

CBSE Class 8 Maths Sample Paper Set 1 Solution

Section A

(Explanations 1 to 12 carry 1 mark each)

1. Answer: B

Given that

Ramesh buys five apples at a cost of Rs.10 each

The cost price of 5 apples = $5 \times 10 = \text{Rs.}50$

He sells all apples to Ganesh at a profit of 10% = 110% of 50 = Rs.55

Therefore, selling price of each apple = $\frac{55}{5} = 11$

2. Answer: B

Given that $length (l) = mn$, $breadth (b) = m^2p$, $Depth(d) = pmn^2$

Volume of the rectangular box = $l \times b \times d$

$$\begin{aligned} &= mn \times m^2p \times pmn^2 \\ &= (m \times m^2 \times m) \times (n \times n^2) \times (p \times p) \end{aligned}$$

If bases are equal then their powers are to be added, $a^m \times a^n = a^{m+n}$

$$\begin{aligned} &= (m^{1+2+1}) \times (n^{1+2}) \times (p^{1+1}) \\ &= m^4n^3p^2 \end{aligned}$$

3. Answer: B

$$F + V - E = 2$$

Where 'F' stands for number of faces,

'V' stands for number of vertices and

'E' stands for number of edges.

This relationship is called Euler's formula

4. Answer: B

Given that,

Number of matches in a series (N) = 5

Matches won by the India = 60% of N

= 60% of 5

$$= \frac{60}{100} \times 5 = 3$$

No of matches lost by India = N - (Matches won by India)

$$= 5 - 3 = 2$$

5. Answer: A

Rewrite $p = 2q + 6$ as $p - 2q = 6$,

Taking the cube on both sides of $p - 2q = 6$, we get

$$(p - 2q)^3 = 6^3$$

Using the algebraic identity

$$(x \pm y)^3 = x^3 \pm y^3 \pm 3xy(x \pm y)$$

$$p^3 - (2q)^3 - 3(p)(2q)(p - 2q) = 216$$

$$p^3 - 8q^3 - 6pq(6) = 216 \text{ [Since given that } (p - 2q) = 6\text{]}$$

$$p^3 - 8q^3 - 36pq - 216 = 0$$

So the value of $p^3 - 8q^3 - 36pq - 216$ is 0

6. Answer: D

$$-\frac{22}{7} + \left(\frac{-3}{12}\right) = -\frac{22}{7} - \frac{3}{12}$$

Take L.C.M of 7, 12 = $7 \times 12 = 84$

$$= \frac{-22 \times 12 - 7 \times 3}{84} = -\frac{285}{84}$$

7. Answer: A

Given that $\frac{1}{8} - \frac{2}{4}x + 1 = 0$

$$\frac{1}{8} + 1 = \frac{2x}{4}$$

$$\frac{1}{8} + \frac{1}{1} = \frac{x}{2}$$

Take L.C.M of 8 and 1 = $8 \times 1 = 8$

$$\frac{1 \times 1 + 1 \times 8}{8} = \frac{x}{2}$$

$$\frac{1+8}{8} = \frac{x}{2}$$

$$\frac{9}{8} = \frac{x}{2}$$

Cross multiply, $9 \times 2 = x \times 8$

$$18 = 8x$$

$$x = \frac{18}{8} = \frac{9}{4}$$

8. Answer: A

Given that equation $x^3 - 2x^2y + 2xy^2 - y^2 = 0$

Substitute the options in the given equation and check whether it is satisfied

(a) (1,1)

$$x = 1, y = 1$$

$$x^3 - 2x^2y + 2xy^2 - y^2 = 0$$

$$\Rightarrow 1^3 - 2 \times 1^2 \times 1 + 2 \times 1 \times 1^2 - 1^2 = 0$$

Therefore, it satisfies the equation

(b) (1,2)

$$x = 1, y = 2$$

$$x^3 - 2x^2y + 2xy^2 - y^2 = 1^3 - 2 \times 1^2 \times 2 + 2 \times 1 \times 2^2 - 2^2 \neq 0$$

(c) (2,1)

$$x = 2, y = 1$$

$$x^3 - 2x^2y + 2xy^2 - y^2 = 2^3 - 2 \times 2^2 \times 1 + 2 \times 2 \times 1^2 - 1^2 \neq 0$$

