

Mathematics

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Marks																
Q.No.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Marks																
Q.No.	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	
Marks																

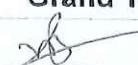
Grand Total

79

Signature of Checker



Signature of Examiner



Section-A

$$\begin{aligned}
 1. \quad & (98)^2 \\
 &= (100-2)^2 \quad \text{Using: } (a-b)^2 = a^2 - 2ab + b^2 \\
 &= (100)^2 - 2(100)(2) + 2^2 \\
 &= 10000 - 400 + 4 \\
 &= \boxed{9604}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad & 5^{x-4} = 1 \\
 & 5^{x-4} = 5^0 \quad \because x^0 = 1
 \end{aligned}$$

As bases are same we equate powers.

$$x-4=0$$

$$\boxed{x=4}$$

$$\begin{aligned}
 3. \quad & \text{No. of sides of regular hexagon} = 6 \\
 & \text{Sum of interior angles} = n(n-2)180^\circ \\
 & = (6-2)180^\circ
 \end{aligned}$$

$$= 4 \times 180^\circ$$

$$= \boxed{720^\circ}$$

$\therefore$ Sum of interior $\angle$ s of regular hexagon is 720° .

$$\begin{array}{r}
 9600 \\
 -400 \\
 \hline
 9600
 \end{array}$$

$$9600$$

$$+ 1800$$

$$500$$

$$(90)^2 + 2(90)(3)$$

$$+ (3)^2$$

$$8100 + 1440$$

$$+ 64$$

$$8100$$

$$1440$$

$$64$$

$$9604$$

$$8100$$

$$1440$$

$$64$$

$$9604$$

$$3 \times 1800$$

$$+ 900$$

$$7200$$

$$(90)^2 + 2(90)(3)$$

$$+ 8^2$$

$$8100 + 1440$$

$$+ 64$$

$$8100$$

$$1440$$

$$64$$

$$9604$$

12 Total no. of outcomes = 11

No. of favourable outcomes = 7 (R, T, H, M, I, C, S)

Probability of getting a consonant = $\frac{7}{11}$

2 Section - C.

13. Product of 2 no.s = 1296

Let one no. be x .

Other number = $16x$ (Acc to Q).

$$\therefore 16x \times x = 1296$$

$$16x^2 = 1296$$

$$x^2 = \frac{1296}{16} = \frac{324}{4} = 81$$

$$x^2 = 81$$

$$\boxed{x = 9}$$

$\therefore$ The numbers are 9 and 144.

3

$$\frac{516}{9} = 144$$

$$\frac{3144}{9} = 1296$$

$$14. 25x^2 + y^2 + 9z^2 - 10xy - 6yz + 30xz$$

Using identity: $(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$

$$= (-5x)^2 + (-y)^2 + (-3z)^2 + 2(-5x)(y) + 2(y)(-3z) + 2(-5x)(-3z)$$

$$= (-5x + y - 3z)^2$$

$$= \boxed{(-5x + y - 3z)(-5x + y - 3z)}$$

$$15. \text{Length} = x$$

$$\text{Breadth} = 2x$$

$$\text{Height} = 3x$$

$$T.S.A. \text{ of cuboid} = 88 \text{ m}^2$$

$$2(lh + bh + lb) = 88$$

$$2(x \times 3x + 2x \times 3x + x \times 2x) = 88$$

$$3x^2 + 6x^2 + 2x^2 = 44$$

$$11x^2 = 44$$

$$x^2 = 4$$

$$\boxed{x = 2}$$

$$\text{Length} = 2 \text{ m}$$

$$\text{Breadth} = 4 \text{ m}$$

$$\text{Height} = 6 \text{ m}$$

$$\begin{aligned} & (-5x + y - 3z)(-5x + y - 3z) \\ &= (-5x)^2 + (-y)^2 + (-3z)^2 + 2(-5x)(y) + 2(y)(-3z) + 2(-5x)(-3z) \\ &= 25x^2 + y^2 + 9z^2 - 10xy - 6yz + 30xz \end{aligned}$$

18. $P = ₹ 7500$

$$4n = \frac{4^2 \times 61}{122} = 2 \text{ quarters}$$

$$R = \frac{8}{4} = 2\% \text{ per quarter}$$

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

$$= 7500 \left(1 + \frac{2}{100}\right)^2$$

$$= 7500 \times \frac{51}{100} \times \frac{51}{100} = ₹ 7803$$

Amount received by him : ₹ 7803.

