that the roots of the equation $(a-b)x^2-6(a+b)x-9(a-b)=0$ are real and unequal.

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10. If the roots of the equation $\left(c^2-ab\right)x^3-2\left(a^2-bc\right)x+b^2-ac=0$ are real and equal prove that either $a=0$ (or) $a^3+b^3+c^3=3\text{abc}$.

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Solution To Exercise 3 14

1. Write each of the following expressions in terms of $\alpha+\beta$ and $\alpha\beta$.

$\frac{\alpha}{3\beta}+\frac{\beta}{3\beta}$

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2. Write each of the following expressions in terms of $\alpha + \beta$ and $\alpha\beta$.

$$\frac{1}{\alpha^2\beta} + \frac{1}{\beta^2\alpha}$$

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3. Write each of the following expressions in terms of $\alpha + \beta$ and $\alpha\beta$.

$$(3\alpha - 1)(3\beta - 1)$$

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4. Write each of the following expressions in terms of $\alpha + \beta$ and $\alpha\beta$.

$$\frac{\alpha + 3}{\beta} + \frac{\beta + 3}{\alpha}$$

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5. The roots of the equation $2x^2 - 7x + 5 = 0$ are α and β. Without solving the root find

$\frac{1}{\alpha}+\frac{1}{\beta}$

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6. The roots of the equation $2x^2-7x+5=0$ are α and β. Without solving the root find

$\frac{\alpha+2}{\beta+2}+\frac{\beta+2}{\alpha+2}$

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7. The roots of the equation $2x^2-7x+5=0$ are α and β. Without solving the root find

$\frac{\alpha+2}{\beta+2}+\frac{\beta+2}{\alpha+2}$

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8. The roots of the equation $x^2 + 6x - 4 = 0$ are α, β. Find the quadratic equation whose roots area

α^2 and β^2

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9. The roots of the equation $x^2 + 6x - 4 = 0$ are α, β. Find the quadratic equation whose roots area

$\frac{2}{\alpha}$ and $\frac{2}{\beta}$

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10. The roots of the equation $x^2 + 6x - 4 = 0$ are α, β. Find the quadratic equation whose roots area

$(\alpha^2\beta)$ and $\beta^2\alpha$

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11. If α, β are the roots of $7x^2 + ax + 2 = 0$ and if $\beta - \alpha = \frac{-13}{7}$. find the value of a.

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12. If one root of the equation $2y^2 - ay + 64 = 0$ is twice the other then find the values of a.

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13. If one root of the equation $3x^2 + kx + 81 = 0$ (having real roots) is the square of the other then find k.

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Solution To Exercise 3 15

1. Graph the following quadratic equations and state their nature of solutions.

$x^2 - 9x + 20 = 0$

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2. Graph the following quadratic equations and state their nature of solutions.

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

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3. Graph the following quadratic equations and state their nature of solutions.

$x^2 + x + 7 = 0$

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4. Graph the following quadratic equations and state their nature of solutions.

$x^2 - 9x + 20 = 0$

Watch Video Solution

5. Graph the following quadratic equations and state their nature of solutions.

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

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6. Graph the following quadratic equations and state their nature of solutions.

$(2x - 3)(x + 2) = 0$

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7. Draw the graph of $y = x^2 - 4$ and hence solve $x^2 - x - 12 = 0$.

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8. Draw the graph of $y = x^2 + x$ and hence solve $x^2 + 1 = 0$.

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9. Draw the graph of $y = x^2 + 3x + 2$ and use it to solve $x^2 + 2x + 1 = 0$.

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10. Draw the graph $y = x^2 + 3x - 4$ and hence use it to solve $x^2 + 3x - 4 = 0$.

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11. Draw the graph of $y = x^2 - 5x + 6$ and hence solve $x^2 - 5x - 14 = 0$.

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12. Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$.

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13. Draw the graph of $y = (x - 1)(x + 3)$ and hence solve $x^2 - x - 6 = 0$.

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Solution To Exercise 3 16

1. In the matrix $A = \begin{bmatrix} 8 & 9 & 4 & 3 \\ -1 & \sqrt{7} & \frac{\sqrt{3}}{2} & 5 \\ 1 & 4 & 3 & 0 \\ 6 & 8 & -11 & 1 \end{bmatrix}$, write

The number of elements.

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2. If the matrix has 18 elements, what are the possible orders it can have? What if it has 6 elements?

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3. Construct a 3×3 matrix whose elements are given by

$a_{ij} = |i - 2j|$

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4. Construct a 3×3 matrix whose elements are given by

$$a_{ij} = \frac{(i+j)^3}{3}$$

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5. If $A = \begin{bmatrix} 5 & 4 & 3 \\ 1 & -7 & 9 \\ 3 & 8 & 2 \end{bmatrix}$ then find the transpose of A.

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6. If $A = \begin{bmatrix} \sqrt{7} & -3 \\ -\sqrt{5} & 2 \\ \sqrt{3} & -5 \end{bmatrix}$ then find the transpose of -A.