(d) (3,1)

$$x = 3, y = 1$$

$$x^3 - 2x^2y + 2xy^2 - y^2 = 3^3 - 2 \times 3^2 \times 1 + 2 \times 3 \times 1^2 - 1^2 \neq 0$$

9. Answer: B

Given that:

81 can be written in powers of 3

$$81 = 3 \times 3 \times 3 \times 3$$

$$81^{-2} = (3 \times 3 \times 3 \times 3)^{-2} = (3^4)^{-2}$$

$$= 3^{-8}$$

$$= \left(\frac{1}{3}\right)^8$$

10. Answer: D

Dice contains 6 faces (1, 2, 3, 4, 5, 6)

$$\text{Probability of Event to happen} = \frac{\text{Number of outcomes that make an event}}{\text{Total number of outcomes of an experiment}}$$

Total number of outcomes of an experiment = 6 faces (1, 2, 3, 4, 5, 6)

Number of outcomes of the dice to show 6 = 1

$$\text{Probability of the dice to show 6} = \frac{1}{6}$$

11. Answer: A

$$\text{Given: } (a^{22} \times a^{-12}) \times (b^{-10} \times b^{20})$$

If bases are equal then their powers are to be added, $a^m \times a^n = a^{m+n}$

$$= (a^{22-12}) \times (b^{-10+20})$$

$$= a^{10} \times b^{10}$$

$$\text{Since, } a^m \times b^n = (ab)^{mn} = (ab)^{10}$$

12. Answer: D

On doing the L.C.M, 256 is written as

2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
1	

$$\begin{aligned} 256 &= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \\ &= (2 \times 2) \times (2 \times 2) \times (2 \times 2) \times (2 \times 2) \\ &= 4 \times 4 \times 4 \times 4 \\ &= (4 \times 4) \times (4 \times 4) \\ &= 16 \times 16 \\ &= 16^2 \end{aligned}$$

$$\begin{aligned} \text{Square root of } 256 &= \sqrt{(16)^2} \\ &= 16 \end{aligned}$$

Section B

(Explanation 13 to 24 carry 2 marks each)

13. Answer:

$$\begin{aligned} \text{(a) } \frac{5}{6} + \left(\frac{-2}{3}\right) + \frac{1}{3} - \left(\frac{-2}{3} \div \frac{3}{2}\right) &= \frac{5}{6} - \frac{2}{3} + \frac{1}{3} - \left(\frac{-2}{3} \div \frac{3}{2}\right) \\ &= \frac{5}{6} - \frac{2}{3} + \frac{1}{3} - \left(\frac{-2}{3} \times \frac{2}{3}\right) \\ &= \frac{5}{6} - \frac{2}{3} + \frac{1}{3} - \left(\frac{-4}{9}\right) \\ &= \frac{5}{6} - \frac{2}{3} + \frac{1}{3} + \frac{4}{9} \end{aligned}$$

Take L.C.M of denominator values 6, 3, 3, 9 = 18

$$= \frac{5 \times 3 - 2 \times 6 + 1 \times 6 + 4 \times 2}{18} = \frac{15 - 12 + 6 + 8}{18} = \frac{3 + 14}{18}$$

$$= \frac{17}{18}$$

Therefore, $\frac{5}{6} + \left(\frac{-2}{3}\right) + \frac{1}{3} - \left(\frac{-2}{3} \div \frac{3}{2}\right) = \frac{17}{18}$

(b) $\frac{1}{2} \times \left(\frac{-5}{6}\right) - \left(\frac{-10}{6}\right) + \left(\frac{1}{2} \div \frac{15}{6}\right) = \frac{1}{2} \times \left(\frac{-5}{6}\right) - \left(\frac{-10}{6}\right) + \left(\frac{1}{2} \div \frac{15}{6}\right)$

$$= \frac{-5}{12} + \frac{10}{6} + \left(\frac{1}{2} \times \frac{6}{15}\right) = \frac{-5}{12} + \frac{5}{3} + \frac{6}{30}$$

$$= \frac{-5}{12} + \frac{5}{3} + \frac{1}{5}$$

Take L.C.M of denominator values 12, 3, 5 = 60

$$= \frac{-5 \times 5 + 20 \times 5 + 1 \times 12}{60} = \frac{-25 + 100 + 12}{60}$$

$$= \frac{87}{60}$$

Therefore, $\frac{1}{2} \times \left(\frac{-5}{6}\right) - \left(\frac{-10}{6}\right) + \left(\frac{1}{2} \div \frac{15}{6}\right) = \frac{87}{60}$

