

1/2K	1/2A	1/4C	1/16T	Total	1/25
------	------	------	-------	-------	------

Name: Solutions

Date: May 12/2011

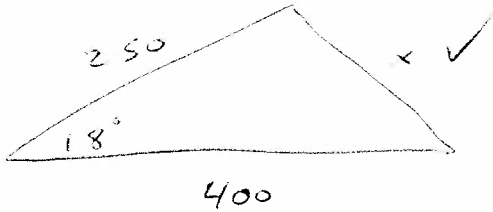
MCR3U

Test: Trigonometry

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

3/3
A

1. The green on a golf hole lies 400 yards directly east of the tee, with a water hazard in between the tee and the green. If a golfer's first shot travels 250 yards from the tee at an angle of 18° [to the north of east] and lands on the fairway, how far will the golfer have to hit the second shot from the fairway in order to land on the green?



$$x^2 = 400^2 + 250^2 - 2(400)(250) \cos 18^\circ$$

$$x^2 = 32288.6$$

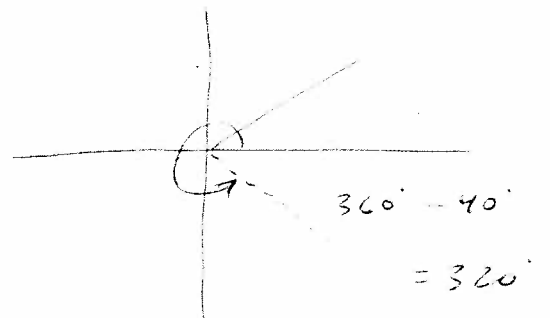
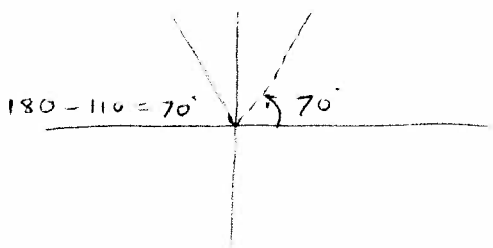
$$x = 179.7 \text{ yards} \quad \checkmark$$

2/2
T

2. Determine another angle between 0 and 360 degrees that has the same trigonometric ratio as each angle given.

a) $\sin 110^\circ = \sin 70^\circ \quad \checkmark$

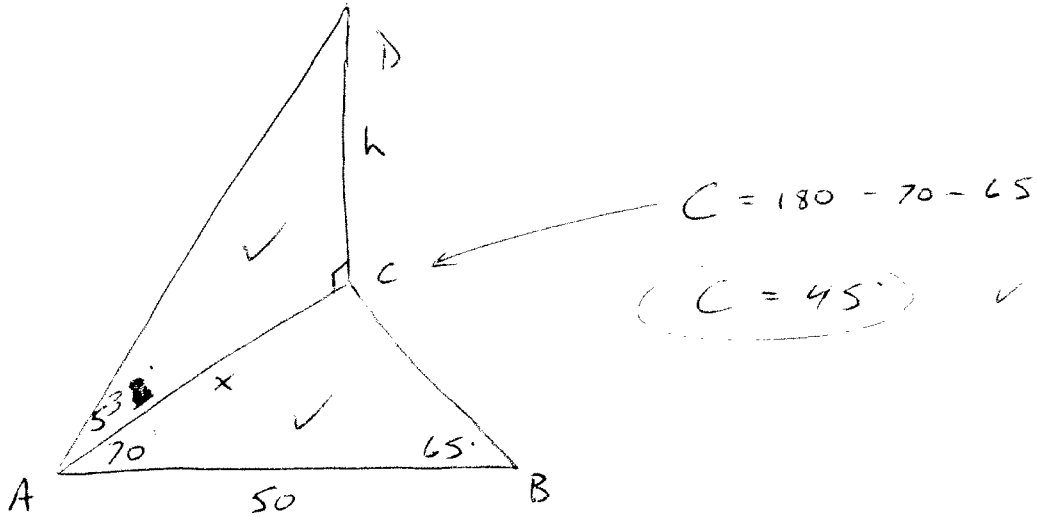
b) $\cos 40^\circ = \cos 320^\circ \quad \checkmark$



/5
A

/2
C

3. A surveyor is on one side of a river and wants to measure the height of a cliff on the other side of the river. She measures a baseline of 50 m from A to B and then measures angle ABC to be 65 degrees when point C is at the base of the cliff. She walks to point A and measures angle CAB to be 70 degrees. Then the angle of elevation (angle CAD) is 53 degrees to point D on the top of the cliff (above point C). Draw a diagram to represent this situation and determine the height of the cliff.

