

Suncoast High School Mathematics
Year 9 Advanced Test Solutions

Solutions

Q1

$$3a + 29 = -1 + 5a$$

$$29 + 1 = 5a - 3a$$

$$30 = 2a$$

$$15 = a$$

$$a = 15$$

Q2

$$\text{Discount} = 15\% \times 315$$

$$= 0.15 \times 315$$

$$= 47.25$$

$$\text{cost price} = 315 - 47.25$$

$$= 267.75$$

Alternative

$$\text{cost price} = 85\% \times 315$$

$$= 0.85 \times 315$$

$$= 267.75$$

Cost price of the TV set is \$267.75

Q3

$$C = \frac{5}{9}(F - 32)$$

$$\text{When } C = 20$$

$$20 = \frac{5}{9}(F - 32)$$

$$\frac{20 \times 9}{5} = F - 32$$

$$\frac{\cancel{20}^4 \times 9}{\cancel{5}_1} = F - 32$$

$$\frac{36}{1} = F - 32$$

$$F = 36 + 32$$

$$F = 68$$

Q4

Athlete's Speed

$$100m \text{ in } 12sec = (100 \times 5)m \text{ in } (12 \times 5)sec$$

$$= 500m \text{ in } 60sec$$

$$= 500m \text{ in } 1min$$

$$= (500 \times 60)m \text{ in } (1 \times 60)min$$

$$= 30000m \text{ in } 60min$$

$$= 30000m \text{ in } 1h$$

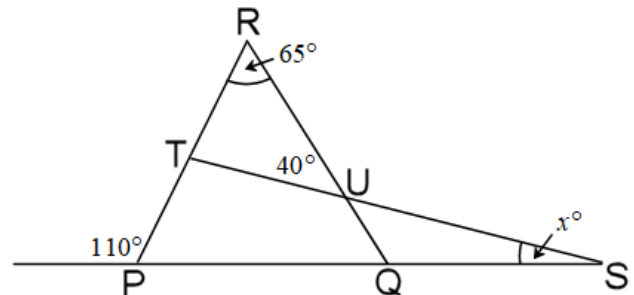
$$= \left(\frac{30000}{1000} \right) m \text{ in } 1h$$

$$= \left(\frac{\cancel{30000}^{30} \cancel{000}^0}{\cancel{1000}^{1000}} \right) km \text{ in } 1h$$

$$= 30km / h$$

The athlete is running at a speed of 30km/h.

Q5



$$\angle RPQ = 70^\circ \quad (\text{supp. } \angle)$$

$$\begin{aligned} \angle RQP &= 180^\circ - 65^\circ - 70^\circ & (\angle \text{ sum } \Delta) \\ &= 45^\circ \end{aligned}$$

$$\begin{aligned} \angle RQS &= 180^\circ - 45^\circ & (\text{supp. } \angle) \\ &= 135^\circ \end{aligned}$$

$$\angle QUS = 40^\circ \quad (\text{vert. opp. } \angle)$$

$$\begin{aligned} x^\circ + 175^\circ &= 180^\circ & (\angle \text{ sum } \Delta QUS) \\ x + 175 &= 180 \end{aligned}$$

