

$$1. \quad \sin 40^\circ = \frac{x}{6}$$

$$6 \times \sin 40^\circ = x$$

$$3.8567 \text{ m} = x$$

$$\text{Area} = \frac{3.8567 \times 6 \times \sin 50^\circ}{2}$$

$$= 8.86 \text{ m}^2$$

1L covers 2 m^2

$$8.86 \div 2 = 4.43 \text{ L needed}$$

$$\therefore \underline{5} \text{ 1L containers}$$

$$2. \quad \frac{20}{\sin 115^\circ} = \frac{10}{\sin C} \Rightarrow \sin C = 0.45315$$

$$C = \sin^{-1}(0.45315)$$

$$\angle C = 26.95^\circ$$

$$\therefore \angle A = 180^\circ - 115^\circ - 26.95^\circ$$

$$\angle A = 38.05^\circ$$

$$\text{Area} = \frac{20 \times 10 \times \sin 38.05^\circ}{2}$$

$$= \underline{61.64 \text{ cm}^2}$$

$$3. \quad \angle C = 180^\circ - 40^\circ - 20^\circ = 120^\circ$$

$$\text{Area} = \frac{8 \times 15 \times \sin 120^\circ}{2}$$

$$= \underline{51.96 \text{ km}^2}$$

$$4. \quad \text{Area} = \frac{20 \times 15 \times \sin 60^\circ}{2} = \underline{129.90 \text{ cm}^2}$$

$$5. \quad \frac{120}{\sin 95^\circ} = \frac{r}{\sin 45^\circ}$$

$$r = 85.1769$$

$$\text{Area} = \frac{120 \times 85.1769 \times \sin 40^\circ}{2}$$

$$= \underline{3285.04 \text{ m}^2}$$

$$\begin{aligned}
 6. \quad d(P,Q) &= \sqrt{(9-6)^2 + (9-6)^2} \\
 &= \sqrt{18} \\
 &= 4.2426
 \end{aligned}$$

$$\begin{aligned}
 d(Q,R) &= \sqrt{(14-9)^2 + (6-9)^2} \\
 &= \sqrt{25 + 9} \\
 &= \sqrt{34} \\
 &= 5.83095
 \end{aligned}$$

$$d(P,R) = 14 - 6 = 8$$

$$S = \frac{4.2426 + 5.83095 + 8}{2} = 9.0368$$

$$\begin{aligned}
 \text{Area} &= \sqrt{9.0368(9.0368 - 8)(9.0368 - 4.2426)(9.0368 - 5.83095)} \\
 &= \sqrt{9.0368(1.0368)(4.79416)(3.2058)} \\
 &= \sqrt{144} \\
 &= \boxed{12 \text{ square units}}
 \end{aligned}$$

$$\begin{aligned}
 7. \quad \frac{2}{\sin 12^\circ} &= \frac{r}{\sin 41^\circ} \\
 r &= 6.3109
 \end{aligned}$$

$$\begin{aligned}
 \text{Area} &= \frac{6.3109 \times 10 \times \sin 53^\circ}{2} \\
 &= \boxed{25.2 \text{ m}^2}
 \end{aligned}$$

8. $P(0, 42)$ (y-intercept)

$$\text{Line RS} \quad a = \frac{37 - 12}{50 - 0}$$

$$a = \frac{25}{50} = 0.5$$

$$b = 12 \quad (\text{Point R is on y-axis})$$

$$\text{equation: } y = 0.5x + 12$$

$$\text{Point Q: by comparison} \quad 0.5x + 12 = -x + 42$$

$$1.5x + 12 = 42$$

$$1.5x = 30$$

$$x = 20$$

$$y = 0.5(20) + 12$$

$$y = 22$$

$$\therefore Q(20, 22)$$

$$d(P, R) = 30$$

$$\begin{aligned} d(P, Q) &= \sqrt{(0-20)^2 + (42-22)^2} \\ &= \sqrt{800} \\ &= 28.2843 \end{aligned}$$

$$\begin{aligned} d(R, Q) &= \sqrt{(0-20)^2 + (12-22)^2} \\ &= \sqrt{500} \\ &= 22.3607 \end{aligned}$$

$$S = \frac{30 + \sqrt{800} + \sqrt{500}}{2} = 40.32248$$

$$\begin{aligned} \text{Area} &= \sqrt{40.32248(40.32248 - 28.2843)(40.32248 - 22.3607)(40.32248 - 30)} \\ &= \sqrt{90000} \\ &= \boxed{300 \text{ square units}} \end{aligned}$$