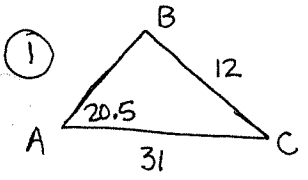
Precalculus – Chapter 6 Review Answers

① 

$\frac{\sin B}{31} = \frac{\sin 20.5}{12}$

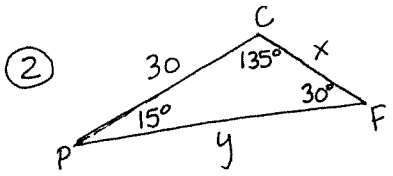
$B = 64.78° \text{ – OR – } 115.22°$

$C = 94.72° \text{ – OR – } 44.28°$

$c = 34.15 \text{ – OR – } 23.92$

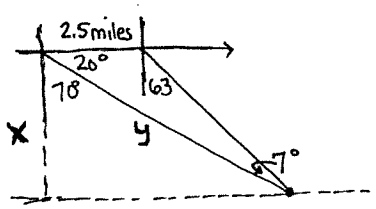
$\frac{c}{\sin 94.72} = \frac{12}{\sin 20.5}$ $\quad c = 34.15$

$\frac{c}{\sin 44.28} = \frac{12}{\sin 20.5}$ $\quad c = 23.92$

② 

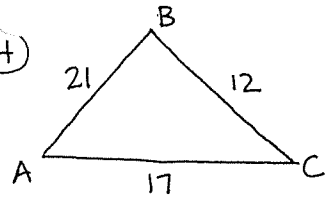
$\frac{30}{\sin 30°} = \frac{x}{\sin 15°}$ $\quad x = 15.53 \text{ km}$

$\frac{30}{\sin 30°} = \frac{y}{\sin(135°)}$ $\quad y = 42.43 \text{ km}$

③ 

$\frac{2.5}{\sin 7°} = \frac{y}{\sin 153°}$ $\quad y = 9.31 \text{ miles}$

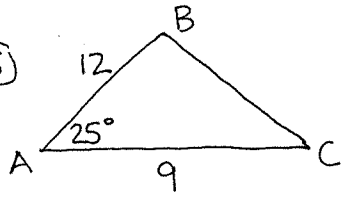
$\cos 70° = \frac{x}{9.31}$ $\quad x = 3.19 \text{ miles}$

④ 

$12^2 = 21^2 + 17^2 - 2(21)(17)\cos A$ $\quad A = 34.84°$

$21^2 = 12^2 + 17^2 - 2(12)(17)\cos C$ $\quad C = 91.12°$

$B = 54.04°$

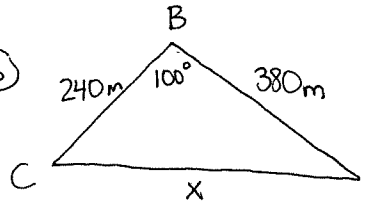
⑤ 

$a^2 = 12^2 + 9^2 - 2(12)(9)\cos 25°$ $\quad a^2 = 29.24$

$a = 5.41$

$9^2 = (\frac{5.41}{29.24})^2 + 12^2 - 2(\frac{5.41}{29.24})(12)\cos B$ $\quad B = 44.70°$

$C = 110.30°$

⑥ 

$x^2 = 240^2 + 380^2 - 2(240)(380)\cos 100°$

$x = 483.4 \text{ m}$

⑦ $s = \frac{1}{2}(12+21+17)$

$= 25$

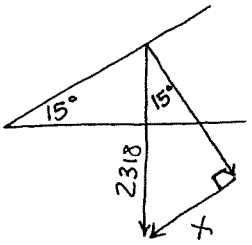
$A = \sqrt{25(13)(4)(8)}$

$= 101.98 \text{ u}^2$

⑧ $A = \frac{1}{2}(12)(9)\sin(25°)$

$= 22.82 \text{ u}^2$

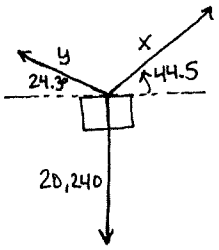
(9)



$\sin 15° = \frac{x}{2318}$

$\boxed{x = 599.94 \text{ lbs.}}$

(10)



$x\langle \cos 44.5°, \sin 44.5° \rangle \rightarrow \langle .713x, .701x \rangle$

$y\langle \cos 155.7°, \sin 155.7° \rangle \rightarrow \langle -.911y, .412y \rangle$

$20{,}240\langle \cos 270°, \sin 270° \rangle \rightarrow \langle 0, -20{,}240 \rangle$

$.412(.713x - .911y = 0) \longrightarrow .294x - .375y = 0$

$.911(.701x + .412y = 20{,}240) \longrightarrow .639x + .375y = 18438.64$

$.933x = 18438.64$

$\boxed{x = 19{,}762.74 \text{ lbs}}$

$.713(19{,}762.74) - .911y = 0$

$-.911y = -14090.836$

$\boxed{y = 15{,}467.438 \text{ lbs.}}$

(11) $400\langle \cos 25°, \sin 25° \rangle = \langle 362.52, 169.05 \rangle$

$300\langle \cos 135°, \sin 135° \rangle = \langle -212.13, 212.13 \rangle$

resultant $= \langle 150.39, 381.18 \rangle$

magnitude $= \sqrt{(150.39)^2 + (381.18)^2}$

$\boxed{= 409.77 \text{ lbs.}}$

$\tan\theta = \frac{381.18}{150.39}$ $\boxed{\theta = 68.47°}$

(12) $\vec{F} = 50\langle \cos 60°, \sin 60° \rangle = \langle 25, 25\sqrt{3} \rangle$

$\vec{PQ} = \langle 12, 0 \rangle$

$\boxed{W = \vec{F} \cdot \vec{PQ} = 300 \text{ ft} \cdot \text{lbs.}}$