19.

$$\begin{array}{r} 2x^3 + 2x^2 + x + 1 \\ x+3 \overline{) 2x^4 + 8x^3 + 7x^2 + 4x + 3} \\ \underline{(-) 2x^4 + 6x^3} \\ 2x^3 + 7x^2 + 4x + 3 \\ \underline{2x^3 + 6x^2} \\ x^2 + 4x + 3 \\ \underline{x^2 + 3x} \\ x + 3 \\ \underline{x + 3} \\ 0 \end{array}$$

Standard form = $2x^4 + 8x^3 + 7x^2 + 4x + 3$
 $Q = 2x^3 + 2x^2 + x + 1$
 $R = 0$

$$\begin{array}{r} 7803 \\ 7500 \\ \hline 303 \end{array}$$

$$303 = 150 \left(1 + \frac{2}{100}\right)^2 - 1$$

$$= 150 \times \frac{102}{100} \times \frac{102}{100} - 1$$

$$= 150 \times \frac{51}{100} \times \frac{51}{100} - 1$$

$$= 150 \times \frac{51}{100} \times \frac{51}{100} - 1$$

$$= 150 \times \frac{51}{100} \times \frac{51}{100} - 1$$

20. Time taken to go downstream = 6 hrs

Time taken to go upstream = 7 hrs

Speed of stream = 2 km/hr

Let speed of steamer in still water be x km/hr.

Distance covered downstream = $6(x+2)$ km

Distance covered upstream = $7(x-2)$ km

Distance in both cases is same.

$\therefore$ Acc to Q.

$$6(x+2) = 7(x-2)$$

$$6x + 12 = 7x - 14$$

$$-x = -14 - 12$$

$$-x = -26$$

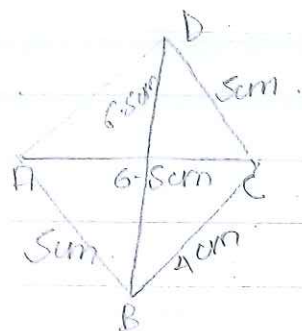
3.

$$x = 26 \text{ km/hr}$$

$\therefore$ Speed of steamer in still water = 26 km/hr.

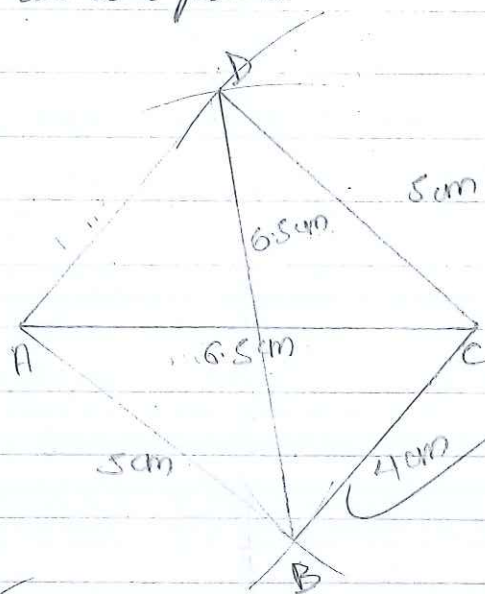
$$\begin{array}{r} 28 \\ 168 \\ \hline 24 \\ 168 \\ \hline \end{array}$$

21



Steps of construction

- 1) Draw rough figure
- 2) ~~At~~ Construct line segment AC of 6.5 cm
- 3) ~~Construct~~ Take measurement 4 cm on compass and draw an arc
- 4) Take measurement 5 cm and draw an arc with compass point on A.
- 5) Take measurement 5 cm and draw an arc from C.
- 6) Take measurement 6.5 cm and draw an arc intersecting the one at step 5.
- 7) Join all the points



ABCD is the
required figure

22. No. of possible outcomes = 52

i) No. of favourable outcomes = 26 (There are 26 red cards in a pack)

$$\text{Probability} = \frac{26}{52} = \frac{1}{2}$$

ii) No. of favourable outcomes = 2 (There are 2 jacks of black colour: one of spades and other of clubs)

$$\text{Probability} = \frac{2}{52} = \frac{1}{26}$$

iii) No. of favourable outcomes = 4 + 4 + 4 = 12 (King, Queen, Jacks are face cards)

$$\text{Probability} = \frac{12}{52} = \frac{3}{13}$$

Section - D.

