

Goa Board
Class VII Mathematics
Sample Paper – 1 Solution

Time: 3 hours

Total Marks: 90

Section A

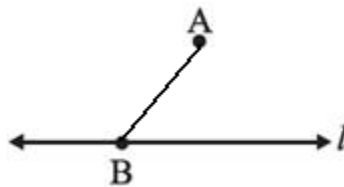
1. Correct answer: A

According to the distributive property of integers, we have:

$$a \times (b + c) = a \times b + a \times c$$

2. Correct answer: B

Join A to B.



3. Correct answer: B

A number is chosen from numbers 1 to 5.

Odd numbers are 1, 3 and 5.

$$\text{Required probability} = \frac{\text{Number of ways to choose an odd number}}{\text{Total number of numbers}} = \frac{3}{5}$$

4. Correct answer: A

$$3x + 4 = 25$$

Transposing 4 to R.H.S, we get

$$3x = 25 - 4$$

$$3x = 21$$

Dividing both sides by 3, we get

$$x = 7$$

5. Correct answer: D

Since, the angle measuring 150° and y are corresponding angles. Therefore, $y = 150^\circ$.
(As the lines are parallel, corresponding angles are equal)

6. Correct answer: B

$$\text{Discount} = 40\% \text{ on Rs. } 7000 = \frac{4}{100} \times 7000 = \text{Rs. } 2800.$$

Therefore, SP = Rs. $(7000 - 2800) = \text{Rs. } 4200.$

7. Correct answer: A

Since the numerators are equal, the rational number with the least denominator is the greatest.

8. Correct answer: B

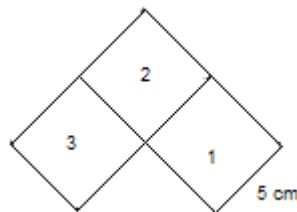
Measure of one side.

9. Correct answer: A

$$a \times a \times a \times a \times y \times y \times y \times y \times z \times z = a^4y^4z^2$$

10. Correct answer: C

Perimeter of the figure = outer boundary of the figure



$$\begin{aligned} &= \text{boundary of (1st square + 2nd square + 3rd square)} \\ &= (5 + 5 + 5) + (5 + 5) + (5 + 5 + 5)\text{cm} \\ &= 40\text{cm} \end{aligned}$$

11. Correct answer: C

Number of lines of symmetry of a regular polygon is equal to its number of sides. Because a regular heptagon has 7 sides, it has 7 lines of symmetry.

12. Correct answer: A

Section B

13. (a) $6n + 4 = 10$

Statement:

For $6n$, six times of a number n .

For $6n + 4$, six times of a number n added to 4.

Thus, for $6n + 4 = 10$, the final statement is

'Six times of a number n added to 4 gives 10'.

(b) $\frac{y}{7} - 3 = 9$

Statement:

For $\frac{y}{7}$, one-seventh of a number y .

For $\frac{y}{7} - 3$, 3 subtracted from one-seventh of a number y .

Thus, for $\frac{y}{7} - 3 = 9$, the final statement is

'3 subtracted from one-seventh of a number y gives 9'.

14. $\frac{2}{4}$ part of the exercise is solved by Raju.

When $\frac{2}{4}$ is converted into lowest form, we get

$$\frac{2}{4} = \frac{2 \div 2}{4 \div 2} = \frac{1}{2}$$

which is the same as part of exercise solved by Sameer.

Thus, both have solved same part of the exercise.

15. Decrease in consumption = $10 - 8 = 2$ kg

Therefore,

$$\text{Percentage Decrease} = \left(\frac{\text{Decrease in value}}{\text{Original value}} \times 100 \right) \%$$

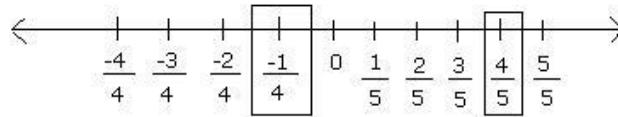
$$= \frac{2}{10} \times 100 = 20$$

16. The rational form of the given decimals are given by:

$$\text{i) } -0.25 = \frac{-25}{100} = \frac{-5}{20} = \frac{-1}{4}$$

$$\text{ii) } 0.8 = \frac{8}{10} = \frac{4}{5}$$

The rational numbers obtained above can be represented as follows:



17. (a) Let the triangle to be constructed be ABC,

where $AB = 8$ cm, $BC = 3$ cm and $AC = 4$ cm

Now, $BC + AC = 3 + 4 = 7$ cm

And $AB = 8$ cm

Therefore, $BC + AC < AB$.

That is the sum two sides is not greater than the third side.

