SECTION A : SOLUTION

1. **(D)**

2. **(D)**

3. **(B)**

4. **(B)**
Black dot should be in right corner with opposite direction of arrow and arrow should be under the black bot

5. **(A)**
The colours adjacent to yellow are orange, blue, red and rose. Hence violet will be opposite to yellow.

6. **(D)**
H.C.F. of 44 & 32 is 4.
$\therefore$ Minimum no. of rows $= \frac{44}{4} + \frac{32}{4} = 19$

7. **(A)**
$f(x) = x^2 + 6x + a = (x+8)(x-2) = x^2 + 6x - 16$
$\therefore\ a = -16$
Similarly $b = -12$ & $c = 48$
$\therefore\ a + b + c = -16 - 12 + 48 = 20$

8. Value of $\left(1+\frac{1}{2}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{16}\right)\left(1+\frac{1}{256}\right).....\infty$ is

(A) 1 (B) 2 (C) $\frac{1}{2}$ (D) $\frac{1}{4}$

8. **(B)**

$$x = \frac{\left(1-\frac{1}{2}\right)\left(1+\frac{1}{2}\right)\left(1+\frac{1}{4}\right)\left(1+\frac{1}{16}\right).....}{\left(1-\frac{1}{2}\right)}$$

$$= \frac{1}{1/2} = 2$$

9. If $a^2 + b^2 - 4a + 2b + 5 = 0 (a, b \in R)$, then

(A) $a^2 + b^2 = 3a + b$ (B) $a^2 + b^2 = a - 2b$
(C) $a^2 + b^2 = 4a$ (D) None

9. **(A)**

$a^2-4a+4+b^2+2b+1=0$

$\Rightarrow (a-2)^2+(b+1)^2=0$

$\therefore\ a=2\ \&\ b=-1$

10. **(A)**

Given: $\frac{28}{x+y}+\frac{12}{x-y}=5$ .....(1)

$\frac{21}{x+y}+\frac{10}{x-y}=4$ .....(2)

$\therefore\ x=9\ \&\ y=5$

$\therefore$ Speed in still water = 9 kmph

11. **(D)**

Given: $30x+40y=360$

$\Rightarrow x=12-\frac{4y}{3}$

$x\ \&\ y$ are positive integers

$\therefore\ y=3$ or 6

$\Rightarrow x=8,1$

$\therefore$ Two combinations.

12. **(B)**

Remainder $= f\left(\frac{1}{2}\right)$

$=\frac{1}{2}-3+7-3=\frac{3}{2}$

13. **(D)**

$x=\frac{-2+4+4}{3}=2$

$y=\frac{3+(-3)+5}{3}=\frac{5}{3}$

14. **(C)**

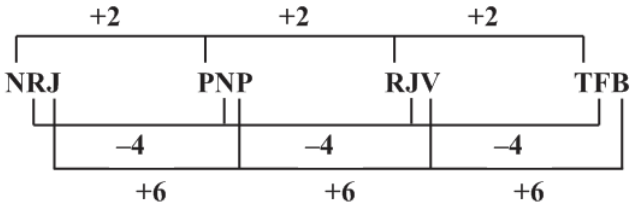
$(4a+5b+5c)^2-(5a+4b+4c)^2+9a^2$

$=(9a+9b+9c)(-a+b+c)+9a^2$

$=9\left[(b+c)^2-a^2\right]+9a^2=9(b+c)^2$

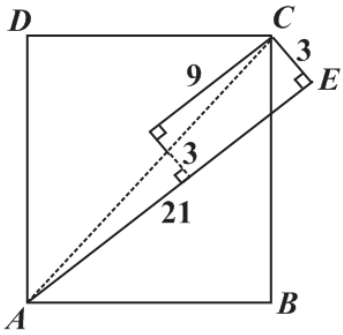
$\therefore$ Sq. root $=3(b+c)$

15. **(B)**



SECTION B : SOLUTIONS

16. **(15)**



AE = 21

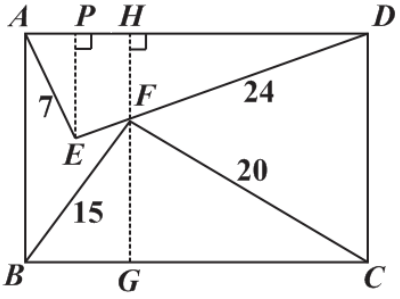
Length of $AC = \sqrt{21^2 + 3^2}$

$= \sqrt{450}$

$= 15\sqrt{2}$

$x = \frac{AC}{\sqrt{2}} = \frac{15\sqrt{2}}{\sqrt{2}} = 15$

17. **(50)**



In ΔAED

$AD = \sqrt{7^2 + 24^2} = 25 = BC$

In ΔBFG

$CF = \sqrt{25^2 - 15^2} = 20$

Also $BF \cdot FC = BC \cdot FG$

$FG = \frac{15 \times 20}{25} = 12$

And $CG = \sqrt{20^2 - 12^2} = 16 = DH$

In ΔDEA

$$EP = \frac{AE \times DE}{AD} = \frac{(7 \times 24)}{25}$$

$$\text{And } DP = \sqrt{24^2 - EP^2} = \frac{(24)^2}{25}$$

$$\Delta DEP \sim \Delta DFH$$

$$\frac{FH}{PE} = \frac{DH}{DP}$$

$$FH = \frac{7 \times 24}{25} \times \frac{16}{(24)^2} 25$$

$$= \frac{14}{3}$$

$$x = FH + FG$$

$$x = 12 + \frac{14}{3}$$

$$3x = 50$$