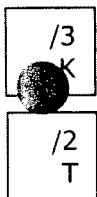


$$\frac{x}{\sin 65^\circ} = \frac{50}{\sin 45^\circ} \quad \checkmark$$

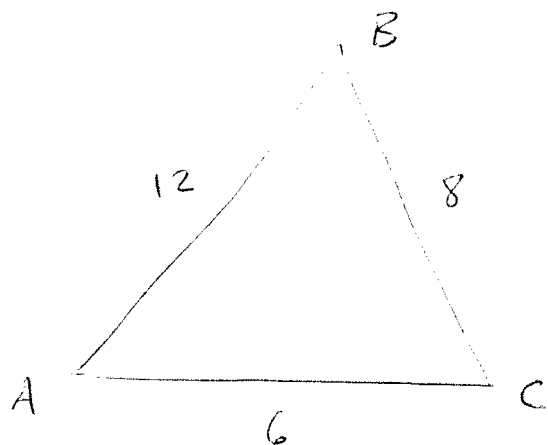
$$(x = 64 \text{ m}) \quad \checkmark$$

$$\tan 53^\circ = \frac{h}{x} \quad \checkmark$$

$$\boxed{h = 85 \text{ m}} \quad \checkmark$$



4. Solve triangle ABC if: $a = 8$ km, $b = 6$ km, $c = 12$ km.



$$12^2 = 6^2 + 8^2 - 2(6)(8)\cos C$$

$$144 = 100 - 96\cos C$$

$$\cos C = -\frac{44}{96}$$

$$\cos C = -0.458\bar{3}$$

$$C = \cancel{63.4}$$

$$117. \checkmark$$

$$C = \cancel{63.4} \quad 117$$

$$\frac{\sin B}{6} = \frac{\sin \cancel{63.4} 117}{12} \quad \checkmark T$$

$$\sin B = 0.44439$$

$$B = 26.3^\circ$$

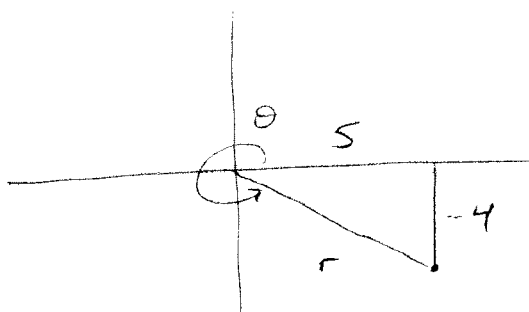
$$B = 26^\circ \quad \checkmark T$$

$$A = 180 - 63 - 26$$

$$A = \cancel{51} 37^\circ \quad \checkmark$$



5. Determine an exact value for $\cos \theta$ if the point $(5, -4)$ lies on the terminal arm of θ .



$$\cos \theta = \frac{5\checkmark}{\sqrt{41}\checkmark}$$

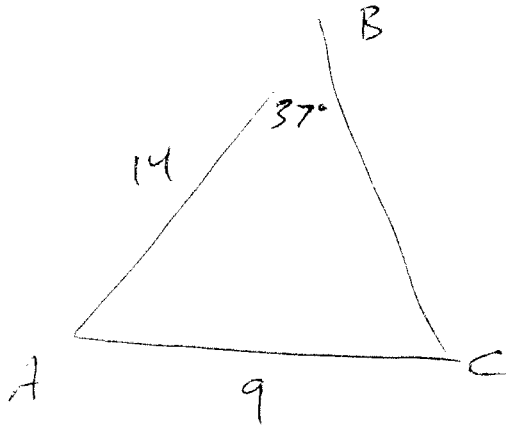
$$r^2 = 16 + 25$$

$$r = \sqrt{41} \checkmark$$

1/3
K

1/2
T

6. Determine the missing angles in triangle ABC if: $B = 37^\circ$, $b = 9$ m, $c = 14$ m.



$$\frac{\sin C}{14} = \frac{\sin 37}{9} \checkmark$$

