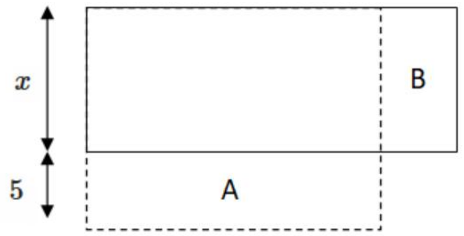
G.S.C.E
Chapter Covered MENSURATION
(25 Answers and Explanations)

1B



Consider the diagram shown above. Initial rectangle is the one drawn with sold lines with length $2x$ and breadth x. Final rectangle is drawn with dashed lines with length $2x - 5$ and breadth $x + 5$

From the diagram, we can see that increase in area is equal to area of the rectangle A - area of rectangle B. Therefore,

$5(2x - 5) - 5x = 75$

$\Rightarrow 5x = 100$

$\Rightarrow x = 20$

Length of the initial rectangle $= 2x = 40$

2B

$$\frac{\text{area of the square}}{\text{area of the rhombus}} = \frac{a^2}{a^2 \sin\theta} = \frac{1}{\sin\theta}$$

Since $0^\circ < \theta < 90^\circ, 0 < \sin\theta < 1$

Therefore, area of the square is greater than that of rhombus, provided both stands on same base.

3D

Given that breadth of the rectangular field is 60% of its length.

$$\Rightarrow b = \frac{60l}{100} = \frac{3l}{5}$$

Perimeter of the field $= 800$ m

$\Rightarrow 2(l + b) = 800$

$$\Rightarrow 2\left(l + \frac{3l}{5}\right) = 800$$

$$\Rightarrow l + \frac{3l}{5} = 400$$

$$\Rightarrow \frac{8l}{5} = 400$$

$\Rightarrow l = 250$ m

$$b = \frac{3l}{5} = \frac{3 \times 250}{5} = 150 \text{ m}$$

Area $= lb = 250 \times 150 = 37500 \text{ m}^2$

4A

Hence, HCF of 544 and 374 $= 34$

Therefore,

side of largest square tile $= 34$ cm

area of largest square tile $= 34 \times 34 \text{ cm}^2$

Required number of tiles

$= \dfrac{544 \times 374}{34 \times 34} = 16 \times 11 = 176$

5A

Length of the fence $= \dfrac{5300}{26.50} = 200$ m

$\Rightarrow$ 2(length + breadth)$= 200$

$\Rightarrow$ length + breadth $= 100$

$\Rightarrow$ length + length - 20 $= 100$ ($\because$ breadth= length -20)

$\Rightarrow$ length $= 60$

6C

Percentage error in calculated area

$= \left(\dfrac{2^2}{100} + 2 \times 2\right)\% = 4.04\%$

7A

Area of the lawn $= \left(\dfrac{60-x}{2}\right)\left(\dfrac{40-x}{2}\right)4$

Lawn is indicated with gray color in the above diagram. Each of the four shaded portions will have same area and therefore, we have taken area of one portion and multiplied it by 4 to get area of the lawn.

Therefore,

$\left(\dfrac{60-x}{2}\right)\left(\dfrac{40-x}{2}\right)4 = 2109$

$\Rightarrow (60-x)(40-x) = 2109$

$\Rightarrow (60-x)(40-x) = 3 \times 19 \times 37$

$\Rightarrow (60-x)(40-x) = 57 \times 37$

$\Rightarrow x = 3$

8B

Percentage increase in area

$= \left(-20 - 10 + \dfrac{20 \times 10}{100}\right)\% = -28\%$

That is, area is decreased by 28%

9A

Change in area

$= \left(-50 + 200 - \dfrac{50 \times 200}{100}\right)\% = 50\%$

That is, area is increased by 50%

10A

Let length of each side = x

Then, length of the diagonal = $\sqrt{x^2+x^2}=\sqrt{2}x$

Distance travelled if walked along the edges

= BC + CD = $x+x=2x$

Distance travelled if walked diagonally

= BD = $\sqrt{2}x=1.41x$

Distance saved $=2x-1.41x=0.59x$

Percent distance saved

$=\left(\frac{0.59x}{2x}\times 100\right)\%\approx 30\%$

11C

diagonal, $d=7\frac{1}{2}$ feet $=\frac{15}{2}$ fe

breadth, $b=4\frac{1}{2}$ feet $=\frac{9}{2}$ feet

From the right-angled triangle

$l=\sqrt{\left(\frac{15}{2}\right)^2-\left(\frac{9}{2}\right)^2}$

$=\sqrt{\frac{225}{4}-\frac{81}{4}}$

$=\sqrt{\frac{144}{4}}=6$ feet

12B

Let length $=l$,

breadth $=b$,

diagonal $=d$

$d=\sqrt{41}$

$\Rightarrow d^2=41$

$\Rightarrow l^2+b^2=41\quad\cdots(1)$

Area $=lb=20\quad\cdots(2)$

From (1) and (2)