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7. If $A = \begin{bmatrix} 5 & 2 & 2 \\ -\sqrt{17} & 0.7 & \frac{5}{2} \\ 8 & 3 & 1 \end{bmatrix}$ then verify $\left(A^T\right)^T = A$.

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8. Find the values of x, y, and z from the following equations

$$\begin{bmatrix} 12 & 3 \\ x & \frac{3}{2} \end{bmatrix} = \begin{bmatrix} y & z \\ 3 & 5 \end{bmatrix}$$

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9. Find the values of x, y, and z from the following equations

$$\begin{bmatrix} x+y & 2 \\ 5+z & xy \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 5 & 8 \end{bmatrix}$$

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10. Find the values of x, y, and z from the following equations

$$\begin{bmatrix} x+y+a \\ x+z \\ y+z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}$$

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Solution To Exercise 3 17

1. If $A = \begin{bmatrix} 1 & 9 \\ 3 & 4 \\ 8 & -3 \end{bmatrix}, B = \begin{bmatrix} 5 & 7 \\ 3 & 3 \\ 1 & 0 \end{bmatrix}$ then verify that

$A + B = B + A$

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2. If $A = \begin{bmatrix} 1 & 9 \\ 3 & 4 \\ 8 & -3 \end{bmatrix}, B = \begin{bmatrix} 5 & 7 \\ 3 & 3 \\ 1 & 0 \end{bmatrix}$ then verify that

$A + (-A) = (-A) + A$

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3. If $A = \begin{bmatrix} 4 & 3 & 1 \\ 2 & 3 & -8 \\ 1 & 0 & -4 \end{bmatrix}, B = \begin{bmatrix} 2 & 3 & 4 \\ 1 & 9 & 2 \\ -7 & 1 & -1 \end{bmatrix}, C = \begin{bmatrix} 8 & 3 & 4 \\ 1 & -2 & 3 \\ 2 & 4 & -1 \end{bmatrix}$

then verify that $A + (B + C) = (A + B) + c$

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4. Find the X and Y if $X+Y=\begin{bmatrix}7 & 0\\ 3 & 5\end{bmatrix}$ and $X-Y=\begin{bmatrix}3 & 0\\ 0 & 4\end{bmatrix}$

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5. If $A=\begin{bmatrix}0 & 4 & 9\\ 8 & 3 & 7\end{bmatrix}, B=\begin{bmatrix}7 & 3 & 8\\ 1 & 4 & 9\end{bmatrix}$ find the value of

B-5A

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6. If $A=\begin{bmatrix}0 & 4 & 9\\ 8 & 3 & 7\end{bmatrix}, B=\begin{bmatrix}7 & 3 & 8\\ 1 & 4 & 9\end{bmatrix}$ find the value of

3A-9B

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7. Find the value of x, y, z if

$$\begin{pmatrix} x-3 & 3x-z \\ x+y+7 & x+y+z \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 1 & 6 \end{pmatrix}$$

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8. Find the value of x, y, z if

$$[x \quad y-z \quad z+3] + [y \quad 4 \quad 3]$$

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9. Find x and y if $x\begin{pmatrix} 4 \\ -3 \end{pmatrix} x + y\begin{pmatrix} -2 \\ 3 \end{pmatrix} = \begin{pmatrix} 4 \\ 6 \end{pmatrix}$.

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10. Find the non-zero values of x satisfying the matrix equation

$$x\begin{bmatrix} 2x & 2 \\ 3 & x \end{bmatrix}, 2\begin{bmatrix} 8 & 5x \\ 4 & 4x \end{bmatrix} = 2\begin{bmatrix} x^2+8 & 24 \\ 10 & 6x \end{bmatrix}$$

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Solution To Exercise 3 18

1. Find the order of the product matrix AB is

	(i)	(ii)	(iii)	(iv)	(v)
Orders of A	3×3	4×3	4×2	4×5	1×1
Orders of B	3×3	3×2	2×2	5×1	1×3

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2. If A is of order $p \times q$ and B is of order $q \times r$, what is order of AB and BA?

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3. A has 'a' rows and 'a+3' columns. B has 'b' rows and '17-b' columns, and if both products AB and BA exists, find a, b?

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4. If $A = \begin{bmatrix} 2 & 5 \\ 4 & 3 \end{bmatrix}, B = \begin{bmatrix} 1 & -3 \\ 2 & 5 \end{bmatrix}$ find AB, BA and check if AB=BA?

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5. Given that $A = \begin{bmatrix} 1 & 3 \\ 5 & -1 \end{bmatrix}, B = \begin{bmatrix} 1 & -1 & 2 \\ 3 & 5 & 2 \end{bmatrix}, C = \begin{bmatrix} 1 & 3 & 2 \\ -4 & 1 & 3 \end{bmatrix}$ verify that $A(B + C) = AB + AC$.

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6. Show that the matrices $A = \begin{bmatrix} 1 & 2 \\ 3 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & -2 \\ -3 & 1 \end{bmatrix}$ satisfy commutative property AB=BA.