3

75284
677376
540000
60000
9408
75267
60000
7500
2382
9408
9500
1875
784
2352
1875
625

$$23. \quad \frac{21}{5} = \frac{11}{5} = 2.2$$

$$\begin{array}{r} 1.483 \\ 1 \overline{) 2.200000} \\ \underline{1} \\ 120 \\ \underline{96} \\ 240 \\ \underline{230} \\ 10 \\ \underline{8} \\ 20 \\ \underline{16} \\ 40 \\ \underline{38} \\ 20 \\ \underline{19} \\ 10 \\ \underline{9} \\ 10 \\ \underline{9} \\ 10 \end{array}$$

$$\therefore \sqrt{2.2} = 1.483$$

$\boxed{1.48}$ (correct to 2 places of decimal)

$$24. \quad \text{Outer diameter} = 14 \text{ cm} \quad \text{Outer radius} = 7 \text{ cm}$$

$$\text{Thickness} = 1 \text{ cm}$$

$$\text{Inner diameter} = 12 \text{ cm} \quad \text{Inner radius} = 6 \text{ cm}$$

$$\text{Length} = 2 \text{ m} = 200 \text{ cm}$$

$$\text{Volume} = \pi R^2 h - \pi r^2 h$$

$$= \pi h (R^2 - r^2)$$

$$= \frac{22}{7} \times 200 (7^2 - 6^2)$$

$$= \frac{22}{7} \times 200 \times 13 = 2600 \times \frac{22}{7} \text{ cm}^3$$

$$\text{Weight of pipe} = 2600 \times \frac{22}{7} \times 7$$

$$= \boxed{57200 \text{ g}} \quad 57200 \text{ g}$$

$$\text{or } 57.2 \text{ kg} \quad 57.2 \text{ kg}$$

$$\text{Weight of tube is } 57.2 \text{ kg or } 57.2 \text{ kg or } 57200 \text{ g}$$

25. $R = 10\%$

$n = 2 \text{ yrs}$

$C.I - S.I = 500$

$$P \left[\left(1 + \frac{R}{100} \right)^n - 1 \right] - \frac{PRT}{100} = 500$$

$$P \left[\left(1 + \frac{10}{100} \right)^2 - 1 - \frac{10 \times 2}{100} \right] = 500$$

$$P \left[\left(\frac{110}{100} \right)^2 - 1 - \frac{2}{10} \right] = 500$$

$$P \left(\frac{121 - 100 - 20}{100} \right) = 500$$

$$P \times \left(\frac{21 - 20}{100} \right) = 500$$

4.

$$P = 500 \times 100$$

$$P = ₹ 50000$$

∴ The sum of money is ₹ 50000

26.

$$\begin{array}{r}
 3x^3 + 7x^2 + 4x + 5 \\
 3x-2 \overline{) 9x^4 + 15x^3 - 2x^2 + 7x - 8} \\
 \underline{9x^4 - 6x^2} \\
 21x^3 - 2x^2 + 7x - 8
 \end{array}$$

$$21x^3 - 2x^2 + 7x - 8$$

$$\underline{21x^3 - 14x^2} $$

$$12x^2 + 7x - 8$$

$$\underline{12x^2 - 8x} $$

$$15x - 8$$

$$\underline{15x - 10} $$

2

$$Q = 3x^3 + 7x^2 + 4x + 5$$

$$R = 2$$

Division algorithm: $D = d \times Q + R$

$$L.H.S.: 9x^4 + 15x^3 - 2x^2 + 7x - 8$$

$$R.H.S.: (3x-2)(3x^3 + 7x^2 + 4x + 5) + 2$$

$$= 3x(3x^3 + 7x^2 + 4x + 5) - 2(3x^3 + 7x^2 + 4x + 5) + 2$$

$$= 9x^4 + 21x^3 + 12x^2 + 15x - 6x^3 - 14x^2 - 8x - 10 + 2$$

$$= 9x^4 + 15x^3 - 2x^2 + 7x - 8$$

$$L.H.S. = R.H.S.$$

Hence verified

27. Total amount of money = ₹ 1380

Let Raman, Rohan and Rakhi's share be x, y, z .