14. Answer:

Thrice the rational number $\frac{3}{6}$ is $3 \times \frac{3}{6} = \frac{3}{2}$

Suppose x is subtracted to this number gives $\frac{2}{5}$

$$\frac{3}{2} - x = \frac{2}{5}$$

$$\frac{3}{2} - \frac{2}{5} = x$$

$$x = \frac{3}{2} - \frac{2}{5}$$

Take L.C.M of the denominator 2, 5 = 10

$$x = \frac{3 \times 5 - 2 \times 2}{10}$$

$$x = \frac{15 - 4}{10} = \frac{11}{10}$$

Therefore, $\frac{11}{10}$ should be subtracted to thrice the rational number $\frac{3}{6}$ to get $\frac{2}{5}$

15. Answer:

By doing Prime factorisation,

$$18252 = 2 \times 2 \times 3 \times 3 \times 3 \times 13 \times 13$$

The prime numbers 2 and 13 do not appear in groups of three. So, that 18252 is not a perfect cube

In the factorisation, 2 will appear once and 13 will also appear once to become 18252 is a perfect cube.

Hence the smallest natural number by which 18252 should be multiplied to make it a perfect cube is $2 \times 13 = 26$

And the resulting perfect cube is $18252 \times 26 = 474552$

16. Answer:

Let us take x and y be two natural numbers

Given that difference between the two natural numbers = 196

$$x - y = 196 \text{ ----- (1)}$$

Ratio of two numbers $x : y = 9 : 5$

$$\frac{x}{y} = \frac{9}{5}$$

Cross multiply on both sides, we get

$$5x = 9y$$

Substitute $x = \frac{9y}{5}$ in equation (1)

$$\frac{9y}{5} - y = 196$$

$$\frac{9y - 5y}{5} = 196$$

$$\frac{4y}{5} = 196$$

$$4y = 196 \times 5 = 980$$

$$y = \frac{980}{4} = 245,$$

$$\text{Then } x = \frac{9 \times 245}{5} = 441$$

Therefore, the required two natural numbers are 441 and 245.

17. Answer:

Given that it is a triangle,

Sum of the interior angles of the triangles = 180

$$x + 60 + 45 = 180$$

$$x = 180 - 105 = 75^\circ$$

At point C it is supplementary angle, $y + 60 = 180$

$$y = 180 - 60 = 120^\circ$$

At point B it is supplementary angle, $z + 45 = 180$

$$z = 180 - 45 = 135^\circ$$

Therefore, the angles are $x = 75^\circ$, $y = 120^\circ$, $z = 135^\circ$

18. Answer:

Given that Principle amount (P) = Rs.8000

Interest rate (R) = 10

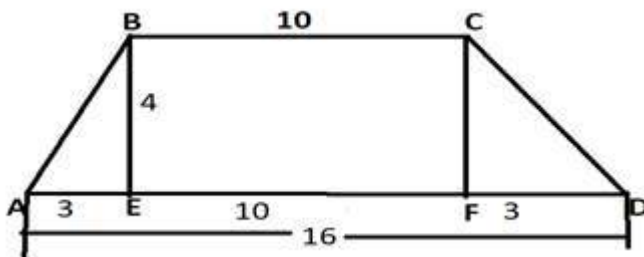
Number of years (N) = 3

$$\text{We have } A = P \left(1 + \frac{R}{100}\right)^n$$

$$\begin{aligned} A &= 8000 \left(1 + \frac{10}{100}\right)^3 \\ &= 8000(1 + 0.1)^3 = 8000(1.1)^3 = 10648 \end{aligned}$$

