

Key

SOH CAH TOA

Review Assignment: Ch. 7- Pythagoras Theorem and Trigonometry

1. Determine the measure of the angle, to the nearest degree.

a)  $\sin B = 0.3420$   $\angle B = 20^\circ$

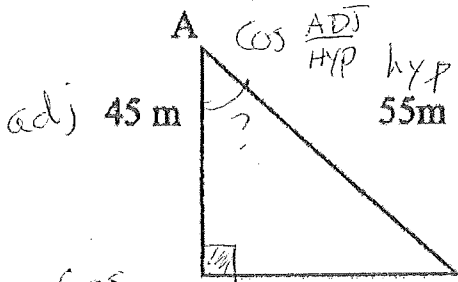
b)  $\cos A = 0.8192$   $\angle A = 35^\circ$

c)  $\tan C = 1.1106$   $\angle C = 48^\circ$

d)  $\angle A = 35^\circ$

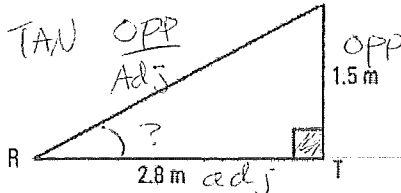
e)  $\angle R = 28^\circ$

f)  $\angle B = 25^\circ$



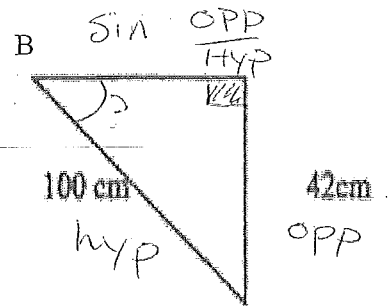
cos

$A = \cos^{-1}\left(\frac{45}{55}\right) = 35.1^\circ$



$\tan R = \frac{1.5}{2.8}$

$R = \tan^{-1}\left(\frac{1.5}{2.8}\right) = 28^\circ$



$\sin B = \frac{42}{100}$

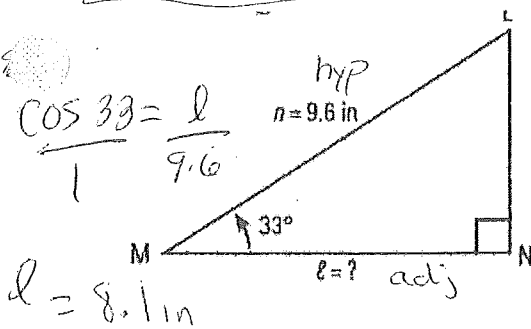
$B = \sin^{-1}\left(\frac{42}{100}\right) = 24.8^\circ \approx 25^\circ$

2. Calculate the indicated side length, to the nearest tenth.

a)  $c = 8.1 \text{ in}$

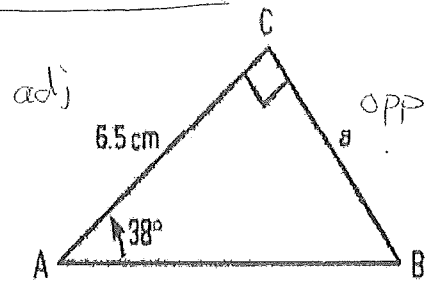
b)  $a = 5.1 \text{ cm}$

c)  $h = 14.3 \text{ mm}$

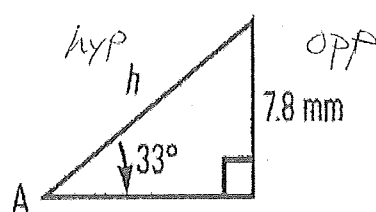


$\cos 33 = \frac{c}{9.6}$

$c = 8.1 \text{ in}$



$\tan 38 = \frac{a}{6.5}$



$\sin 33 = \frac{7.8}{h}$

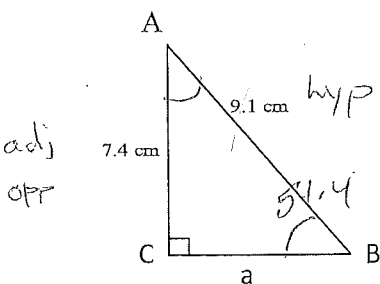
3. Use a calculator and determine each ratio! Round to four decimal places.