Hence, the triangle cannot be constructed.

(b) Let the triangle to be constructed be XYZ

where $XY = 9$ cm, $YZ = 5$ cm and $XZ = 4$ cm

Now, $YZ + XZ = 5 + 4 = 9$ cm

And $XY = 9$ cm

Therefore, $YZ + XZ = XY$.

That is the sum two sides is not greater than the third side.

Hence, the triangle cannot be constructed.

18. We have,

$$5^{2x+1} \div 25 = 125$$

$$\Rightarrow 5^{2x+1} \div (5 \times 5) = 5 \times 5 \times 5$$

$$\Rightarrow 5^{2x+1} \div 5^2 = 5^3$$

$$\Rightarrow 5^{2x+1-2} = 5^3$$

$$\Rightarrow 5^{2x-1} = 5^3$$

Because bases are equal, powers are also equal.

$$\therefore 2x - 1 = 3$$

$$\Rightarrow 2x = 3 + 1 = 4$$

$$\Rightarrow x = 2$$

19. Total maximum marks = $50 \times 5 = 250$
 Total marks obtained = $30 + 35 + 40 + 25 + 45 = 175$
 Percentage of marks = $\frac{175}{250} \times 100 = 70\%$

20. Let the required number be y .

$$15\frac{5}{4} \div y = 15$$

$$\frac{65}{4} \times \frac{1}{y} = 15$$

$$\frac{1}{y} = \frac{65}{15 \times 4}$$

Since 15 and 65 have common factor 5, we get

$$y = \frac{13}{3 \times 4}$$

$$= \frac{13}{12}$$

$$= 1\frac{1}{12}$$

Thus, the required number is $1\frac{1}{12}$.

Section C

21. This is a problem of multiplication of rational numbers.

Size of Raju's plot = $1\frac{1}{3}$ acres

Value of land per acre = Rs. 48,000 per acre

So, value of Raju's plot = Rs. $48000 \times 1\frac{1}{3}$

$$= \text{Rs. } 48000 \times \frac{4}{3}$$

$$= \text{Rs. } (16000 \times 4)$$

$$= \text{Rs. } 64,000$$

Thus, the value of Raju's land is Rs. 64,000.

22. Cost Price of the scooter = Rs. 12000

Overheads = Rs. 2850

Total cost price = Rs. (12000 + 2850) = Rs. 14850

Selling Price = Rs. 13860

Since $CP > SP$, Mohan suffers a loss.

Loss = Rs. (14850 - 13860) = Rs. 990

$$\text{Loss}\% = \left(\frac{\text{loss}}{\text{total CP}} \times 100 \right)\%$$

$$= \left(\frac{99}{14850} \times 100 \right)\%$$

$$= 6\frac{2}{3}\%$$

23. Median is the middle most value.

Median = 4th observation = $2x + 9$

$$2x + 9 = 29$$

$$2x = 20$$

$$x = 10$$

24. We have to find:

$$[(3x - y + z) + (-y - z)] - (3x - y - z)$$

$$= [3x - y + z - y - z] - (3x - y - z)$$

$$= (3x - 2y) - (3x - y - z)$$

$$= 3x - 2y - 3x + y + z$$

$$= 3x - 3x - 2y + y + z$$

$$= -y + z$$

25. (1) Sales of branch B2 for both years = $75 + 65 = 140$

Sales of branch B4 for both years = $85 + 95 = 180$

$$\text{Required ratio} = \frac{140}{180} = \frac{7}{9} = 7:9$$

(2) Average sales of all the six branches (in thousand numbers) for the year 2000

$$= \frac{1}{6} \times (80 + 75 + 95 + 85 + 75 + 70) = 80$$

(3) Total sales of branch B6 for both the years = $70 + 80 = 150$

Total sales of branch B3 for both the years = $95 + 110 = 205$

$$\text{Required percentage} = \left(\frac{150}{205} \times 100 \right) \% = 73.17\%$$

26. Since, ADB is a right-angled triangle.

$$AD^2 + BD^2 = AB^2$$

$$AD^2 + BD^2 = AC^2 \text{ [given, } AB = AC\text{]}$$

$$AD^2 + BD^2 = (AD + CD)^2$$

$$AD^2 + BD^2 = AD^2 + CD^2 + 2AD \cdot CD$$

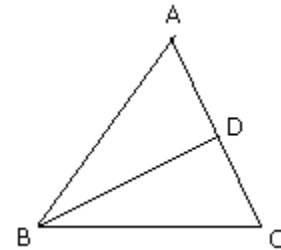
[Subtract AD^2 from both sides]

$$BD^2 = CD^2 + 2AD \cdot CD$$

[Subtract CD^2 from both sides]

$$BD^2 - CD^2 = 2AD \cdot CD$$

$$\text{Thus, } BD^2 - CD^2 = 2AD \cdot CD$$



27. $(x + y)^2 - (x - y)^2$

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

$$= 4xy$$

Putting $x = \frac{1}{2}$ and $y = \frac{1}{4}$, we get

$$(x + y)^2 - (x - y)^2 = 4 \times \frac{1}{2} \times \frac{1}{4} = \frac{1}{2}$$

