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ANNUAL EVALUATION 2021-22

CLASS: 9 MATHEMATICS

1) $\Delta ABC, \Delta ABD, \Delta ABE$ have equal area

2) a) $\frac{1}{10} + \frac{2}{100} + \frac{3}{1000} = 0.1 + 0.02 + 0.003$

$= 0.123$

b) $0.125 = \frac{1}{10} + \frac{2}{100} + \frac{5}{1000}$

3) b) Here $BD = \sqrt{2}$

a). Area of Square $BDEF = (\sqrt{2})^2$

$= 2 m^2$

4) Here $\frac{AB}{BC} = \frac{PQ}{QR}$

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

$\therefore QR = 6 \times \frac{3}{2}$

$= 9 cm$

Also, $\frac{BC}{CD} = \frac{QR}{RS}$

$\frac{3}{4} = \frac{9}{RS}$

$\therefore RS = 9 \times \frac{4}{3} = 12 cm$

5) a) Perimeter = 4 × Side
= 4a

b) Constant of proportionality = 4

6) a) We have, BD : DC = AB : AC
= 8 : 12
= 2 : 3

b) We have,
area(ΔABD) : area(ΔADC) = BD : DC
= 2 : 3

8) one table + one chair = 4000
one table + 3 chairs = 6000

∴ Cost of 2 chairs = 6000 − 4000
= 2000

∴ Cost of 1 chair = $\frac{2000}{2}$
= 1000 rupees.

Since Cost of one table + One chair = 4000

∴ Cost of one table = 4000 − 1000
= 3000 rupees

7) Since Smaller Side = x.

a) Longer Side = 10 + x

b) Perimeter of that Longer rectangle = 4 × Side
= 4(10 + x)

9) a) Since perpendicular drawn from centre to a chord bisects the chord

Since $PQ = 8cm$, $PC = \frac{1}{2} \times 8 = 4cm$

b) OC bisects the longer chord AB

also, $\therefore AC = BC$

$AP + PC = CQ + BQ$

$\therefore AP = BQ \quad (\because PC = CQ)$

10) a) The line segment joining any 2 sides of a triangle is parallel to the third side and its length is equal to the half of the third side.

$\therefore PR = \frac{1}{2} \times BC$

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

$= 3 \text{ cm}$

b) Perimeter of $\triangle PQR = \frac{1}{2} \times$ Perimeter of $\triangle ABC$

$= \frac{1}{2} \times 18$

$= 9 \text{ cm}$

11) a) $AC = 6$, $PR = 3$

$\therefore AC$ is 2 times PR

b) Here $\triangle ABC \sim \triangle RQP$

$\therefore \frac{AB}{RQ} = \frac{BC}{QP} = \frac{AC}{RP}$

$\frac{8}{RQ} = \frac{4}{QP} = \frac{6}{3}$

$\therefore \frac{8}{RQ} = \frac{6}{3}$ $\therefore RQ = 8 \times \frac{1}{2} = \underline{4}$