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7. Let $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}, B = \begin{bmatrix} 4 & 0 \\ 1 & 5 \end{bmatrix}, C = \begin{bmatrix} 2 & 0 \\ 1 & 2 \end{bmatrix}$ show that

$A(BC) = (AB)C$

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8. Let $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}, B = \begin{bmatrix} 4 & 0 \\ 1 & 5 \end{bmatrix}, C = \begin{bmatrix} 2 & 0 \\ 1 & 2 \end{bmatrix}$ show that

$(A - B)C = AC - BC$

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9. Let $A = \begin{bmatrix} 1 & 2 \\ 1 & 3 \end{bmatrix}, B = \begin{bmatrix} 4 & 0 \\ 1 & 5 \end{bmatrix}, C = \begin{bmatrix} 2 & 0 \\ 1 & 2 \end{bmatrix}$ show that

$(A - B)^T = A^T - B^T$

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10. If $A = \begin{pmatrix} \cos\theta & 0 \\ 0 & \cos\theta \end{pmatrix}, B = \begin{pmatrix} \sin\theta & 0 \\ 0 & \sin\theta \end{pmatrix}$ then show that $A^2 + B^2 = I$.

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11. If $A = \begin{pmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{pmatrix}$ prove that $AA^T = I$.

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12. Verify that $A^2 = I$ when $A = \begin{pmatrix} 5 & -4 \\ 6 & -5 \end{pmatrix}$

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13. If $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ and $I - \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$ show that $A^2 - (a+d)A = (bc - ad)I_2$.

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14. If $A = \begin{bmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{bmatrix}, B = \begin{bmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{bmatrix}$ verify that $(AB)^T = B^T A^T$.

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15. If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ show that $A^2 - 5A + 7I_2 = 0$

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Solution To Exercise 3 19 Multiple Choice Questions

1. A system of three linear equations in three variables is inconsistent if their planes.

A. intersect only at a point

B. intersect in a line

C. coincides with each other

D. do not intersect

Answer: D

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2. The solution of the system $x + y - 3z = -6, -7y + 7z = 7, 3z = 9$ is

A. $x = -1, y = -2, z = 3$

B. $x = -1, y = 2, z = 3$

C. $x = -1, y = -2, z = 3$

D. $x = 1, y = 2, z = 3$

Answer: A::D

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3. If (x-6) is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is.

A. 3

B. 5

C. 6

D. 8

Answer: B

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4. $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is

A. $\frac{9y}{7}$

B. $\frac{9y^2}{(21y-21)}$

C. $\frac{21y^2-42y+21}{3y^3}$

D. $\frac{7(y^2-2y+1)}{y^2}$

Answer: A

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5. $y^2+\frac{1}{y^2}$ is not equal to

A. $\frac{y^4+1}{y^2}$

B. $\left(y+\frac{1}{y}\right)^2$

C. $\left(y-\frac{1}{y}\right)^2+2$

D. $\left(y+\frac{1}{y}\right)^2-2$

Answer: B

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6. $\frac{x}{x^2-25}-\frac{8}{x^2+6x+5}$ gives

A. $\frac{x^2 - 7x + 40}{(x-5)(x+5)}$

B. $\frac{x^2 + 7x + 40}{(x-5)(x+5)(x+1)}$

C. $\frac{x^2 - 7x + 40}{(x^2-25)(x+1)}$

D. $\frac{x^2 + 10}{(x^2-25)(x+1)}$

Answer: C

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7. The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to

A. $\left(\frac{16x^2z^4}{5y^2}\right)$

B. $\left(\frac{16y^2}{x^2z^4}\right)$

C. $\left(\frac{16y}{5xz^2}\right)$

D. $\left(\frac{16xz^2}{5y}\right)$

Answer: D

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8. Which of the following should be added to make $x^4 + 64$ a perfect square.

A. $4x^2$

B. $16x^2$

C. $8x^2$

D. $-8x^2$

Answer: B

Watch Video Solution

9. The solution of $(2x - 1)^2 = 9$ is equal to

A. -1

B. 2

C. $-1, 2$

D. None of these

Answer: C

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10. The values of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are

A. 100, 120

B. 10, 12

C. $-120, 100$

D. 12, 10

Answer: C

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11. If the roots of the equation $q^2x^2 + p^2x + r^2 = 0$ are the squares of the roots of the equation $qx^2 + px + r = 0$, are the squares of the roots of the equation $qx^2 + px + r = 0$, then q, p, r are in:

A. A.P

B. G.P

C. Both A.P and G.P

D. None of these

Answer: B

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12. Graph of a linear polynomial is a

A. straight line

B. circle

C. parabola

D. hyperbola

Answer: A

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13. The number of points of intersection of the quadratic polynomial $x^2 + 4x + 4$ with the X axis.

