

Suncoast High School Mathematics (Y9 Adv. Test)

Solutions

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

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

$$30 = 2a$$

$$15 = a$$

$$a = 15$$

2) Discount = $15\% \times 315$

$$= 0.15 \times 315$$

$$= 47.25$$

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

$$= 267.75$$

Cost price of TV after discount is \$267.75

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

when $C = 20$

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

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

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

$$36 = F - 32$$

$$36 + 32 = F$$

$$F = 68$$

4) Athletes Speed

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

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

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

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

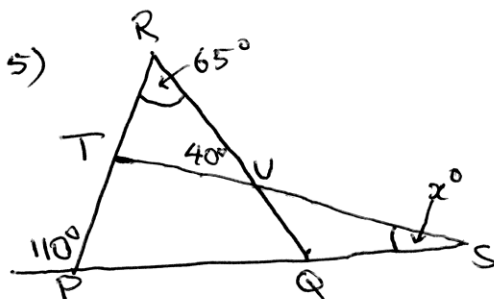
$$= 30000 \text{ m in } 60 \text{ min}$$

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

$$= \frac{30000}{1000} \text{ km in } 1 \text{ h}$$

$$= \frac{30000}{1000} \text{ km in } 1 \text{ h}$$

$$= 30 \text{ km/h}$$



$$\angle RPQ = 70^\circ \text{ (supplementary } \angle)$$

$$\angle RQP = 180^\circ - 65^\circ - 70^\circ \text{ (L sum } \Delta)$$

$$= 45^\circ$$

$$\angle RQS = 180^\circ - 45^\circ \text{ (supp. } \angle)$$

$$= 135^\circ$$

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

$$40^\circ + 135^\circ + x^\circ = 180^\circ \text{ (L sum } \Delta QUS)$$

$$175^\circ + x^\circ = 180^\circ$$

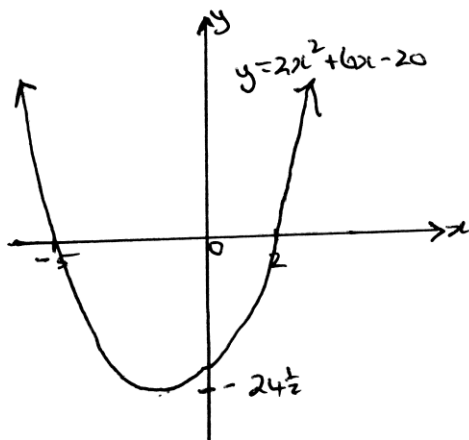
$$175 + x = 180$$

$$x = 5$$

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

$$\begin{aligned}
 (ii) \quad 2x^2 + 6x - 20 &= 0 \\
 2(x-2)(x+5) &= 0 \\
 x &= 2, -5 \\
 x &= -5, 2
 \end{aligned}$$

(iii)



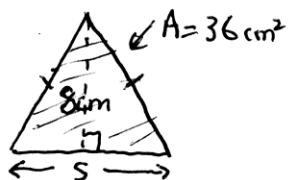
(iv) Min. Value when

$$\begin{aligned}
 x &= \frac{-5+2}{2} \\
 &= \frac{-3}{2} \\
 &= -1\frac{1}{2}
 \end{aligned}$$

$$\begin{aligned}
 \therefore y &= 2x^2 + 6x - 20 \\
 &= 2\left(-\frac{3}{2}\right)^2 + 6\left(-\frac{3}{2}\right) - 20 \\
 &= 2 \times \frac{9}{4} - 9 - 20 \\
 &= \frac{9}{2} - 9 - 20 \\
 &= 4\frac{1}{2} - 9 - 20 \\
 &= -4\frac{1}{2} - 20 \\
 &= -24\frac{1}{2}
 \end{aligned}$$

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

7)



$$\begin{aligned}
 (i) \quad A &= \frac{1}{2}bh \\
 36 &= \frac{1}{2} \times b \times 8 \\
 36 &= 4b \\
 9 &= b \\
 \therefore s &= 9 \quad (\text{since } b=s)
 \end{aligned}$$

(ii) Cross-Section Area

$$\begin{aligned}
 A &= A_{\Delta} + A_{\square} \\
 &= 36 + 9^2 \\
 &= 36 + 81 \\
 &= 117 \text{ cm}^2
 \end{aligned}$$

7) (iii) Volume of Prism

$$V = Ah$$

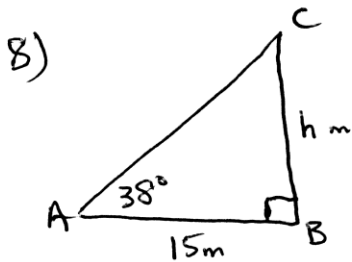
$$= AL$$

when $A = 117$, $L = 13$

$$V = 117 \times 13$$

$$= 1521$$

The volume of the prism is 1521 cm^3



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

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

$$h = 11.7192844$$

$$h \approx 11.7$$

$\therefore BC$ is 11.7 m high

(ii) In right triangle ABC

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

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

$$= 136.89 + 225$$

$$= 361.89$$

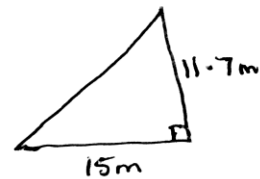
$$b = \sqrt{361.89}$$

$$= 19.02340663$$

$$b \approx 19$$

The hypotenuse is 19 m in length

(iii)



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

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

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

$$= 87.75$$

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