a)  $\sin 45^\circ = 0.7071$

b)  $\cos 18^\circ = 0.9511$

c)  $\tan 60^\circ = 1.7321$

4. Solve for the unknown side length "a" and find angle A and angle B.



$\cos A = \frac{7.4}{9.1}$   $\cos^{-1}\left(\frac{7.4}{9.1}\right) = 35.6^\circ$

$\tan 54.4 = \frac{7.4}{a}$   $a = 5.3$

$\angle A = 35.6^\circ, \angle B = 54.4^\circ, a = 5.3 \text{ cm}$

$\sin B = \frac{7.4}{9.1}$   
 $\sin^{-1}\left(\frac{7.4}{9.1}\right) = 54.4^\circ$

$a^2 = 82.81 - 54.7$   
 $c^2 - b^2 = a^2$   $\sqrt{a^2} = 28.05$   
 $(9.1)^2 - (7.4)^2 = a^2$   $a = 5.3$

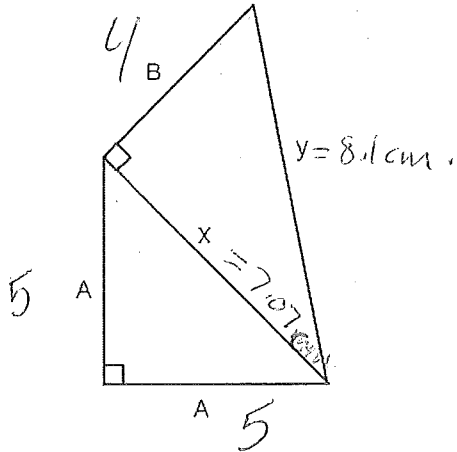
5. The diagram below has the following dimensions:

A = 5 cm

B = 4 cm

Find the length of  $y$  and  $x$ . Use Pythagoras Theorem!

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

$$5^2 + 5^2 = x^2$$

$$25 + 25 = x^2$$

$$\sqrt{50} = \sqrt{x^2}$$

$$x = 7.07 \text{ cm}$$

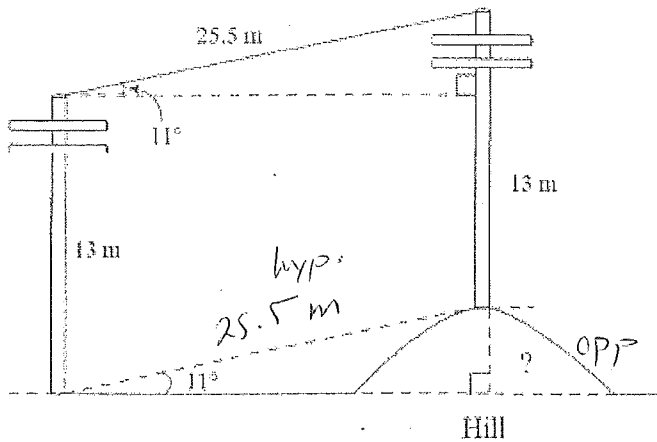
$$4^2 + 50 = y^2$$

$$\sqrt{66} = \sqrt{y^2}$$

$$8.1 \text{ cm} = y$$

6. What is the height of the hill? Answer to one decimal place.

12



$$\sin 11^\circ = \frac{h}{25.5}$$

$$h = 4.9 \text{ m}$$

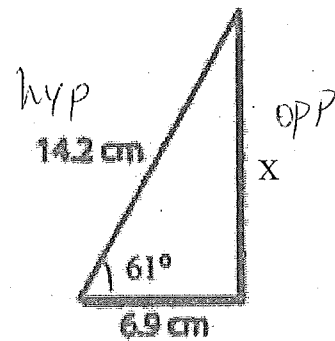
7. Which equation could be used to find the value of  $x$ ?