$l^2+b^2+2lb=41+2\times 20$

$\Rightarrow l^2+2lb+b^2=81$

$\Rightarrow (l+b)^2=81$

$\Rightarrow l+b=9$

perimeter = $2(l+b)=2\times 9=18$

13A

In this case, $l = 25$ m, $w = 12$ m, $h = 6$ m and all surface needs to be plastered except the top.

Hence, total area to be plastered
= total surface area - area of the top face
$= (2lw + 2lh + 2wh) - lw$
$= lw + 2lh + 2wh$
$= 25 \times 12 + 2 \times 25 \times 6 + 2 \times 12 \times 6$
$= 300 + 300 + 144$
$= 744 \text{ m}^2$

Cost of plastering
$= 744 \times 75$
$= 55800$ paise
$=$ ₹558

14D

we cannot determine total cost of construction

15D

Let base $= x$
Then, height $= 2x$

Area $= x \times 2x = 2x^2$

Area is given as 72 cm^2
$\Rightarrow 2x^2 = 72$
$\Rightarrow x^2 = 36$
$\Rightarrow x = 6$ cm

16D

Area of the field $= 680$ sq.feet.

Length of the adjacent sides are
20 feet and $\frac{680}{20} = 34$ feet.

Required length of the fencing
$= 20 + 34 + 34 = 88$ feet

17A

length $= 9$ feet
breadth $= \frac{37 - 9}{2} = 14$ feet

area $= 9 \times 14 = 126$ square feet

18B

$lb = 460 \quad \cdots (1)$
$l = \frac{115b}{100} \quad \cdots (2)$

From (1) and (2),
$\frac{115b}{100} \times b = 460$
$\Rightarrow b^2 = 400$
$\Rightarrow b = \sqrt{400} = 20$

19B

Larger area - smaller area

= One-fifth of the average of the two areas

$$= \frac{1}{5} \times \frac{700}{2} = 70$$

Larger area + smaller area $= 700$

Therefore, smaller area $= \dfrac{700-70}{2} = 315$

20A

Area $= 5.5 \times 3.75\ \mathrm{m}^2$

Cost of $1\ \mathrm{m}^2 = ₹800$

Hence, required cost

$= 5.5 \times 3.75 \times 800$

$= 5.5 \times 3000$

$= ₹16500$

21C

Distance travelled by the man at the speed of 12 km/hr in 8 min

$$= 12 \times \frac{8}{60} \times 1000 = 1600\ \mathrm{m}$$

But total distance travelled

$= 2(3x+2x) = 10x$

Therefore,

$10x = 1600$

$\Rightarrow x = 160\ \mathrm{m}$

Area $= 3x \times 2x = 6x^2$

$= 6 \times 160^2 = 153600\ \mathrm{m}^2$

22C

Increase in area

$$= \left(\frac{20^2}{100} + 2 \times 20\right)\% = 44\%$$

23A

length = breadth $+23$. Therefore,

$4\times$ breadth $+2 \times 23 = 206$ m

$\Rightarrow$ breadth $= 40$ m

length $= 40 + 23 = 63$ m

Area $= 63 \times 40 = 2520\ \mathrm{m}^2$

24A

$2(l+b):b=5:1$

$\Rightarrow 2l+2b=5b$

$\Rightarrow 2l=3b$

$\Rightarrow b=\dfrac{2l}{3}$

Also given that, area $=216\ \text{cm}^2$

$\Rightarrow lb=216\ \text{cm}^2$

Substituting the value of b, we get,

$l\times\dfrac{2l}{3}=216$

$\Rightarrow l^2=3\times 108=3\times 3\times 36$

$\Rightarrow l=3\times 6=18\ \text{cm}$

25D

Hence, HCF of 1517 and 902 $=41$

Therefore,

side of largest square tile $=41$ cm

area of largest square tile $=41\times 41\ \text{cm}^2$

Number of tiles required

$=\dfrac{1517\times 902}{41\times 41}=37\times 22=814$