$QP = \frac{1}{2} \times BC = \frac{1}{2} \times 4 = \underline{2}$

12) radius (r) = 5cm

$\therefore$ Permuter $= 2\pi r$

$= 2\pi \times 5$

$= 10\pi$

$\approx 10 \times 3.14$

$\approx \underline{31.4 \text{ cm}}$

Area $= \pi r^2$

$= \pi \times 5^2$

$= 25\pi$

$\approx 25 \times 3.14$

≈ 78.50

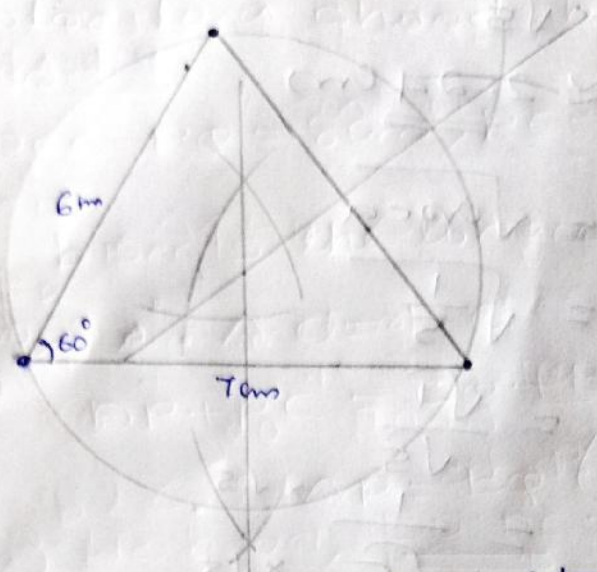
$\approx \underline{78.5 \text{ cm}^2}$

13) a) Distance $= 7 - 3$

$= \underline{4}$ units

b) mid Point $= \frac{3+7}{2} = \frac{10}{2} = \underline{5}$.

14)



15) Let the numbers be x, y

Given, $5x+2y = 20 \rightarrow ① \times 3$

$2x+6y = 34 \rightarrow ②$

$15x+6y = 60 \rightarrow ③$

$③ - ② \Rightarrow 13x = 26$

$\therefore x = \frac{26}{13}$

$= \underline{\underline{2}}$.

Substitute $x = 2$ in ①

$5(2)+2y = 20$

$10+2y = 20$

$2y = 20-10$

$2y = 10$

$y = \frac{10}{2} = \underline{\underline{5}}$.

Two numbers are $\underline{\underline{2, 5}}$.

16)

a) Side $= \sqrt{\text{area}}$

$= \sqrt{5}$

≈ 2.24 cm

b) Side $= \sqrt{\text{area}}$

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

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

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

$= \frac{\sqrt{5}}{5}$

$\approx \frac{2.24}{5}$

≈ 0.448 cm.

17) $\frac{1}{3} = \frac{1}{10} \times \frac{10}{3}$

$= \frac{1}{10}\left[3 + \frac{1}{3}\right]$

$= \frac{3}{10} + \frac{1}{30}$.

$\frac{1}{3} - \frac{3}{10} = \frac{1}{30} \rightarrow (1)$

Similarly

$\frac{1}{3} - \frac{33}{100} = \frac{1}{300} \rightarrow (2)$

$\frac{1}{3} - \frac{333}{1000} = \frac{1}{3000} \rightarrow (3)$

∴ a) $\frac{1}{3} \approx \frac{3}{10}$

$\frac{1}{3} \approx \frac{33}{100}$

$\frac{1}{3} \approx \frac{333}{1000}$

b) $\frac{1}{3} = 0.3333\ldots$

18)

a) Centroid divides each median in the ~~ratio~~ 2:1

∴ AG : GD = 2 : 1

b) Also BG : GE = 2 : 1

Since GE = 3 cm ∴ BG = 2 × 3

= 6 cm

c) median divides triangle into 2 triangles of equal area.

∴ area of △ABD = $\frac{1}{2} \times 60$

= 30 cm^2

19)

a) Since △ABC ~ △PQR.

So we have AB : PQ = AD : PS

10 : 20 = 8 : PS

∴ PS = 16 cm

b) Here Scale factor = 2
(k)

∴ Area of $\triangle PQR = k^2 \times$ area of $\triangle ABC$

$= 2^2 \times 48$

$= 4 \times 48$

$= 192\ cm^2$

20)

a) Given $2\pi r = 12\pi$

$\therefore r = 6\ cm$

Area $= \pi r^2$

$= \pi \times 6^2$

$= 36\pi\ cm^2$

b) Arc length $= 2\pi r \times \frac{x}{360}$

$= 12\pi \times \frac{120}{360}$

$= 4\pi\ cm$

21)

a) Given $|x| = 3$ $\therefore x = +3, -3$

b) $|x-1| = 3$ $\therefore x-1 = +3$ or $x-1 = -3$

$x = 3+1$ | $x = -3+1$

$= 4$ | $= -2$.

c) $|x-1| = |x-3|$

$\therefore x = \frac{1+3}{2} = \frac{4}{2} = 2$.

