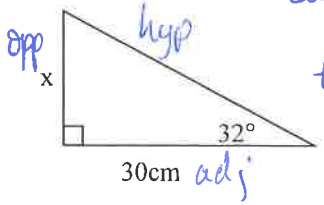
MCR 3U Unit 5 Lesson 1: Trigonometry Review Problems

1. Find the length of the indicated side in each triangle below. Show your work and round your final answer to one decimal place.

a)

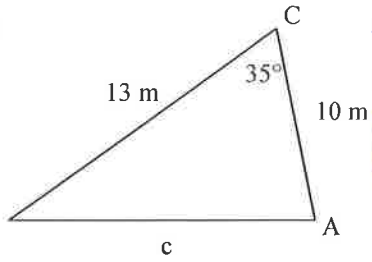


$\tan\theta = \frac{opp}{adj}$

$\tan 32° = \frac{x}{30}$

$x \doteq 18.7\text{cm}$

b)

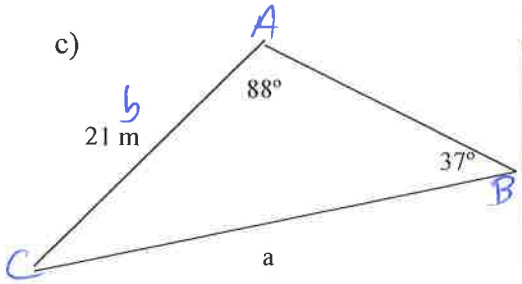


$c^2 = a^2 + b^2 - 2ab\cos C$

$c^2 = 13^2 + 10^2 - 2(13)(10)\cos 35°$

$c \doteq 7.5\text{m}$

c)



$\frac{a}{\sin A} = \frac{b}{\sin B}$

$\frac{a}{\sin 88°} = \frac{21}{\sin 37°}$

$a \doteq 34.9\text{ m}$

e)

(i) $a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 13^2 + 16^2 - 2(13)(16)\cos 63°$

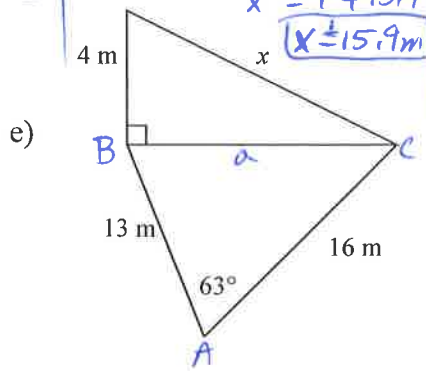
$a \doteq 15.4\text{ m}$

(ii) $a^2 + b^2 = c^2$

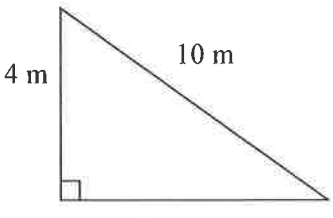
$x^2 = 4^2 + 15.4^2$

$x \doteq 15.9\text{m}$

e)



d)



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

$b = \sqrt{c^2 - a^2}$

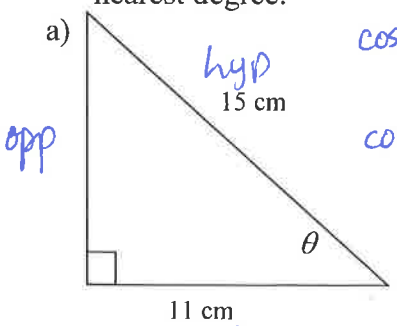
$b = \sqrt{10^2 - 4^2}$

$b = \sqrt{84}$

$b \doteq 9.2\text{ m}$

2. Find the value of θ in each triangle below. Show your work and round your answer to the nearest degree.

a)

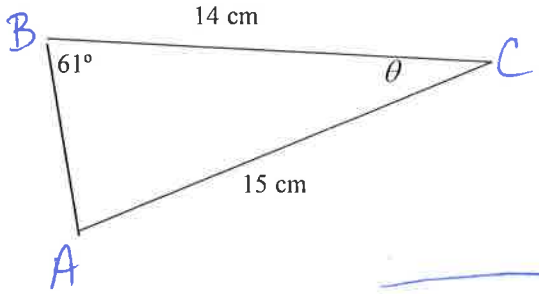


$\cos\theta = \frac{adj}{hyp}$

$\cos\theta = \frac{11}{15}$

$\theta \doteq 43°$

b)



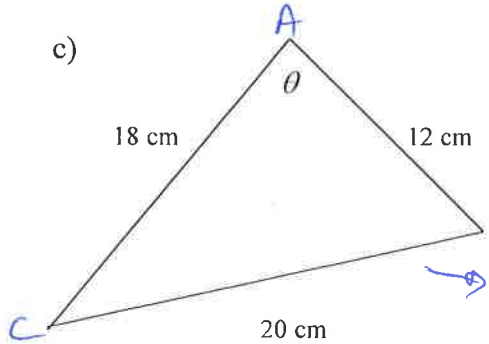
(i) $\frac{\sin A}{a} = \frac{\sin B}{b}$

$\frac{\sin A}{14} = \frac{\sin 61°}{15}$

$\angle A \doteq 55°$

(ii) $\angle C \doteq 64°$ (AST)

c)



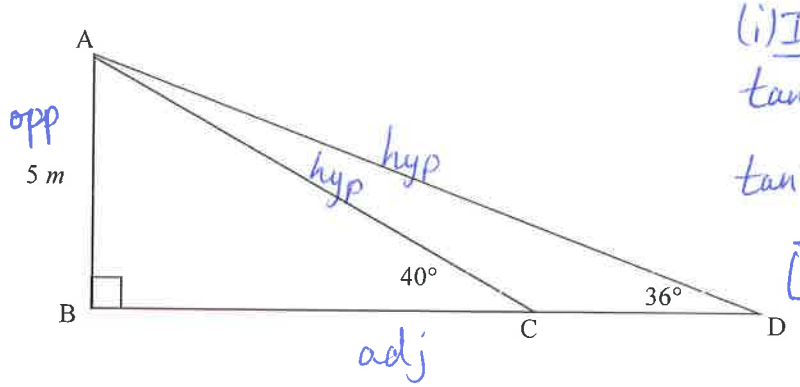
$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

$\cos A = \frac{18^2 + 12^2 - 20^2}{2(18)(12)}$

$\angle A \doteq 81°$

Keep one extra decimal place.