A. 0

B. 1

C. 0 or 1

D. 2

Answer: B

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14. For the given matrix $A = \begin{bmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{bmatrix}$ the order of the matrix A^T is

A. 2×3

B. 3×2

C. 3×4

D. 4×3

Answer: D

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15. If A is a 2×3 matrix and B is 3×4 matrix, how many columns does AB have

A. 3

B. 4

C. 2

D. 5

Answer: B

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16. If number of columns and rows are not equal in a matrix then it is said to be a

A. diagonal matrix

B. rectangular matrix

C. square matrix

D. identify matrix

Answer: B

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17. Transpose of a columns matrix is

A. unit matrix

B. diagonal matrix

C. column matrix

D. row matrix

Answer: D

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18. Find the matrix X if $2X + \begin{bmatrix} 1 & 3 \\ 5 & 7 \end{bmatrix} = \begin{bmatrix} 5 & 7 \\ 9 & 5 \end{bmatrix}$

A. $\begin{pmatrix} -2 & -2 \\ 2 & -1 \end{pmatrix}$

B. $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$

C. $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$

D. $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$

Answer: B

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19. Which of the following can be caluculated from the given matrices

$$A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}, B = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

(i)A^2 (ii)B^2

(iii)AB (iv)BA

A. (i) and (ii) only

B. (ii) and (iii) only

C. (ii) and (iv) only

D. all of these

Answer: C

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20. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 \\ 2 & -1 \\ 0 & 2 \end{bmatrix}$ and $C = \begin{bmatrix} 0 & 1 \\ -2 & 5 \end{bmatrix}$ which of the following statements are corrrect? (i) $AB + C = \begin{bmatrix} 5 & 5 \\ 5 & 5 \end{bmatrix}$ (ii) $BC = \begin{bmatrix} 0 & 1 \\ 2 & -3 \\ -4 & 10 \end{bmatrix}$ (iii) $BA + C = \begin{bmatrix} 2 & 5 \\ 3 & 0 \end{bmatrix}$ (iv) $(AB)C = \begin{bmatrix} -8 & 20 \\ -8 & 13 \end{bmatrix}$

A. (i) and (ii) only

B. (ii) and (iii) only

C. (iii) and (iv) only

D. all of these

Answer: A

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Solution To Unit Exercise

1. Solve $\frac{1}{3}(x+y-5)=y-z=2x-11=9-(x+2z)$.

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2. One hundred and fifty students are admitted to a school. They are distributed over three sections A, B, C. If 6 students are shifted from section A to Sections C, the students will have equal number of students. If 4 times of students of section C exceeds the number of students of setion A by the number of students in sectionB, find the number of students in the sections.

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3. In a three-digit number, when the tens and the hundreds digit are interchanged the new number is 54 more than three times the original number. If 198 is added three times the original number. If 198 is added to the number, the digits are reversed. The tests difit exceeds the

hundreds digit by twice as that of the tens digit exceeds the unit digit.

Find the originall number.

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4. Find the least number common multiple of $xy(k^2+1)+k(x^2+y^2)$ and $xy(k^2-1)+k(x^2-y^2)$.

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5. Find the GCD of following by division algorithm $2x^4+13x^3+27x^2+23x+7, x^3+3x^2+3x+1, x^2+2x+1.$

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6. Reduce the given Rational expression to its lowest form

$$\frac{x^{3a}-8}{x^{2a}+2x^a+4}$$

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7. Reduce the given Rational expression to its lowest form

$$\frac{10x^3 - 25x^2 + 4x - 10}{-4 - 10x^2}.$$

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8. Simplify $\frac{\frac{1}{p} + \frac{1}{q+r}}{\frac{1}{p} - \frac{1}{q+r}} \times \left[1 + \frac{q^2 + r^2 - p^2}{2pr}\right]$

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9. Arul, Ravi, and Ram working together can clean a store in 6 hours. Working alone, Ravi takes twice as long to clean the store as Arul does. Ram needs three times as long as Arul does. How long would it take each if they are working alone?

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10. Find the square root of $289x^4 - 612x^3 + 970x^2 - 684x + 361$.

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11. Solve $\sqrt{y+1} + \sqrt{2y-5} = 3$.

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12. A boat takes 1.6 hours longer to go 36kms up a river than down the river. If the speed of the water current is 4 km per hr, what is the speed of the boat in still water?

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13. Is it possible to design a rectangular park of perimeter 320m and area $4800m^2$? If so find its length and breadth.

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14. At t minutes past 2pm, the time needed to 3 pm is 3minutes less than $\frac{t^2}{4}$ find t.

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15. The number of seats in a row is equal to the total number of rows in a hall. The total number of seats in the hall will increase by 375 if the number of rows is doubled and the number of seats in each row is reduced by 5. Find the number of rows in the hall at the beginning.

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16. If a and b are the roots of the polynomial $f(x) = x^2 - 2x + 3$, find the polynomial whose roots are

$\alpha + 2\beta$

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17. If a and b are the roots of the polynomial $f(x) = x^2 - 2x + 3$, find the polynomial whose roots are

$$\frac{\alpha - 1}{\alpha + 1}, \frac{\beta - 1}{\beta + 1}$$

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18. If -4 is a root of the equation $x^2 + px - 4 = 0$ and the equation $x^2 + px + q = 0$ has coincident roots, find the values of p and q.