Therefore, Compound interest = $A - P = 10648 - 8000 = \text{Rs. } 2648$

19. Answer:



Given

$$BC = 10$$

$$BE = 4$$

$$AD = 16$$

$$\text{Perimeter of the Trapezium} = AB + BC + CD + DA$$

We can divide trapezium as a Rectangle (BCEF) and the two triangles (ABE and CFD)

From triangle ABE

$$AB^2 = BE^2 + EA^2$$

$$AB^2 = 4^2 + 3^2$$

$$AB^2 = 16 + 9 = 25$$

$$AB = 5$$

Since, ABE and CFD are similar triangles $AB = CD = 5$

Therefore, Perimeter of the Trapezium = $AB + BC + CD + DA$

$$= 5 + 10 + 5 + 16 = 36$$

20. Answer:

Given that annual income of Afzal is 5 lakhs

Assume Income generated by Afzal = Total expenditure of Afzal

(a) According to the graph,

The amount he spent on food is 30% of the total expenditure of Afzal

The amount he spent on food = 30% of 5 lakhs

$$= 30\% \text{ of } 500000$$

$$= \frac{30}{100} \times 500000 = 30 \times 5000 = \text{Rs. } 150000$$

Therefore, the amount he spent on food is 150000

(b) According to the graph,

The amount he spent on food is 30% of the total expenditure of Afzal

The amount he spent on House rent is 20% of the total expenditure of Afzal

The amount he spent for House rent and Food = (30 + 20)% of the total

expenditure of Afzal

$$= 50\% \text{ of } 5 \text{ lakhs}$$

$$= 50\% \text{ of } 500000$$

$$= \frac{50}{100} \times 500000 = 50 \times 5000 = \text{Rs } 250000$$

Therefore, the amount he spent for House rent and Food is 250000

21. Answer:

Given that

$$\frac{3x-5}{2} + x + \frac{2x-3}{3} = \frac{5}{6} - \frac{3x}{2}$$

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

Take L.C.M. of 2, 1, 3 is 6 and L.C.M. of 6, 2 is 6

$$\frac{(3x-5) \times 3 + 6x + (2x-3) \times 2}{6} = \frac{5 - 3x \times 3}{6}$$

$$\frac{9x-15 + 6x+4x-6}{6} = \frac{5-9x}{6}$$

$$\frac{19x-21}{6} = \frac{5-9x}{6}$$

Cross multiply on both sides, $6 \times (5 - 9x) = 6 \times (19x - 21)$

$$5 - 9x = 19x - 21$$

$$26 = 28x$$

$$x = \frac{26}{28} = 0.928$$

22. Answer:

(a) If a number is divisible by 9, the sum of the digits of the number is divisible by 9

$$\text{Given number is } 231325x = 2 + 3 + 1 + 3 + 2 + 5 + x = 16 + x$$

$16 + x$ is divisible by 9, when x values are 2, 11, 20 - - - - -

Therefore, the least number of x is 2.

(b) If a number is divisible by 11, (Sum of all odd digit values) – (Sum of all even digit

Values) = divisible by 11

Given number

$$1051x85 = (1 + 5 + x + 5) - (0 + 1 + 8) = 11 + x - 9 = 2 + x$$

$2 + x$ is divisible by 11 when x values are 9, 20, - - - - -

Therefore, the least number of x is 9.

23. Answer:

Given that

Marked price (M.P) = Rs.5000

Selling price (S.P) = Rs.2250

Discount = Marked price – Selling price

$$= 5000 - 2250 = \text{Rs.}2750$$

On marked price of Rs.5000, the discount is Rs.2750.

On MP of Rs.100, the discount percentage will be

$$\text{Discount \%} = \frac{2750}{5000} \times 100 = 55 \%$$

24. Let us take the age of Ganesh is 'x', age of Ramesh is 'y'

Sum of their ages, $x + y = 35$ - - - - - (1)