A.  $\cos 61^\circ = \frac{x}{6.9}$

C.  $\sin 61^\circ = \frac{6.9}{14.2}$

B.  $\cos 61^\circ = \frac{x}{14.2}$

**D.**  $\tan 61^\circ = \frac{x}{6.9}$



$$\tan 61 = \frac{x}{6.9}$$

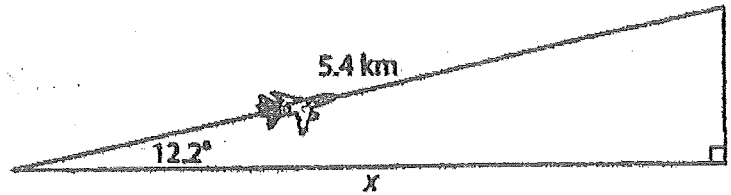
$$\sin 61 = \frac{x}{14.2}$$

$$\cos 61 = \frac{6.9}{x}$$

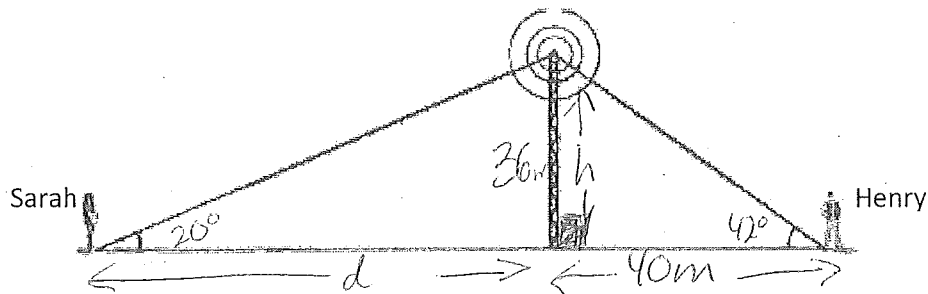
8. Cindi was asked to solve the following problem. A plane takes off at an angle of elevation of  $12.2^\circ$ . Determine the horizontal distance the plane has travelled after flying 5.4 km. At what step did Cindi make her first error? STEP 3

Correction: Step 3  $5.4 \times \cos(12.2^\circ)$

- Step 1  $\cos A = \frac{\text{adjacent}}{\text{hypotenuse}}$
- Step 2  $\cos 12.2^\circ = \frac{x}{5.4}$
- Step 3  $\frac{\cos 12.2^\circ}{5.4} = x$
- Step 4  $0.999... = x$



9. Henry and Sarah are standing on opposite sides of a cell phone tower. Henry is standing 40 m from the base of the tower. His angle of elevation to the tower is  $42^\circ$ . Sarah's angle of elevation to the tower is  $20^\circ$ .



a) How tall is the cell phone tower?

$$\frac{\tan 42^\circ}{1} = \frac{h}{40} \quad h = 36 \text{ m}$$

b) How far from the base of the tower is Sarah standing?

$$\frac{\tan 20^\circ}{1} = \frac{36}{d} \quad d = 36 \div \tan 20$$

$$d = 98.9 \text{ or } 99 \text{ m}$$

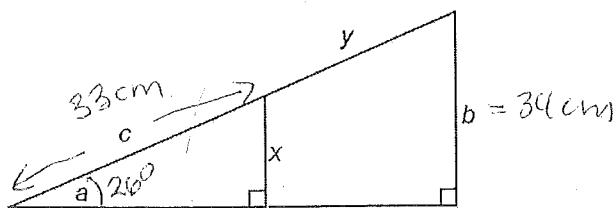
c) How far apart are Sarah and Henry?

$$98.9 + 40 = 134.9 \text{ m}$$

10. The diagram below has the following dimensions:

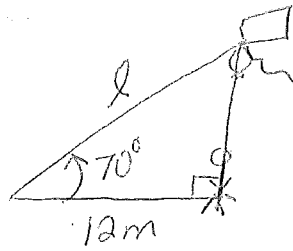
$a = 26^\circ$ ;  $b = 34 \text{ cm}$ ;  $c = 33 \text{ cm}$

What is the value of  $x$ ?  $x = 14.5 \text{ cm}$



$$\frac{\sin 26^\circ}{1} = \frac{x}{33}$$

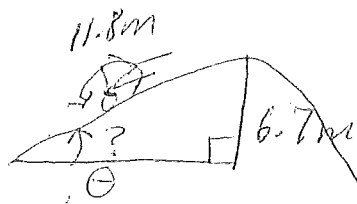
11. Gerald wants to use his kite to see if he can successfully drop a water balloon on an unsuspecting target on the ground. If his kite is flying at an angle of  $70^\circ$  from the ground and his target is 12 m away, how much string does Gerald need to let out on his kite? Draw and label a diagram. Then solve!



$$\frac{\cos 70^\circ}{1} = \frac{12}{l}$$

$$l = 12 \div \cos 70 = 35.1 \text{ m}$$

12. A child rolls down a hill that is 6.7 m high. If he rolls a total of 11.8 m to reach the base of the hill, at what angle does the hill rise? Draw and label a diagram. Then Solve!