$$\sin C = 0.9361$$

$$C = 69.4$$

$$C = 69^\circ \checkmark$$

$$\therefore A = 74^\circ \checkmark$$

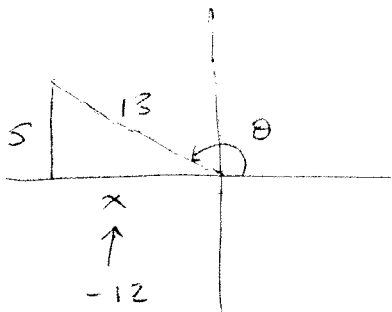
$$\text{or } C = 180 - 69 \checkmark \quad T$$

$$C = 111^\circ$$

$$\therefore A = 32^\circ \checkmark \quad T$$

1/4
T

7. If the angle θ lies in the second quadrant and $\sin \theta = \frac{5}{13}$, determine an exact value for $\tan \theta$.



$$\tan \theta = -\frac{5}{12} \checkmark$$

$$x^2 + 25 = 169$$

$$x = 12 \checkmark$$

/2

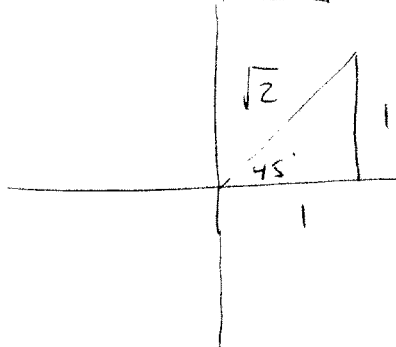
8. Explain why there are two angles between 0 and 360 degrees with the same sine ratio.

/5

9. Determine the exact value of each trigonometric ratio.

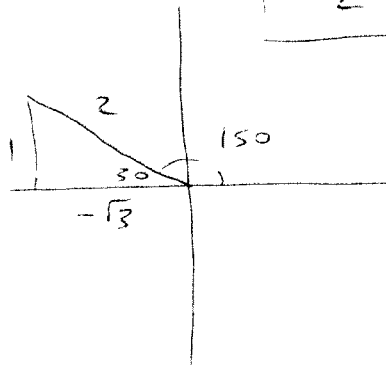
a) $\sin 45^\circ =$

$$\frac{1}{\sqrt{2}} \checkmark$$



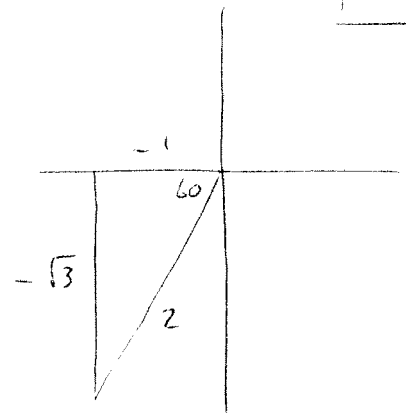
b) $\cos 150^\circ =$

$$-\frac{\sqrt{3}}{2} \checkmark$$



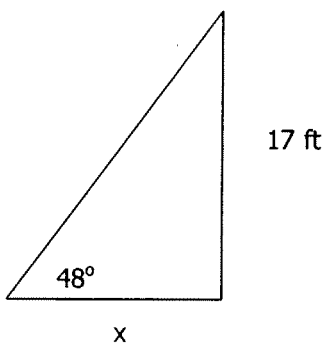
c) $\tan 240^\circ =$

$$+\sqrt{3} \checkmark$$



/3

10. Determine the unknown side in this right angle triangle using a reciprocal trigonometric ratio.



$$\cot 48^\circ = \frac{x}{17} \checkmark$$

$$\frac{1}{\tan 48^\circ} = \frac{x}{17} \checkmark$$

$$\frac{17}{\tan 48^\circ} = x \rightarrow$$

$$x = 15.3 \text{ ft}$$