$$x = 5$$

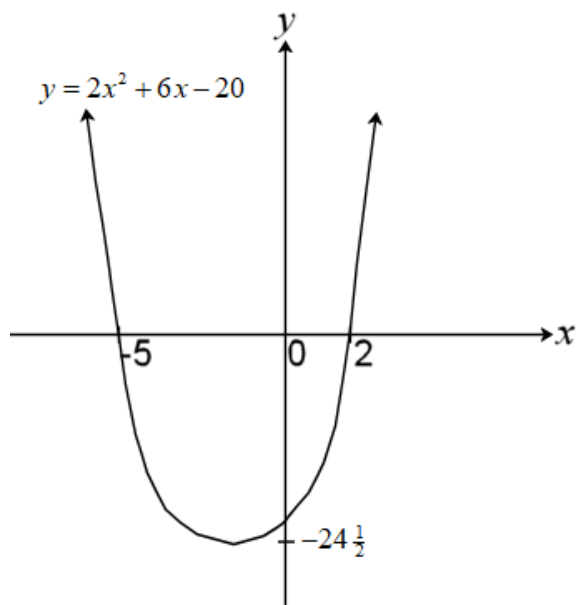
Q6

$$\begin{aligned}
 \text{i} \quad 2(x-2)(x+5) &= 2[x(x+5) - 2(x+5)] \\
 &= 2[x^2 + 5x - 2x - 10] \\
 &= 2[x^2 + 3x - 10] \\
 &= 2x^2 + 6x - 20
 \end{aligned}$$

$$\text{ii} \quad 2x^2 + 6x - 20 = 0$$

$$\begin{aligned}
 2(x-2)(x+5) &= 0 \\
 x &= 2, -5 \\
 x &= -5, 2
 \end{aligned}$$

iii

Iv Min. Value when

$$x = \frac{-5+2}{2}$$

$$= \frac{-3}{2}$$

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

 $\therefore$

$$y = 2x^2 + 6x - 20$$

$$= 2\left(-\frac{3}{2}\right)^2 + 6\left(-\frac{3}{2}\right) - 20$$

$$= 2 \times \left(\frac{9}{4}\right) - 6 \times \frac{3}{2} - 20$$

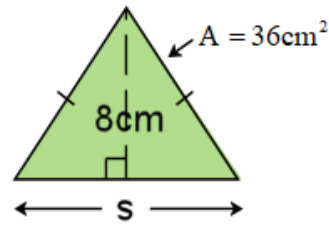
$$= \frac{9}{2} - 9 - 20$$

$$= 4\frac{1}{2} - 9 - 20$$

$$= -24\frac{1}{2}$$

Min. Value is $y = -24\frac{1}{2}$ (diagram)

Q7



i

$$A = \frac{1}{2}bh$$

$$36 = \frac{1}{2} \times s \times 8$$

$$36 = 4s$$

$$9 = s$$

$$s = 9$$

ii Cross-Section Area

$$A = A_{Tri.} + A_{Sq.}$$

$$= 36 + 9^2$$

$$= 36 + 81$$

$$= 117 \text{ cm}^2$$

Volume of Prism

$$V = Ah$$

$$V = AL$$

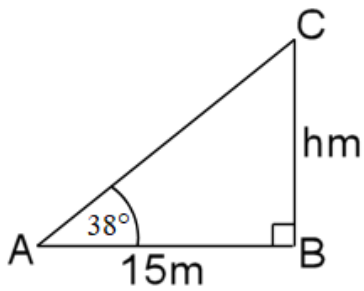
When A=117, L=13

$$V = 117 \times 13$$

$$= 1521$$

The volume of the prism is 1521 cm^3

Q8



i

$$\tan 38^\circ = \frac{h}{15}$$

$$15 \times \tan 38^\circ = h$$

$$h = 11.7192844$$

$$h \approx 11.7$$

li In right triangle ABC

$$b^2 = a^2 + c^2$$

$$= (11.7)^2 + 15^2$$

$$= 136.89 + 225$$

$$= 361.89$$

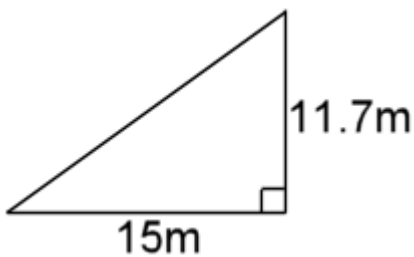
$$b = \sqrt{361.89}$$

$$= 19.02340663$$

$$b \approx 19$$

The hypotenuse is 19m in length

lii



$$A = \frac{1}{2}bh$$

$$= \frac{1}{2} \times 15 \times 11.7$$

$$= 0.5 \times 15 \times 11.7$$

$$= 87.75$$

Area of $\triangle ABC$ is 87.75m^2