Acc to Q,

$$x = 5y = x = 5z = 3y$$

$$\therefore z = \frac{x}{5} \text{ and } y = \frac{x}{3}$$

$$\therefore x + \frac{x}{5} + \frac{x}{3} = 1380$$

$$\frac{15x + 3x + 5x}{15} = 1380$$

$$\frac{23x}{15} = 1380$$

$$x = \frac{1380 \times 15}{23}$$

$$x = ₹ 900$$

$$\therefore \text{Raman's share} = ₹ 900$$

$$\text{Rakhi's share} = ₹ 300 - 180$$

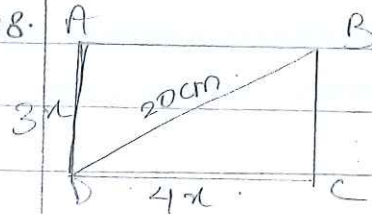
$$\text{Rohan's share} = ₹ 300$$

$$\begin{array}{r} 13 \\ 6 \\ \hline 128 \end{array}$$

$$\begin{array}{r} 180 \\ 480 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 900 \\ 300 \\ 180 \\ \hline 1380 \end{array}$$

28.



Given: ABCD is a rectangle
 $BD = 20\text{cm}$

To find: Lengths of sides, Perimeter

Solution: $AD = BC = 3x$ (opp. sides of $\square$ are equal)
 $AB = DC = 4x$

$\therefore$ Each $\angle$ of $\square$ is 90° .

$\triangle ABD$ and $\triangle DBC$ are right $\triangle$ s.

$\therefore$ By Pythagoras theorem,

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

$$(3x)^2 + (4x)^2 = (20)^2$$

$$9x^2 + 16x^2 = 400$$

$$25x^2 = 400$$

$$x^2 = 16$$

$$\boxed{x = 4}$$

$$AB = DC = 4 \times 4 = 16\text{cm}$$

$$AD = BC = 3 \times 4 = 12\text{cm}$$

$$\text{Perimeter} = 2(l + b)$$

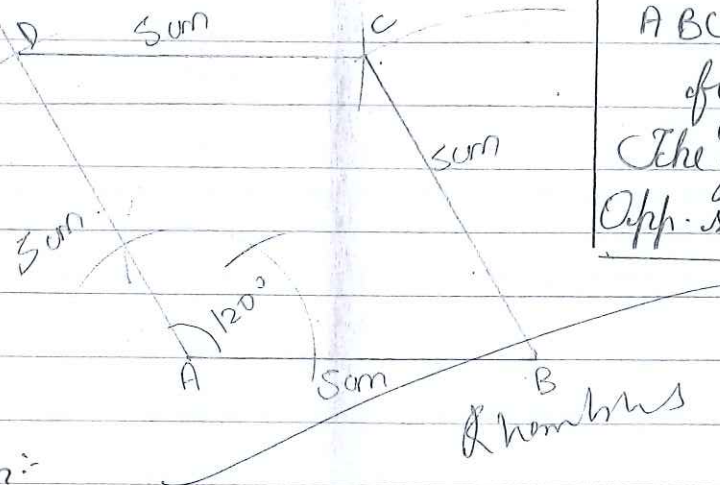
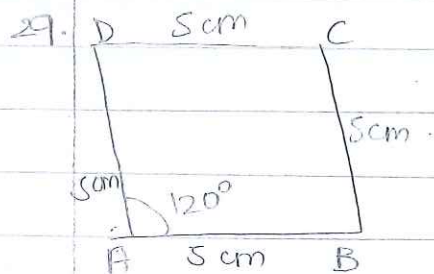
$$= 2(16 + 12)$$

$$= 2 \times 28$$

$$= \boxed{56\text{cm}}$$

4

16
12
56



A B C D is the required figure.
The figure is a parallelogram.
Opp. side and $\angle$ s are equal.

Steps of construction:-

- 1) Draw rough figure ABCD
- 2) Construct line segment AB of 5 cm.
- 3) Construct $\angle A = 120^\circ$
- 4) Take measure of 5 cm on compass and cut an arc marking point D.
- 5) Take measure of 5 cm and draw arcs from B and D. Both of them intersect each other at point C.
- 6) Join all the points.

$$\begin{array}{r} 25 \overline{) 16134} \\ \underline{50} \\ 11134 \\ \underline{1125} \\ 884 \end{array}$$

$$5400 \left(1 + \frac{12}{100} \right)^2 = 5400 \times 1.12 \times 1.12 = 6720$$

$$\begin{array}{r} 112 \overline{) 1296} \\ \underline{1296} \\ 0 \end{array}$$

Please add the graph
shown on page 2.

