10^{th} - CBSE

18th Aug '18

CT-2M

Solution

Section : A

1) DE ∥ BC

$\Rightarrow \dfrac{AD}{AB} = \dfrac{DE}{BC}$

$\therefore \dfrac{2}{5} = \dfrac{4}{x}$

$\therefore \boxed{x = 10\text{ cm}}$

2) $\dfrac{2\tan 30^\circ}{1 - \tan^2 30^\circ} = \dfrac{2(1/\sqrt{3})}{1-(1/\sqrt{3})^2}$

$= \dfrac{2/\sqrt{3}}{1 - 1/3}$

$= \dfrac{2/\sqrt{3}}{2/3}$

$= \sqrt{3}$

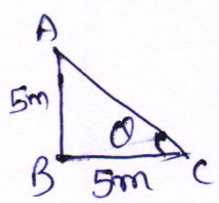
3) $13(7 \times 11 + 1)$

$= 13\ (13 \times 3 \times 2)$

= product of primes

$\therefore$ $13(7 \times 11 + 1)$ is a composite number.

4)



$\tan\theta = \dfrac{Opp.}{Adj} = \dfrac{AB}{BC}$

$= \dfrac{5}{5}$

$\tan\theta = 1$

$\therefore \boxed{\theta = 45^\circ}$

5) $D = b^2 - 4ac$

$= (10)^2 - 4(3\sqrt{3})(\sqrt{3})$

$= 100 - 36$

$\therefore \boxed{D = 64}$

Section : B

6) The max. no. of column = HCF (616, 32).

$616 = 32 \times 19 + 8$

$32 = 8 \times 4 + 0$

$\therefore$ 8 is the HCF of 32 & 616.

$\therefore$ Maximum no. of columns in which they can march is 8.

7) $\alpha = \sqrt{3} + \sqrt{2}$, $\beta = \sqrt{3} - \sqrt{2}$

$\rightarrow \alpha + \beta = \sqrt{3} + \sqrt{2} + \sqrt{3} - \sqrt{2} = 2\sqrt{3}$

$\rightarrow \alpha\beta = (\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2})$

$= 3 - 2 = 1.$

$\therefore$ The quadratic polynomial will be:

$x^2 - (\alpha + \beta)x + \alpha\beta$

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

8) $\frac{36}{24} = \frac{AB}{PQ}$

$\frac{36}{24} = \frac{AB}{10}$

$\therefore \boxed{AB = 15\text{cm}}$

9) In ΔOPQ,

$$OP^2 + PQ^2 = OQ^2$$

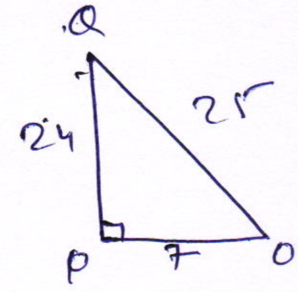
$$PQ^2 + 7^2 = (1+PQ)^2$$

$$PQ^2 + 49 = 1 + 2PQ + PQ^2$$

$$2PQ = 48$$

$$PQ = 24 \text{ cm}$$

$$OQ = 25 \text{ cm}$$



→ $\sin Q = \frac{OP}{OQ}$

$= \frac{7}{25}$

→ $\cos Q = \frac{PQ}{OQ}$

$= \frac{24}{25}$

Section : C

10) let a be any positive integer and $b=3$. Applying division lemma with a & $b=3$,

$a = 3q + r$, $0 \le r < 3$, q is some integer

$a = 3q + 0$, $a = 3q + 1$, $a = 3q + 2$

$\Rightarrow a = 3q$, $a = 3q+1$, $a = 3q+2$ for some int. q.

11) $p(x) = 4x^2 + 4x - 3$

$4x^2 + 6x - 2x - 3 = 0$

$\therefore 2x(2x+3) - 1(2x+3) = 0$

$(2x+3)(2x-1) = 0$

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