Ganesh is 5 years elder than Ramesh, $x = y + 5$

Substitute value of x value in equation (1)

$$y + 5 + y = 35$$

$$2y + 5 = 35$$

$$2y = 35 - 5 = 30$$

$$y = 30/2 = 15$$

$$x = y + 5 = 15 + 5 = 20$$

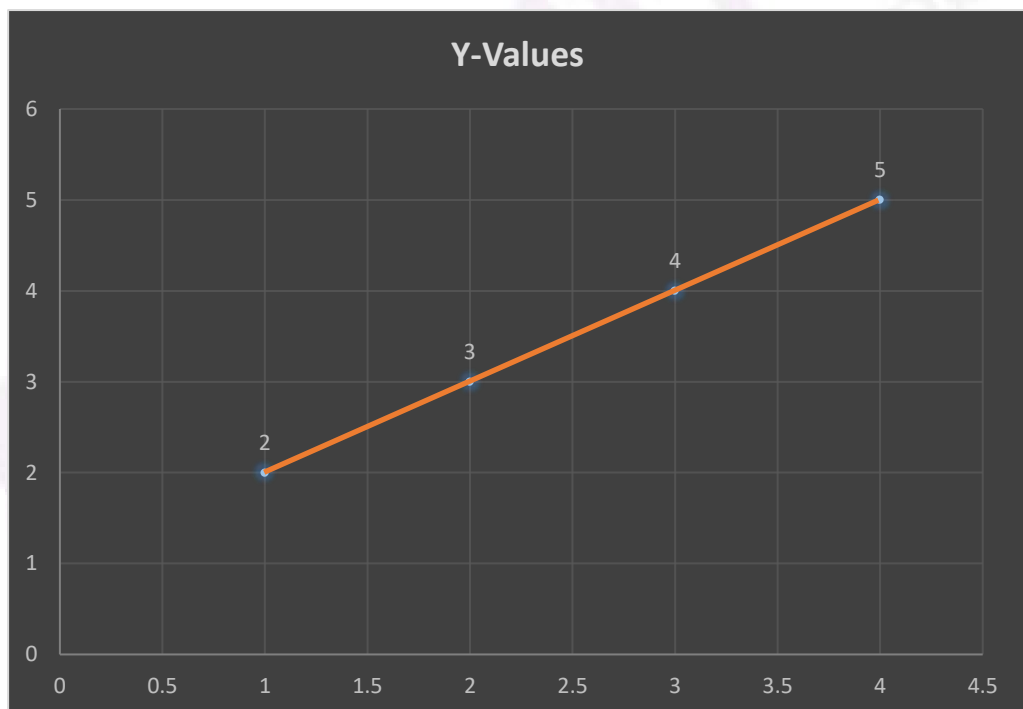
Therefore, age of Ganesh is 15 and age of Ramesh is 20

Section C

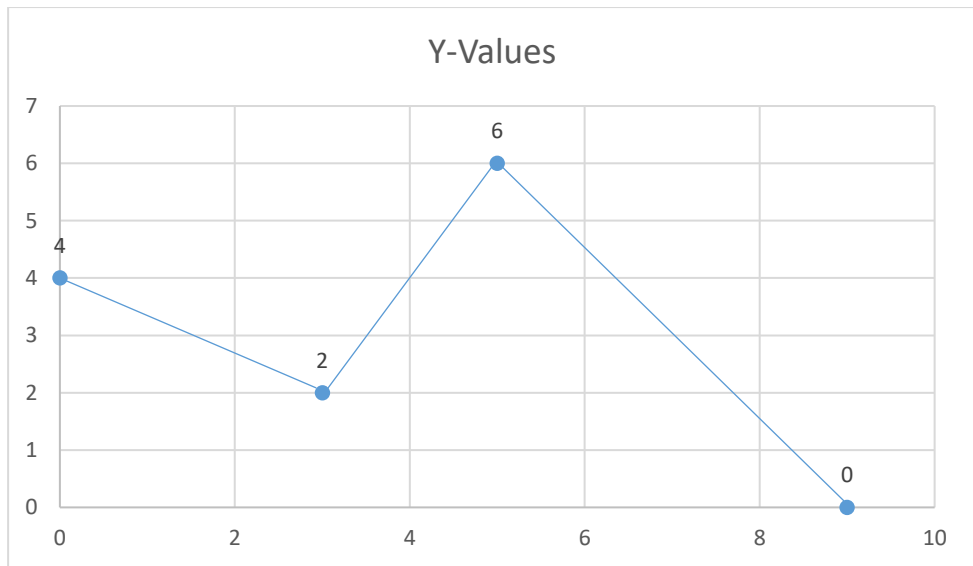
(Explanations 25 to 32 carry 3 marks each)