22) Given $l = 50\text{cm}$, $b = 30\text{cm}$, $h = 40\text{cm}$

$$T.S.A = 2(lb + bh + lh)$$
$$= 2(50 \times 30 + 30 \times 40 + 50 \times 40)$$
$$= 2(1500 + 1200 + 2000)$$
$$= 2 \times 4700$$
$$= 9400\ \text{cm}^2$$

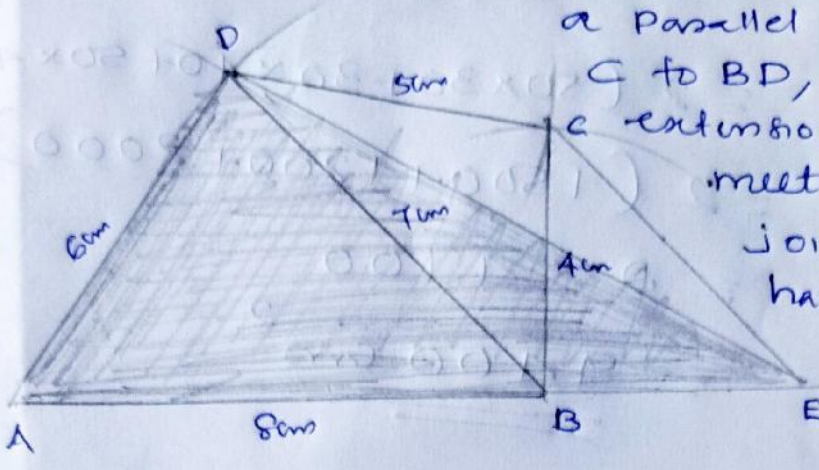
23

Daily wages	Numbers	Total daily wages
500	3	$500 \times 3 = 1500$
600	7	$600 \times 7 = 4200$
700	10	$700 \times 10 = 7000$
900	8	$900 \times 8 = 7200$
1000	2	$1000 \times 2 = 2000$
TOTAL	30	21900

Average daily wages $= \frac{21900}{30}$

$= 730$ rupees.

2A)



Draw the quad. ABCD
draw one diagonal BD
Extend AB, draw
a parallel line from
C to BD, so that the
extension of AB
meets it at E.
Joint DE, $\triangle AED$
has the same area
as that of
quad. ABCD.

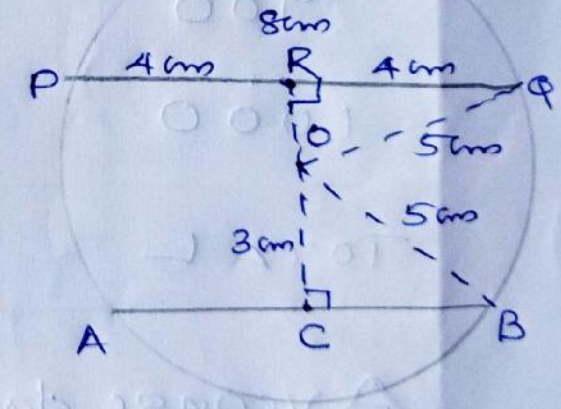
25) $\sqrt{32} = \sqrt{16 \times 2} = \sqrt{16} \times \sqrt{2} = \underline{\underline{4\sqrt{2}}}$

a) $\sqrt{50} = \sqrt{25 \times 2} = \sqrt{25} \times \sqrt{2} = \underline{\underline{5\sqrt{2}}}$

b) $\sqrt{50} + \sqrt{32} = 5\sqrt{2} + 4\sqrt{2} = \underline{\underline{9\sqrt{2}}}$

c) $\sqrt{50} - \sqrt{32} = 5\sqrt{2} - 4\sqrt{2} = \underline{\underline{\sqrt{2}}}$