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19. Two farmers and Ravi cultivates three varieties of grains namely rice, wheat and ragi. If the sale (in ₹) of three varieties of grains by both the farmers in the month of April is given by the matrix.

April sale in ₹

$$A = \begin{bmatrix} \text{rice} & \text{Wheat} & \text{ragi} \\ 500 & 1000 & 1500 \\ 2500 & 1500 & 500 \end{bmatrix} \begin{matrix} \text{Senthil} \\ \text{Ravi} \end{matrix}$$

and the May month sale (in ₹) is exactly twice as that of the April month sale for each variety.

What is the average sales of the months April and May.

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20. Two farmers and Ravi cultivates three varieties of grains namely rice, wheat and ragi. If the sale (in ₹) of three varieties of grains by both the farmers in the month of April is given by the matrix.

April sale in ₹

$$A = \begin{bmatrix} \text{rice} & \text{Wheat} & \text{ragi} \\ 500 & 1000 & 1500 \\ 2500 & 1500 & 500 \end{bmatrix} \begin{matrix} \text{Senthil} \\ \text{Ravi} \end{matrix}$$

and the May month sale (in ₹) is exactly twice as that of the April month sale for

each variety.

If the sales continue to increase in the same way in the successive months, what will be sales in the month of August?

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21. If $\cos\theta\begin{pmatrix}\cos\theta & \sin\theta\\ -\sin\theta & \cos\theta\end{pmatrix}+\sin\theta\begin{pmatrix}x & -\cos\theta\\ \cos\theta & x\end{pmatrix}=I_2$, find x.

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22. Given $A=\begin{bmatrix}p & 0\\ 0 & 2\end{bmatrix}, B=\begin{bmatrix}0 & q\\ 1 & 0\end{bmatrix}, C=\begin{bmatrix}2 & -2\\ 2 & 2\end{bmatrix}$ and If $BA=C^2$, find p and q.

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23. $A=\begin{bmatrix}3 & 0\\ 4 & 5\end{bmatrix}, B=\begin{bmatrix}6 & 3\\ 8 & 5\end{bmatrix}, C=\begin{bmatrix}3 & 6\\ 1 & 1\end{bmatrix}$ find the matrix D, such that $CD-AB=0$.

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Solution Thinking Corner

1. The number of possible solutions when solving system of linear equations in three variables are .....

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2. If three planes are parallel then the number of possible point(s) of intersection is/are .....

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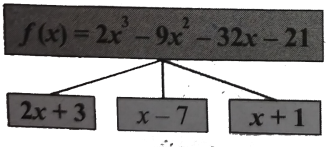
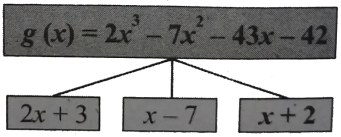
3. Complete the factor tree for the given polynomials f(x) and g(x). Hence find their GCD and LCM.





1. GCD $[f(x) \text{ and } g(x)]$ = ...

2. LCM $[f(x) \text{ and } g(x)]$ = ...

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4. Is

$f(x) \times g(x) \times r(x) = LCM[f(x), g(x), r(x)] \times GCD[f(x), g(x), r(x)]$

?

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5. Are $x^2 - 1$ and $\tan x = \dfrac{\sin x}{\cos x}$ rational expressions ?

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6. The number of excluded values of $\frac{x^3 + x^2 - 10x + 8}{x^4 + 8x^2 - 9}$ is .....

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Solution Thinking Corner Say True Or False

1. Fill up the empty box in each of the given expression so that the resulting quadratic polynomial becomes a perfect square.

(i) $x^2 + 14x +$ .....

(ii) $x^2 - 24x +$ .....

(iii) $(p)^2 + 2qp +$ .....

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Solution To Progress Check

1. For system of linear equations with three variables the minimum number of equations required to get unique solution is .....

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2. A system with ..... Will reduce to identity.

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3. A system with ..... Will provide absurd equation.

Watch Video Solution

4. If $r(x) = 0$ when f(x) is divided by g(x) then g(x) then g(x) is called ..... of the polynomials.

Watch Video Solution

5. If $f(x) = g(x)q(x) + r(x)$, ... must be added to f(x) to make f(x) completely divisible by g(x).

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6. If $f(x) = g(x)q(x) + r(x)$, ... Must be subtracted to f(x) to make f(x) completely divisible by g(x).

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7. Find the unknown expression in the following figures rectangle.