30

Food grain	Production (in million of tonnes)
Rice	57
Wheat	76
Coarse cereals	38
Pulses	19

Sector angle.

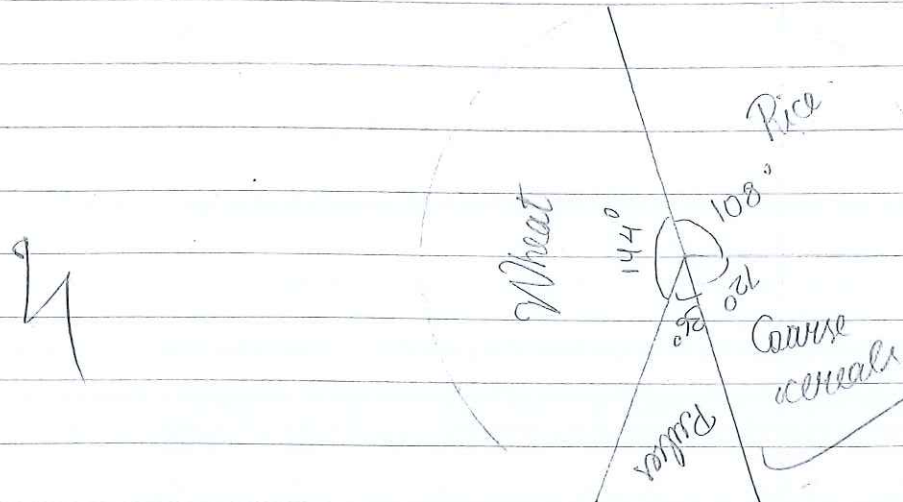
$$\frac{57}{190} \times 360^\circ = 108^\circ$$

$$\frac{76}{190} \times 360^\circ = 144^\circ$$

$$\frac{38}{190} \times 360^\circ = 72^\circ$$

$$\frac{19}{190} \times 360^\circ = 36^\circ$$

$$\text{Total production} = 57 + 76 + 38 + 19 = 190$$



This is the required
pie-chart.

$$\begin{array}{r} 360 \\ 190 \overline{) 6480} \\ 570 \\ \hline 510 \\ 180 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 360 \\ 190 \overline{) 5184} \\ 380 \\ \hline 1384 \\ 1140 \\ \hline 244 \\ 190 \\ \hline 54 \end{array}$$

$$\begin{array}{r} 360 \\ 190 \overline{) 1384} \\ 760 \\ \hline 624 \\ 380 \\ \hline 244 \\ 190 \\ \hline 54 \end{array}$$

$$\begin{array}{r} 360 \\ 190 \overline{) 5184} \\ 570 \\ \hline 510 \\ 180 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 360 \\ 190 \overline{) 1384} \\ 760 \\ \hline 624 \\ 380 \\ \hline 244 \\ 190 \\ \hline 54 \end{array}$$

Second Choice of Question No. 26 & 30.

Ans-30- Histogram in Graph paper.

Weight (in kg)	60-65	65-70	70-75	75-80	80-85	85-90
No. of persons	12	20	8	9	6	5

Ans-26- Dividend = $x^3 - 6x^2 + 11x - 6$
 Divisor = $x + 1$

Division:

$$\begin{array}{r}
 x+1 \overline{) x^3 - 6x^2 + 11x - 6} \\
 \underline{x^3 + x^2} \\
 -7x^2 + 11x - 6 \\
 \underline{-7x^2 - 7x} \\
 18x - 6 \\
 \underline{18x + 18} \\
 -24
 \end{array}$$

Quotient = $x^2 - 7x + 18$
 Remainder = -24

$$\begin{aligned}
 \text{Difference between quotient and remainder} &= (Q - R) \\
 &= [(x^2 - 7x + 18) - (-24)] \\
 &= x^2 - 7x + 18 + 24 \\
 &= x^2 - 7x + 42
 \end{aligned}$$

$\therefore$ The difference between the quotient and the remainder is $x^2 - 7x + 42$

$$\begin{array}{r}
 \text{Rough} \\
 24 \\
 18 \\
 \hline
 42
 \end{array}$$