26)



a) From $\triangle OCB$,

$BC = \sqrt{5^2 - 3^2}$

$= \sqrt{25 - 9}$

$= \sqrt{16}$

$= 4$

$\therefore AB = 4 \times 2 = \underline{\underline{8\text{ cm}}}$

b) From $\triangle ORQ$, $OR = \sqrt{5^2 - 4^2} = \sqrt{25 - 16}$

$= \sqrt{9} = \underline{\underline{3\text{ cm}}}$

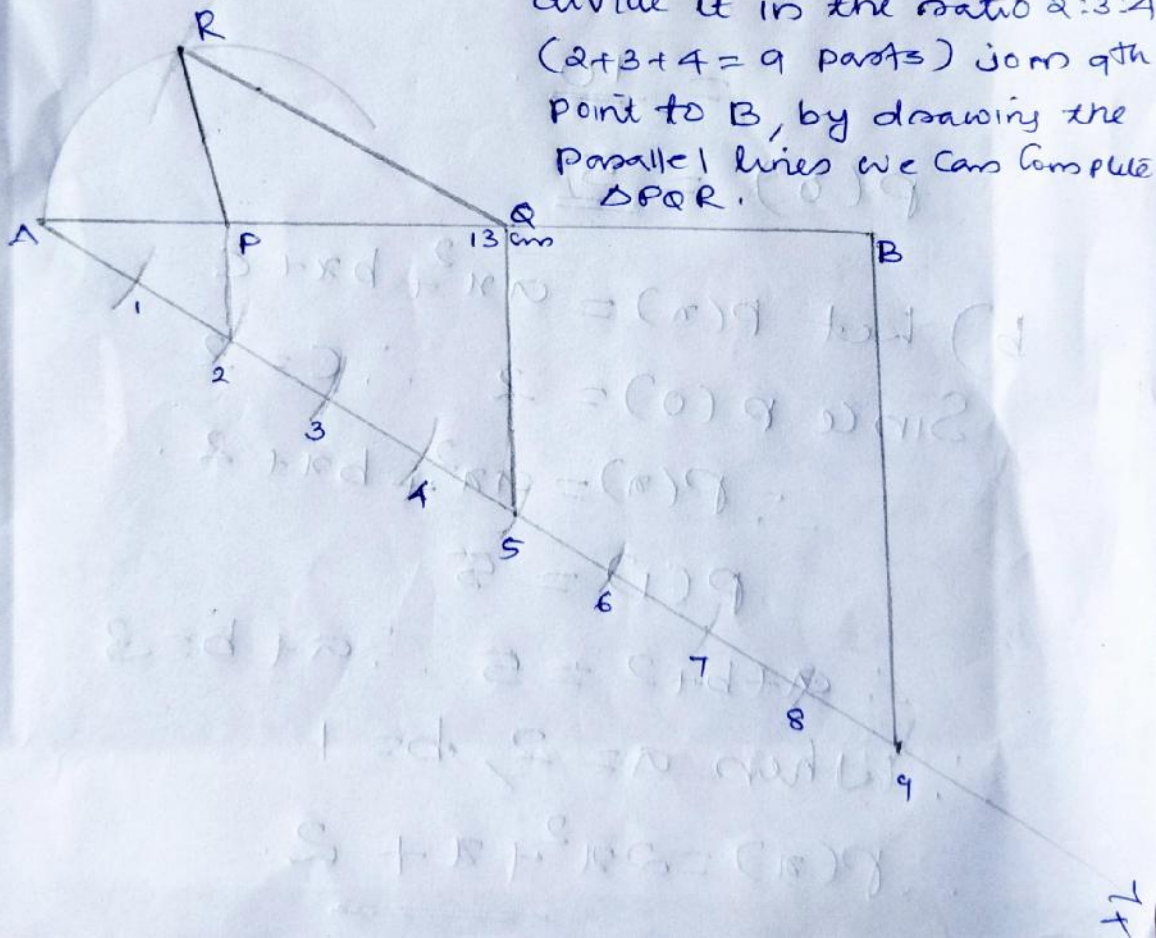
Distance of PQ from the Centre
= 3 cms

c) Distance b/w AB & PQ
= 3 + 3
= 6 cms

[Here AB and PQ are of same lengths so they are equal distance from the Centre. In that way also we can solve this problem]

27)

First draw AB = 13 cms
draw a slanted ray AX
divide it in the ratio 2:3:4
(2+3+4 = 9 parts) join 9th point to B, by drawing the parallel lines we can complete ΔPQR.