Area $= \frac{(x-4)(x+3)}{3x-12} km^2$ breadth = ? Length $= \frac{x-3}{3}$ km

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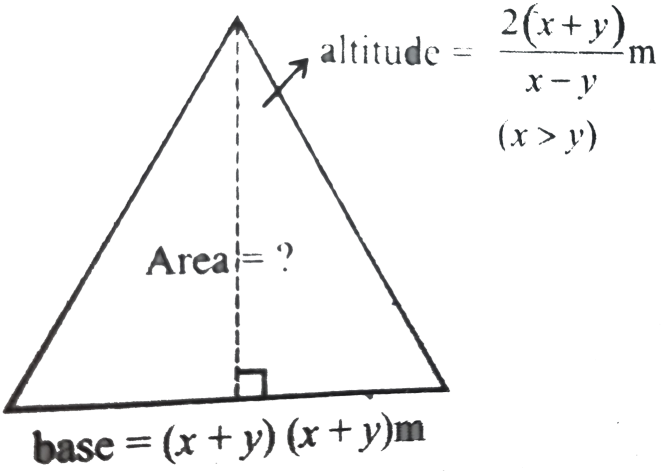
8. Find the unknown expression in the following figures.



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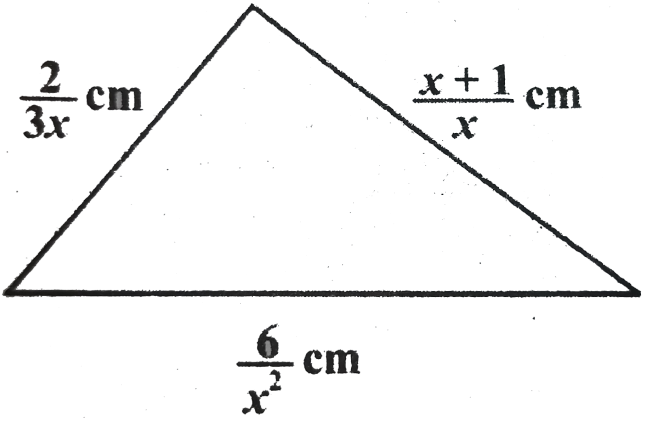
9. Write an expression that represents the perimeter of the figure and simplify.



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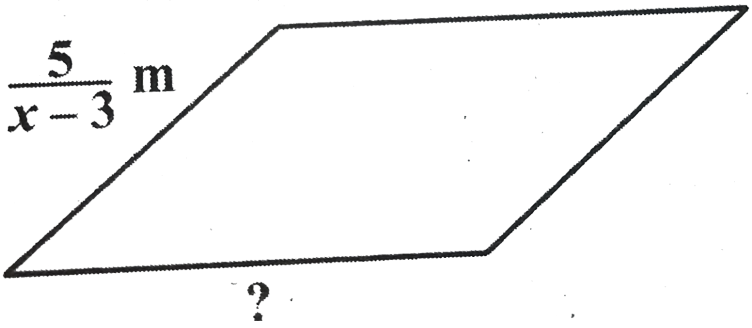
10. Find the base of the given parallelogram whose perimeter is $= \frac{4x^2 + 10x - 50}{(x-3)(x+5)}$.



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11. Is $x^2 + 4x + 4$ a perfect square ?

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12. What is the value of x in $3\sqrt{x} = 9$?

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13. The square root of $361x^4y^2$ is ___.

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14. $\sqrt{a^2x^2 + 2abx + b^2}$ = ...

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15. If a polynomial is a perfect square then its factors will be repeated ____ number of times.

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16. Find the element in second row and third column of the matrix $\begin{bmatrix} 1 & -2 & 3 \\ 2 & 1 & 5 \end{bmatrix}$ is _____.

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17. Find is the order of the matrix $\begin{pmatrix} \sin\theta \\ \cos\theta \\ \tan\theta \end{pmatrix}$

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18. Determine the entries denoted by $a_{11}, a_{22}, a_{33}, a_{44}$ from the matrix :

$$\begin{pmatrix} 2 & 1 & 3 & 4 \\ 5 & 9 & -4 & \sqrt{7} \\ 3 & \frac{5}{2} & 8 & 9 \\ 7 & 0 & 1 & 4 \end{pmatrix}$$

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19. The number of column(s) in a column matrix are .....

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20. The number of row(s) in a row matrix are .....

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21. The no-diagonal elements is any unit matrix are ___.

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22. Does there exist a square matrix with 32 elements ?

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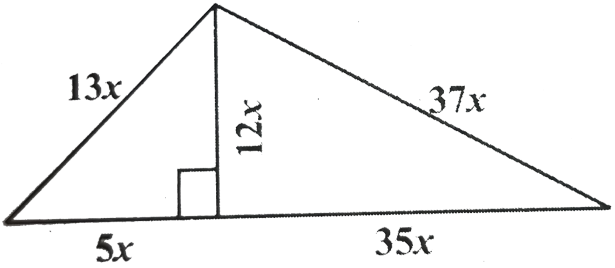
Solution To Activities

1. Find the ratio of the perimeter to the area of the given triangle.



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2. Serve the fishes (Equations) with its appropriate food (roots). Identify a fish which cannot be served ?

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3. Take calendar sheets of a particular month in a particular year.

