Linear Inequations Ex 15.4 Q9

Let the length of the shortest side be x.

Then, the length of te longest side and third side of the triangle are $3x$ and $3x-2$ respectively.

According to question,

perimeter of triangle ≥ 61

$\Rightarrow \quad x+3x-2+3x \geq 61$

$\Rightarrow \quad 7x \geq 61+2$

$\Rightarrow \quad 7x \geq 63$

$\Rightarrow \quad x \geq \frac{63}{7}$

$\Rightarrow \quad x \geq 9$

$\therefore$ The minimum length of the shortest side is 9cm.

Linear Inequations Ex 15.4 Q10

Let the quantity of water to be added to solution $= x$ liters.

$\therefore \quad 25\%(1125+x) < 45\%\text{ of } 1125$

$\Rightarrow \quad \frac{25}{100}(1125+x) < \frac{45}{100} \times 1125$

$\Rightarrow \quad 1125+x < \frac{45}{25} \times 1125$

$\Rightarrow \quad 1125+x < 45 \times 45$

$\Rightarrow \quad 1125+x < 2025$

$\Rightarrow \quad x < 2025-1125$

$\Rightarrow \quad x < 900$

and 45% of $1125 < 30\%(1125+x)$

$\Rightarrow \quad \frac{45}{100} \times 1125 < \frac{30}{100}(1125+x)$

$\Rightarrow \quad \frac{45}{30} \times 1125 < 1125+x$

$\Rightarrow \quad \frac{3}{2} \times 1125 < 1125+x$

$\Rightarrow \quad 1.5 \times 1125 < 1125+x$

$\Rightarrow \quad 1687.5 < 1125+x$

$\Rightarrow \quad 1687.5-1125 < x$

$\Rightarrow \quad 562.5 < x \quad \ldots\ldots\ldots\ldots\ldots\ldots (ii)$

Using (i) and (ii), we get $562.5 < x < 900$

Hence, quantity of water lies between 562.5 litres and 900 litres.

Linear Inequations Ex 15.4 Q11

Let x liters of 2% solution will have to be added to 640 liters of the 8% solution of acid.

Total quantity of mixture = $(640+x)$

Total acid in the $(640+x)$ liters of mixture

$$\frac{2}{100}x+\frac{8}{100}640$$

It is given that acid content in the resulting mixture must be more than 4% but less than 6%.

$$\frac{4}{100}[640+x]<\left(\frac{2}{100}x+\frac{8}{100}640\right)<\frac{6}{100}[640+x]$$

$$\Rightarrow 4[640+x]<(2x+8640)<6[640+x]$$

$$\Rightarrow 2560+4x<2x+8640 \text{ and } 2x+8640<3840+6x$$

$$\Rightarrow 2560-8640<2x-4x \text{ and } 2x-6x<3840-8640$$

$$\Rightarrow x<1280 \text{ and } x>320$$

More than 320 litres but less than 1280 liters of 2% is to be added.

Linear Inequations Ex 15.4 Q12

Let the pH value of third reading be x.

$$\therefore \quad 7.2<\frac{7.48+7.85+x}{3}<7.8$$

$$\Rightarrow \quad 21.6<7.48+7.85+x<23.4$$

$$\Rightarrow \quad 21.6<15.33+x<23.4$$

$$\Rightarrow \quad 21.6-15.33<x<23.4-15.33$$

$$\Rightarrow \quad 6.27<x<8.07$$

$\therefore$ The range of pH value for the third reading is lies between 6.27 and 8.07.

********** END **********