28. Given that, in $\triangle ABC$,

$BC = \text{base} = 4 \text{ cm}$; $AD = \text{height} = 6 \text{ cm}$

Area of triangle ABC

$$= \frac{1}{2} \times b \times h$$

$$= \frac{1}{2} \times 4 \times 6$$

$$= 12 \text{ cm}^2$$

Also, in $\triangle ABC$,

$AC = \text{base} = 10 \text{ cm}$; $BL = \text{height} = h$ (say)

Area = 12 cm^2

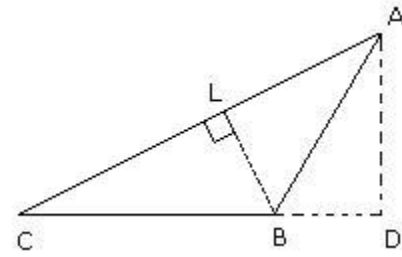
$$\text{Area of triangle} = \frac{1}{2} \times b \times h$$

$$12 = \frac{1}{2} \times 10 \times h$$

$$5h = 12$$

$$h = \frac{12}{5} = 2.4 \text{ cm}$$

Thus, the height (BL) of the triangle = 2.4 cm



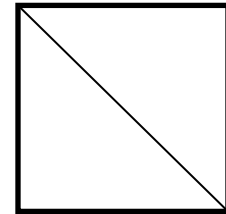
29. Perimeter of square = $4s = 40 \text{ cm}$

Each side of the square = 10 cm

Diagonal divides the square into two equal triangles

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times 10 \times 10 = 50 \text{ cm}.$$

Area of each triangle = $50 \text{ cm}.$



30. Let the third number be x .

Then, the first number is 120% of x

$$= \frac{120x}{100} = \frac{6x}{5}$$

The second number is 150% of x

$$= \frac{150x}{100} = \frac{3x}{2}$$

Therefore, ratio of first two numbers:

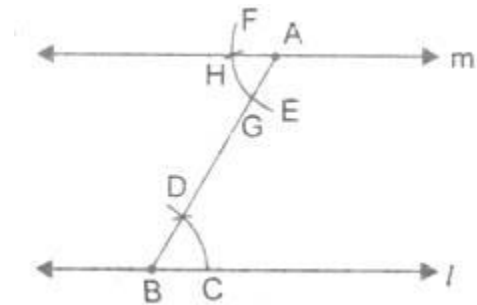
$$\begin{aligned} &= \left(\frac{6x}{5} : \frac{3x}{2} \right) \\ &= 12x : 15x \\ &= 4 : 5 \end{aligned}$$

Section D

31. Draw a line l , take a point A above it. Construct a line through A and parallel to l .

Steps of constructions:

1. Draw a line l of any length and take a point A above it.
2. Take any point B on l and join AB .
3. Taking B as a centre and any small radius draw an arc CD .
4. With the same radius and A as a centre, draw an arc EF which cut AB at G .
5. Measure the arc CD using compass and with same measure cut the arc EF from G to H .
6. Join the points AH and extend in both the directions, name this line as m .
Now, m is the required parallel line.



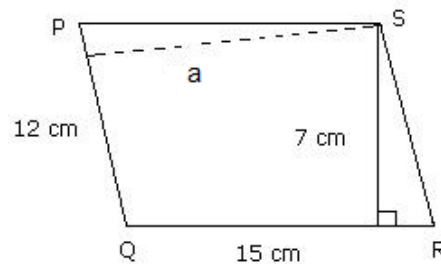
32.