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4. Construct matrices from the dates of the calendar sheet.

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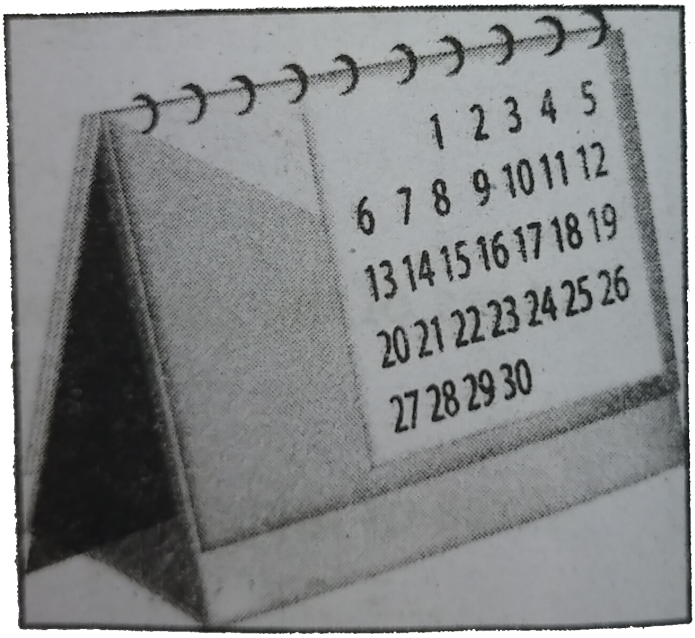
5. Find the maximum possible order of a matrix that you can create from the given calendar sheet.



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6. Mention the use of matrices to organize information from daily life situations.

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7. Do you find any relationship between number of elements (second column) and number of possible orders (fourth column)? If so, what is it ?

No.	Elements	Possible Orders	Number of Possible Orders
1.	4	$1 \times 4, 4 \times 1, 2 \times 2$	3
2.	9	$1 \times 9, 9 \times 1, 3 \times 3$	3
3.	20	$1 \times 20, 20 \times 1, 2 \times 10, 10 \times 2, 4 \times 5, 5 \times 4$	6
4.	8	$1 \times 8, 8 \times 1, 2 \times 4, 4 \times 2$	4
5.	1	1×1	1
6.	100	$1 \times 100, 100 \times 1, 2 \times 50, 50 \times 2, 25 \times 4, 4 \times 25, 10 \times 10$	7
7.	10	$1 \times 10, 10 \times 1, 2 \times 5, 5 \times 2$	4

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Other Important Objective Type Questions

1. A linear equation in two variables represent a ..... In xy plane.

A. circle

B. point

C. straight line

D. two straight lines

Answer: C

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2. Solve: $2x + y = 5, 3x - 2y = 4$

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3. The GCD of $x^4 - 1$ and $x^2 - 2x + 1$ is :

A. $\left(x^2 + 1\right)(x + 1)(x - 1)^2$

B. $(x - 1)^2$

C. $(x - 1)$

D. None of these

Answer: C

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4. The LCM of $6x^3y^2$ and $48x^2y^4$ is :

A. $48x^3y^4$

B. $6x^2y^2$

C. $6x^3y^4$

D. $48x^2y^2$

Answer: A

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5. LCM $\times$ GCD is equal to ..... Of two given numbers.

A. sum

B. product

C. difference

D. unity

Answer: B

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6. Reduce to its lowest terms $\frac{x^2 - 9}{x^2 - 7x + 12}$:

A. $\frac{x + 3}{x + 4}$

B. $\frac{x - 3}{x + 4}$

C. $\frac{x - 3}{x - 4}$

D. $\frac{x + 3}{x - 4}$

Answer: D

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7. Find the excluded value of $\frac{3p+2}{p^2-5p+6}$:

A. (6,1)

B. $(-2, -3)$

C. (2,3)

D. $\frac{-2}{3}, 6$

Answer: C

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8. Simplify : $\left(\frac{x^2-1}{(x^2-3x+2)}\right) \times \left(\frac{x-2}{x+1}\right)$

A. $\left(\frac{x-1}{x+2}\right)$

B. x

C. 1

D. 0

Answer: C

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9. Find : $\frac{16a^2 - 2a - 3}{8a^2 + 11a + 3} \div \frac{3a^2 - 2a - 1}{3a^2 - 11a - 4}$

A. 1

B. $\frac{a^2 - 9a + 2}{a - 1}$

C. $\frac{2a^2 - 9a + 4}{a^2 - 1}$

D. None of these

Answer: C

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10. If a polynomial $p(x) = x^2 - 6x - 7$ is divided by g(x), we get $\frac{x - 7}{x + 1}$ then g(x) is:

A. $\frac{x-1}{x+7}$

B. $\frac{x+1}{x-7}$

C. $(x+1)^2$

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

Answer: C

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11. Simplify : $\frac{x^2+1}{x^2+3x+2} - \frac{x^2-x}{x^2+3x+2}$