28) $d_1 : d_2 = r_1 : r_2$

a) $= \underline{3 : 4}$

b) $P_1 : P_2 = r_1 : r_2$

$= \underline{3 : 4}$

c) $A_1 : A_2 = r_1^2 : r_2^2$

$= \underline{9 : 16}$

29) $P(x) = 2x^2 + 3x + 5$

a) $P(1) = 2(1)^2 + 3(1) + 5$

$= 2 + 3 + 5$

$= \underline{10}$.

$P(0) = \underline{5}$

b) Let $P(x) = ax^2 + bx + c$

Since $P(0) = 2 \quad \therefore c = 2$

$\therefore P(x) = ax^2 + bx + 2$.

$P(1) = 5$

$\therefore a + b + 2 = 5 \quad \therefore a + b = 3$

$\therefore$ When $a = 2, \; b = 1$

$\therefore P(x) = 2x^2 + x + 2$.

$V = \pi r^2 h$.

$= \pi \times 1 \times 1 \times 2$

$= 2\pi \ m^3$

$= 2\pi \times 1000$ litres

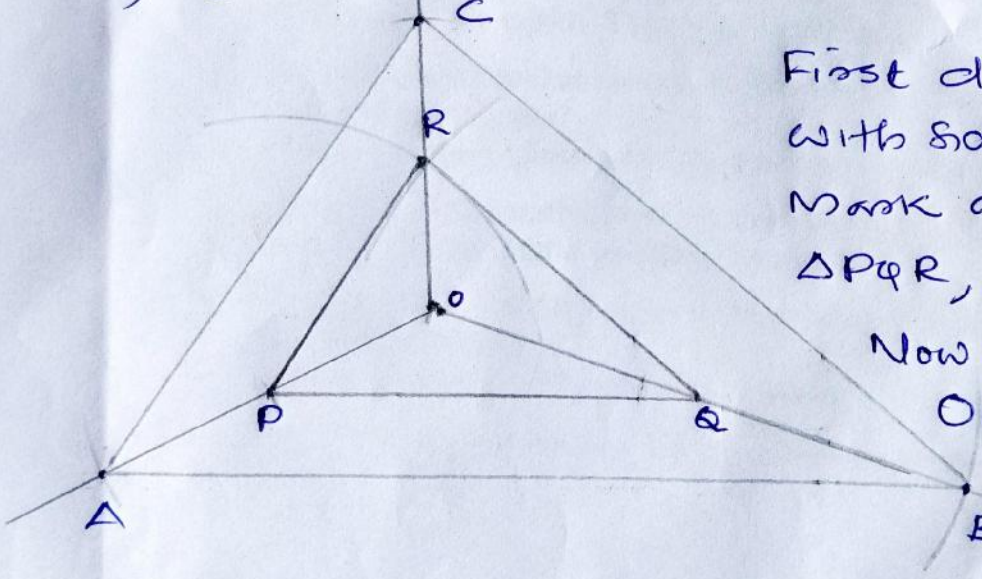
$= 2000\pi$ litres

$\approx 2000 \times 3.14$

≈ 6280 litres.

31) Here ratio of sides $= r_1 : r_2 = 1 : 2$

a) Since $PQ = 5$ cm $\therefore AB = 2 \times 5 = 10$ cm



First draw $\triangle PQR$ with sides 4cm, 5cm, 6cm. Mark a point 'O' inside $\triangle PQR$, Join OP, OQ, OR. Now extend OP to OA such that $OP = PA$, OQ to OB such that $OQ = QB$ and OR to OC such that $OR = RC$.

In that way we can complete the $\triangle ABC$.

32)

a) $3 \times 3 \times 3 = 3^3 = 27$

b) 3^4

c) 3 times

d) 3^5

e) 3^{10}

f) 3^n