$ \begin{aligned} \text{(i)} \quad & \frac{a^2 \times a^3 \times b^3 \times b^4}{a^5 \times b^2} \\ &= \frac{a^{2+3} \times b^{3+4}}{a^5 \times b^2} \\ &= \frac{a^5 \times b^7}{a^5 \times b^2} \\ &= a^{5-5} \times b^{7-2} \\ &= a^0 \times b^5 \\ &= 1 \times b^5 \\ &= b^5 \end{aligned} $	$ \begin{aligned} \text{(ii)} \quad & \left(\frac{a^3}{b^4}\right)^2 \times \left(\frac{b^2}{a^3}\right)^3 \\ &= \frac{(a^3)^2}{(b^4)^2} \times \frac{(b^2)^3}{(a^3)^3} \\ &= \frac{a^6}{b^8} \times \frac{b^6}{a^9} \\ &= \frac{a^6}{a^9} \times \frac{b^6}{b^8} \\ &= a^{6-9} \times b^{6-8} \\ &= a^{-3} \times b^{-2} \end{aligned} $
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33. Area of the parallelogram is given by:

$$\text{Area} = \text{base (b)} \times \text{height (h)}$$

$$\text{base (b)} = 15 \text{ cm ; height (h)} = 7 \text{ cm}$$



i) Area of the parallelogram = $15 \times 7 = 105 \text{ cm}^2$

ii) base (b) = 12 cm ; height = a (say),

$$\text{Area} = 105 \text{ cm}^2$$

$$\text{Area of the parallelogram} = (b \times a) \text{ cm}^2$$

$$105 = 12 \times a$$

$$\text{Thus, } a = 8.75 \text{ cm}$$

So, the height corresponding to base PQ is 8.75 cm.

34. We have to find:

$$\begin{aligned} & [(4x + y) + (3x - 5y)] - [(-6x + 2y) + (7x - 5y)] \\ &= [4x + y + 3x - 5y] - [-6x + 2y + 7x - 5y] \\ &= (7x - 4y) - (x - 3y) \\ &= 7x - 4y - x + 3y \\ &= 6x - y \end{aligned}$$

Substitute $x = 2$ and $y = -4$

$$6x - y = 6(2) - (-4) = 12 + 4 = 16$$

35. Total number of balls = 12

It is also given that the bag contains an equal number of balls of each of the four colours: yellow, blue, green and red.

Therefore,

Number of yellow balls = Number of blue balls = Number of green balls = Number of red balls = 3

$$P(\text{yellow}) = \frac{\text{Number of yellow balls}}{\text{Total number of balls}} = \frac{3}{12} = \frac{1}{4}$$

$$P(\text{blue}) = \frac{\text{Number of blue balls}}{\text{Total number of balls}} = \frac{3}{12} = \frac{1}{4}$$

$$P(\text{green}) = \frac{\text{Number of green balls}}{\text{Total number of balls}} = \frac{3}{12} = \frac{1}{4}$$

$$P(\text{red}) = \frac{\text{Number of red balls}}{\text{Total number of balls}} = \frac{3}{12} = \frac{1}{4}$$

36. For borrowing, $P = \text{Rs } 5000$, $R = 4\% \text{ p.a.}$ and $T = 2 \text{ years}$

$$\text{Rs} \left(\frac{5000 \times 4 \times 2}{100} \right) = \text{Rs.} 400$$

For lending, $P = 5000$, $R = 6\frac{1}{4}\% = \frac{25}{4}\%$ and $T = 2 \text{ years}$

$$\text{Thus S.I. (lending)} = \text{Rs.} \left(\frac{5000 \times \frac{25}{4} \times 2}{100} \right) = \text{Rs.} 625$$

Hence, $\text{Gain} = \text{Rs.} 625 - \text{Rs.} 400 = \text{Rs.} 225$ for 2 years

$$\text{Therefore, gain per year} = \frac{\text{Rs.} 225}{2} = \text{Rs.} 112.50$$

37. What must be added to $7x^2 - 14x + 32$ to get $9x^2 - 10x - 15$?

$$\begin{aligned} \text{The expression to be added to } 7x^2 - 14x + 32 \text{ is given by } & (9x^2 - 10x - 15) - (7x^2 - 14x + 32) \\ & = 9x^2 - 10x - 15 - 7x^2 + 14x - 32 \\ & = (9x^2 - 7x^2) + (-10x + 14x) + (-15 - 32) \\ & = 2x^2 + 4x - 47 \end{aligned}$$

38. In quadrilateral PQRS in which $QM \perp PR$, $SN \perp PR$, $PR = 20 \text{ cm}$, $QM = 3 \text{ cm}$ and $SN = 2 \text{ cm}$.

$$\text{Area of } \Delta PQR = \frac{1}{2} \times PR \times QM = \frac{1}{2} \times 20 \times 3 = 30 \text{ cm}^2$$

$$\text{Area of } \Delta PRS = \frac{1}{2} \times PR \times SN = \frac{1}{2} \times 20 \times 2 = 20 \text{ cm}^2$$

$$\text{Area of } \square PQRS = \text{Area of } \Delta PQR + \text{Area of } \Delta PRS = 30 + 20 = 50 \text{ cm}^2$$