A. $\frac{1}{x+2}$

B. $\frac{1}{x+1}$

C. $\frac{2}{x+2}$

D. $\frac{x}{x+2}$

Answer: A

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12. Find the square root of: $\frac{144(a+b)^8(x-y)^4}{64(a-b)^2(x+y)^6}$

A. $\frac{3}{2}\frac{(a-b)^4(x-y)^2}{(a-b)(x+y)^3}$

B. $\frac{3}{2}\frac{(a+b)^6(x-y)^2}{(a-b)(x+y)^4}$

C. $\frac{3}{2}\frac{(a+b)^4(x-y)^2}{(a-b)^2(x+y)^6}$

D. None of these

Answer: A

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13. Find the square root of $\left(1+\frac{2}{x^4}+\frac{1}{x^8}\right)$:

A. $\left(1+\frac{1}{x^4}\right)$

B. $\left(1-\frac{1}{x^4}\right)$

C. $\frac{2}{1+x^4}$

D. $\frac{1}{(1+x^4)}$

Answer: A

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14. Find the zeros of $x^2 - 6x - 7$:

A. $(1, -7)$

B. $(7, -1)$

C. $(6, 7)$

D. $(-6, -7)$

Answer: B

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15. What is the quadratic equation fr which the sum and product of the roots are $\frac{-3}{4}$ and $-\frac{1}{2}$?

A. $4x^2 + 3x + 2$

B. $8x^2 - 10x - 3$

C. $4x^2 - 3x + 2$

D. $8x^2 + 10x + 3$

Answer: D

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16. Solve : $\sqrt{3}x^2 + 5x + 2\sqrt{3} = 0$

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

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

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

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

Answer: C

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17. The condition put the equation $x^2\left(p^2+q^2\right)-2x(pr+qs)+\left(r^2+s^2\right)=0$ has equal roots is :

A. $pr+qs=0$

B. $pr=qs$

C. $ps=qr$

D. None of these

Answer: C

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18. If α and β are roots of $x^2 + 8x + 10 = 0$ then $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$ is :

A. $-\frac{22}{5}$

B. $\frac{22}{5}$

C. $\frac{-5}{4}$

D. 44

Answer: B

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19. If $A = \begin{vmatrix} 8 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{vmatrix}$ then A is:

A. Scalar matrix

B. Diagonal matrix

C. Unit matrix

D. Row matrix

Answer: B

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20. If A is $(m \times n)$ matrix then A^T will be a matrix of the type :

A. $(n \times m)$

B. $(m \times n)$

C. $(n \times n)$

D. $(m \times m)$

Answer: A

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21. If $\begin{vmatrix} 1 & 2a+b \\ 0 & 3a-b \end{vmatrix} = \begin{vmatrix} 1 & 5 \\ 0 & 5 \end{vmatrix}$ find a and b:

A. $(-1, -2)$

B. $(3, 1)$

C. $(1, 2)$

D. $(2, 1)$

Answer: D

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22. Find x and y if $x\begin{bmatrix}4\\-2\end{bmatrix}+y\begin{bmatrix}2\\1\end{bmatrix}=\begin{bmatrix}10\\-6\end{bmatrix}$

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23. If $A=[1 \quad -1 \quad 2], B=\begin{bmatrix}-1 & 3\\4 & 3\\7 & -1\end{bmatrix}$ then AB is :

A. $(-9, 2)$

B. $[7]$

C. $\begin{bmatrix} 9 \\ -2 \end{bmatrix}$

D. $[9, \ -2]$

Answer: D

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24. $(AB)^T$ is :

A. $B^T A^T$

B. $A^T B^T$

C. $A^T - B^T$

D. $A^T + B^T$

Answer: A

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25. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ then $\mathrm{A}\ \mathrm{A}^T$ is :

A. A

B. A^T

C. I

D. O

Answer: C

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26. If A is (3×4) matrix and B is (4×3) matrix how many columns does AB have :

A. 1

B. 2

C. 3

D. 4

Answer: C

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27. Find the odd man out :

A. unit matrix

B. diagonal matrix

C. Scalar matrix

D. row matrix

Answer: D

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28. Find the incorrect statement from the following :

A. $(AB)^T = B^T A^T$

B. $A + B = B + A$ if A and B are of same type of matrix

C. $(A + B) + C = A + (B + C)$ if A, B, C are of same type of matrices

D. $\mathrm{A}\ \mathrm{A}^T = I$

Answer: D

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Other Important Objective Type Questions Match The Following

1. $x^4 - 8x^2 + k$ is a perfect square then k is

A. -1

B. 12

C. 190

D. 16

Answer: D

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2. $p^2x^2 + p^2x + q = 0$ the sum of the roots is

A. -1

B. 12

C. 190

D. 16

Answer: A

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3. 8, x, 18 are in GP then x is

A. -1

B. 12

C. 190

D. 16

Answer: B

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4. $1+2+3+\ldots+19$ is

A. -1

B. 12

C. 190

D. 16

Answer: C

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