25. Answer:

(i)



(ii)



26. Answer:

Given that

A box contains,

No. of red balls = 4

No. of green balls = 5

No. of blue balls = 6

$$(a) \text{ The probability of getting a green ball} = \frac{\text{Number of outcomes that get a green ball}}{\text{Total number of green balls}}$$

$$= \frac{1}{5}$$

$$(b) \text{ The probability of getting a blue ball} = \frac{\text{Number of outcomes that get a blue ball}}{\text{Total number of blue balls}}$$

$$= \frac{1}{6}$$

$$(c) \text{ The probability of getting a non-red ball} = 1 - \frac{\text{Number of outcomes that get a red ball}}{\text{Total number of red balls}}$$

For getting non-red balls, we simply subtract the probability of getting red ball to total probability

$$= 1 - \frac{1}{4} = \frac{4-1}{4} = \frac{3}{4}$$

Therefore, the probability of getting a non-red ball = $\frac{3}{4}$

27. Answer:

Given that

Overall CP of each book = Rs.800

One is sold at a loss of 10%

This means if CP is Rs.100, then SP is Rs.90

Therefore, when CP is Rs.800, then $SP = \frac{90}{100} \times 800 = 720$

Also, the second book is sold at a profit of 15%

It means, if CP is Rs.100, then SP is Rs.115.

Therefore, when CP is Rs.800, then $SP = \frac{115}{100} \times 800 = 920$

Now, we need to find the combined CP and SP to say whether there was an overall profit or loss.

Total CP = Rs.800 + Rs.800 = Rs.1600

Total SP = Rs.720 + Rs.920 = Rs.1640

Since Total SP > Total CP,

Profit (1640 – 1600) = 40

Hence Rs.40 has been made as profit.