3. Find the distance between points C and D in the diagram below. **Round your final answer to 2 decimal places.**



(i) In △ABC

$\tan\theta = \frac{opp}{adj}$

$\tan 40° = \frac{5}{BC}$

$BC \doteq 5.958\,m$

(ii) In △ABD

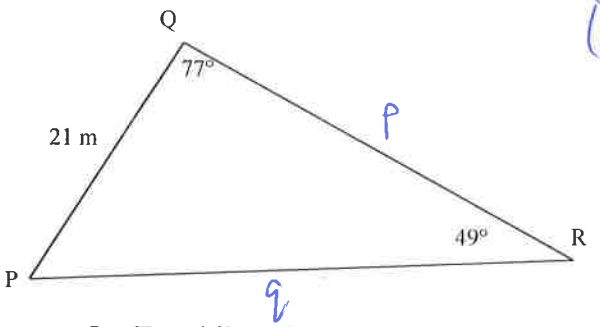
$\tan 36° = \frac{5}{BD}$

$BD \doteq 6.881\,m$

(iii) $CD = 6.881 - 5.958$

$CD \doteq 0.92\,m$

4. ***Solve*** the triangle below by finding ***all missing sides and angles***.



(i) $\angle P = 54°$ (AST)

(ii) $\frac{q}{\sin Q} = \frac{r}{\sin R}$

$\frac{q}{\sin 77°} = \frac{21}{\sin 49°}$

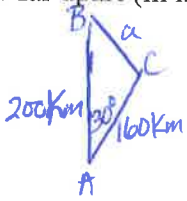
$q \doteq 27.1\,m$

(iii) $\frac{p}{\sin P} = \frac{r}{\sin R}$

$\frac{p}{\sin 54°} = \frac{21}{\sin 49°}$

$p = 22.5\,m$

5. Two bikers leave a town at the same time. One biker travels down a road directly north at a speed of 100 km/h. The other biker travels down a road that is 30° East of North at a speed of 80 km/h. After 2 hours how far apart (in km) are the bikers?



Let a rep. the distance between the bikers.

$a^2 = b^2 + c^2 - 2bc\cos A$

$a^2 = 160^2 + 200^2 - 2(160)(200)\cos 30°$

$a \doteq 101$

∴ After 2 hrs. the bikers are approx. 101 km apart.

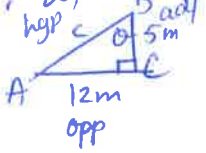
Text page 274 1, 3, 5–7.

Answers

1. a) 18.7 cm b) 7.5 m c) 34.9m d) 9.2m e) 15.9m 2. a) 43° b) 64° c) 81° 3. 0.92m

4. p = 22.5m <P = 54° q = 27.1m 5. 101km

U5/L1 p 274 1, 3, 5, 6, 7

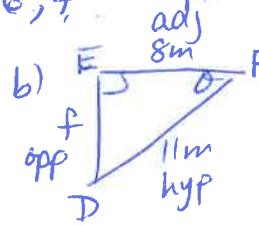
1. a) 

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

$5^2+12^2=c^2$

$169=c^2$

$c=13m$

b) 

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

$f^2+8^2=11^2$

$f=\sqrt{11^2-8^2}$

$f=\sqrt{121-64}$

$f=\sqrt{57}$

$f \doteq 7.5m$

← From Δ's in Q#1

3. a) $\tan\theta = \frac{opp}{adj}$

$\tan B = \frac{12}{5}$

$\angle B \doteq 67^\circ$

b) $\cos\theta = \frac{adj}{hyp}$

$\cos F = \frac{8}{11}$

$\angle F \doteq 43^\circ$

5. a) $\cos\theta = 0.3312$

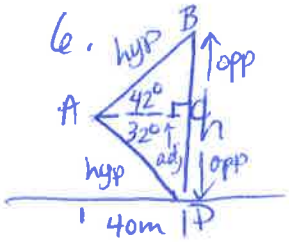
$\therefore \theta \doteq 71^\circ$

b) $\sin\theta = 0.7113$

$\therefore \theta \doteq 45^\circ$

c) $\tan\theta = 1.1145$

$\therefore \theta \doteq 48^\circ$

6. 

Let BD rep. the height of the tower.

(i) $\tan\theta = \frac{opp}{adj}$

$\tan 42^\circ = \frac{BC}{40}$

$BC \doteq 36.0m$

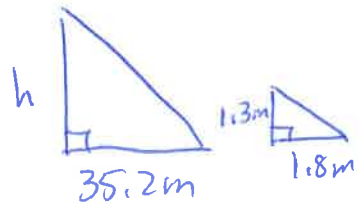
(ii) $\tan 32^\circ = \frac{CD}{40}$

$CD \doteq 25.0m$

(iii) $BD = 36.0 + 25.0$

$BD \doteq 61m$

∴ The tower is approx 61m high.

7. 

Let h rep the height of the tower.

$\frac{h}{35.2} = \frac{1.3}{1.8}$

$h \doteq 25.4$

∴ The tower is approx. 25.4m tall.