28. Answer:



Top view =



Front view =



Side view =

29. Answer:

Given that area of the trapezium is 480 m^2

$$\frac{1}{2} (a + b) \times h = 480$$

$$(a + b) \times h = 480 \times 2 = 960$$

Smallest side of the trapezium (a) = 10

Height of the trapezium (h) = 20

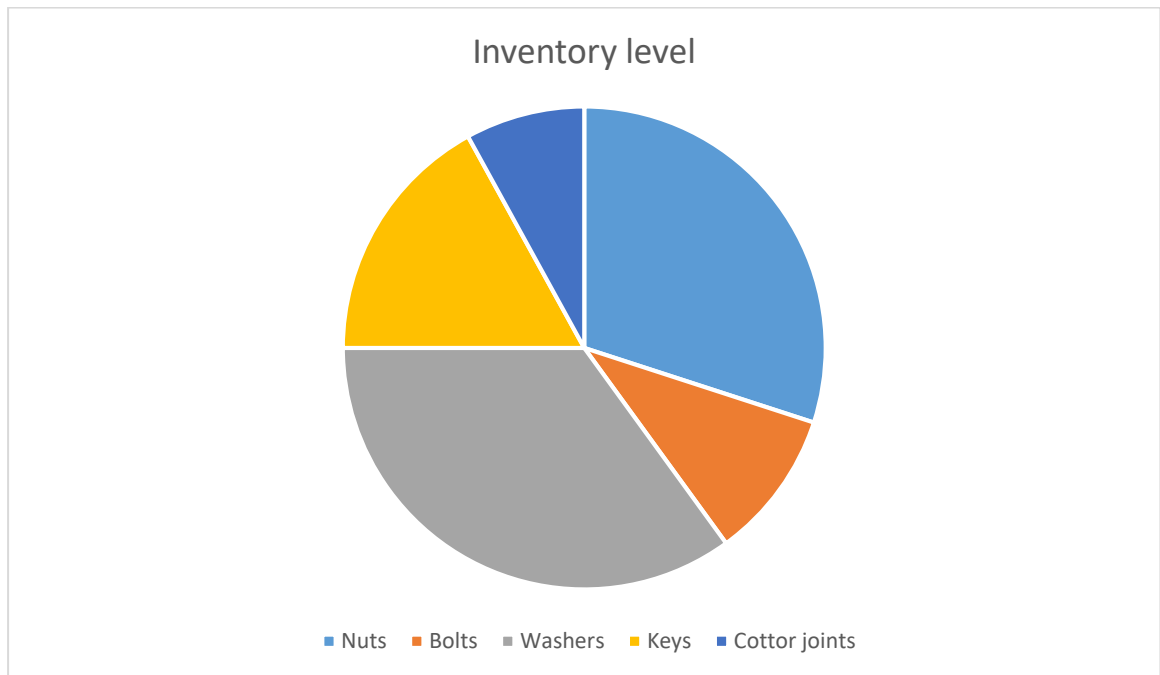
$$(10 + b) \times 20 = 960$$

$$10 + b = 48$$

$$b = 48 - 10 = 38 \text{ m}$$

30. Answer:

Pie chart for the given data:



31. Given that Principle amount (P) = Rs.14000

Interest rate (R) = 8

Number of years (N) = 2

Simple interest:

$$\text{Simple interest} = \frac{PNR}{100}$$

$$= \frac{14000 \times 2 \times 8}{100} = \text{Rs. } 2240$$

Therefore, Simple interest = Rs.2240

Compound interest:

$$\text{We have } A = P \left(1 + \frac{R}{100} \right)^n$$

$$A = 14000 \left(1 + \frac{8}{100} \right)^2$$

$$= 14000(1 + 0.08)^2 = 14000(1.08)^2 = 16329.6$$

Therefore, Compound interest = A – P = 16329.6 – 14000 = Rs.2329.6

Extra amount Pawan has to pay = difference between compound interest and simple interest
= 2940 – 2329.6 = Rs.610.4

Therefore, the extra amount Pawan has to pay is Rs.610.4

32. Answer:

$$\begin{aligned}(x^2 + 2x + 3)(x^2 - 3)(x - 1) &= (x^2 + 2x + 3)(x^2(x - 1) - 3(x - 1)) \\ &= (x^2 + 2x + 3)(x^3 - x^2 - 3x + 1) \\ &= x^2(x^3 - x^2 - 3x + 1) + 2x(x^3 - x^2 - 3x + 1) + 3(x^3 - x^2 - 3x + 1) \\ &= x^5 - x^4 - 3x^3 + x^2 + 2x^4 - 2x^3 - 6x^2 + 2x + 3x^3 - 3x^2 - 9x + 3 \\ &= x^5 + (2x^4 - x^4) + (3x^3 - 3x^3 - 2x^3) + (x^2 - 3x^2 - 6x^2) + (2x - 9x) + 3 \\ &= x^5 + x^4 - 2x^3 - 8x^2 - 7x + 3\end{aligned}$$

Therefore, $(x^2 + 2x + 3)(x^2 - 3)(x - 1) = x^5 + x^4 - 2x^3 - 8x^2 - 7x + 3$

Section D

(Explanations 33 to 37 carry 4 marks each)

33. Answer:

(a) Given that $\frac{36x^2y(x-y)^2}{(x^2-xy)}$

$$= \frac{36x^2y(x-y)^2}{x(x-y)} = \frac{36x^2y(x-y) \times (x-y)}{x(x-y)}$$

Cancel the same terms in numerator and denominator

$$= 36xy(x-y) = 36x^2y - 36xy^2$$

(b) Given that $\frac{x^3 - y^3}{(x-y)^6}$

We know that $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

$$\begin{aligned}&= \frac{x^3 - y^3}{(x-y)^6} = \frac{(x-y)(x^2 + xy + y^2)}{(x-y)^6} \\ &= \frac{x^2 + xy + y^2}{(x-y)^5}\end{aligned}$$

34. Answer:

(a) $91^2 - 23^2$

We know that $(a^2 - b^2) = (a + b)(a - b)$

$$\text{Here } a = 91, b = 23$$

$$91^2 - 23^2 = (91 + 23)(91 - 23) = 114 \times 68 = 7752$$

(b) 101×99

We write this as

$$101 \times 99 = (100 + 1)(100 - 1)$$

We know that $(a + b)(a - b) = (a^2 - b^2)$

$$\text{Here } a = 100, b = 1$$

$$= (100^2 - 1^2) = 10000 - 1 = 9999$$

(c) $999^2 = (1000 - 1)^2$

This is in the form of $(a - b)^2 = a^2 - 2ab + b^2$

$$\text{Here } a = 1000, b = 1$$

$$(1000 - 1)^2 = 1000^2 - 2 \times 1000 \times 1 + 1 \\ = 1000000 - 2000 + 1 = 998001$$

35. Answer:

Given that analysis of demand and production rate of 4 automobile companies

(a) According to the graph

Companies	Demand	Production	Difference
Honda	3000	1000	2000
TVS	600	1300	-700
Hyundai	2500	700	1800
Tata	1200	800	400

On observing the above table, TVS Company meets high demand over the rate of production because the production rate of TVS is high when compared to its Demand

(b) $\text{Average} = \frac{\text{Sum of elements}}{\text{Number of elements}}$

$$\text{Average production rate of all companies} = \frac{\text{Sum of the production rates of all companies}}{\text{Total no. of companies}}$$

$$\text{Sum of the production rates of all companies} = 1000 + 1300 + 700 + 800 = 3800$$

$$\text{Total no of companies} = 4$$

$$\text{Average production rate of all companies} = \frac{3800}{4} = 950$$

(c) **Honda:**

$$\text{Demand (D)} = 3000$$

Production (P) = 1000

Difference between Demand and Production of Honda = $D - P = 3000 - 1000 = 2000$

Tata:

Demand (D) = 1200

Production (P) = 800

Difference between Demand and Production of Tata = $D - P = 1200 - 800 = 400$

Given, the difference between Demand and Production of Honda is x times of Tata

Therefore, $2000 = x400$

$$x = \frac{2000}{400} = 5$$

Thus, the value of x is 5.

36. Answer:

Given that

Total cash with ATM = 400000

The ratio of the number of 500, 100, 50 = 3 : 3 : 4

Let's take, 'X' denominations

$$3 \times 500 \times X + 3 \times 100 \times X + 4 \times 50 \times X = 400000$$

$$1500X + 300X + 200X = 400000$$

$$2000X = 400000$$

$$X = 200$$

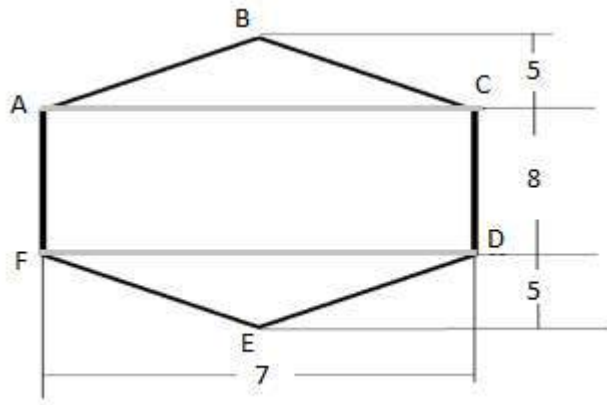
Therefore, Number of Rs.500 notes = $3X = 3 \times 200 = 600$

Number of Rs.100 notes = $3X = 3 \times 200 = 600$

Number of Rs.50 notes = $4X = 4 \times 200 = 800$

37. Answer:

Given figure is divided into three figures: 2 triangles and 1 rectangle



Triangle ABC:

$$\text{Area of the triangle ABC} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$= \frac{1}{2} \times AC \times \text{height} = \frac{1}{2} \times 7 \times 5 = 17.5 \text{ m}^2$$

$$\text{Area of the triangle FED} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$= \frac{1}{2} \times FD \times \text{height} = \frac{1}{2} \times 7 \times 5 = 17.5 \text{ m}^2$$

Rectangle ACDF:

$$\text{Area of the rectangle ACDF} = AC \times AF$$

$$= 7 \times 8 = 56$$

Therefore, area of the whole figure = Area of the triangle ABC + Area of the triangle FED + Area of the rectangle ACDF

$$= 17.5 + 17.5 + 56 = 91 \text{ m}^2$$