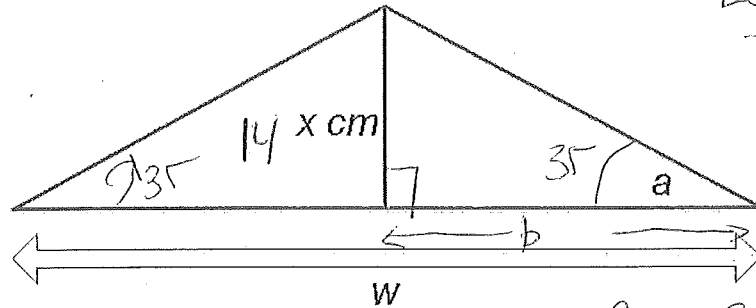


$$\sin \theta = \frac{6.7}{11.8}$$

$$\sin^{-1}\left(\frac{6.7}{11.8}\right) = 34.6^\circ$$

or  $35^\circ$

13. A clothes hanger, excluding the hook, has a height of 14 cm (x). If the slanting sides of the hanger must make a  $35^\circ$  angle with its base ( $\angle a$ ), how wide is the hanger?



$$\frac{\tan 35}{1} = \frac{14}{b}$$

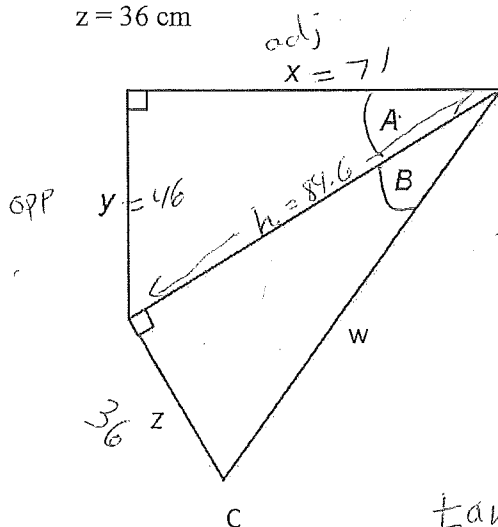
$$b = 14 \div \tan 35$$

$$b = 20 \text{ cm}$$

$$w = 2b = 2 \times 20 = 40 \text{ cm}$$

14. Find the value of  $\angle A$  and  $\angle B$  and the length of  $w$  given the following measures:

$x = 71 \text{ cm}$   
 $y = 46 \text{ cm}$   
 $z = 36 \text{ cm}$



$$\angle A = 32.9^\circ, \angle B = 23^\circ, w = 92.1 \text{ cm}$$

$$\tan A = \frac{46}{71} \quad \tan^{-1}\left(\frac{46}{71}\right) = 32.94^\circ$$

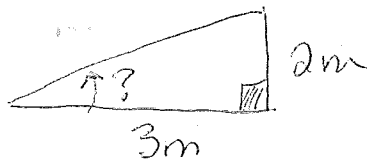
$$\frac{\sin 32.94}{1} = \frac{46}{h} \quad h = 46 \div \sin 32.94$$

$$h = 84.6$$

$$\tan B = \frac{36}{84.6} \quad \tan^{-1}\left(\frac{36}{84.6}\right) = 23^\circ$$

$$\sin 23^\circ = \frac{36}{w} \quad \Rightarrow 36 \div \sin 23 = 92.1$$

15. What is the angle of elevation of a ramp if the height is 2 m and horizontal length is 3 m?



$$\tan \theta = \frac{2}{3} = \tan^{-1}\left(\frac{2}{3}\right) = 33.7^\circ$$

16. Mani left his house and walked 1.3 km due east and then 1.6 km due south. What is the straight line distance between Mani and his house?

W N E

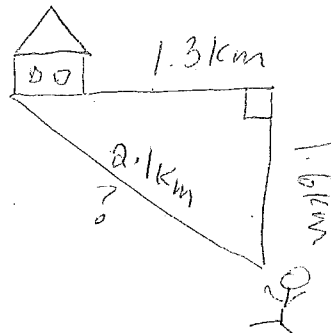
$$a^2 + b^2 = c^2$$

$$(1.3)^2 + (1.6)^2 = c^2$$

$$4.25 = c^2$$

$$c = \sqrt{4.25}$$

$$c = 2.1 \text{ km}$$



17. Is a triangle with side lengths 3, 7 and 10 a right triangle? Prove it using the pythagorus theorem.

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

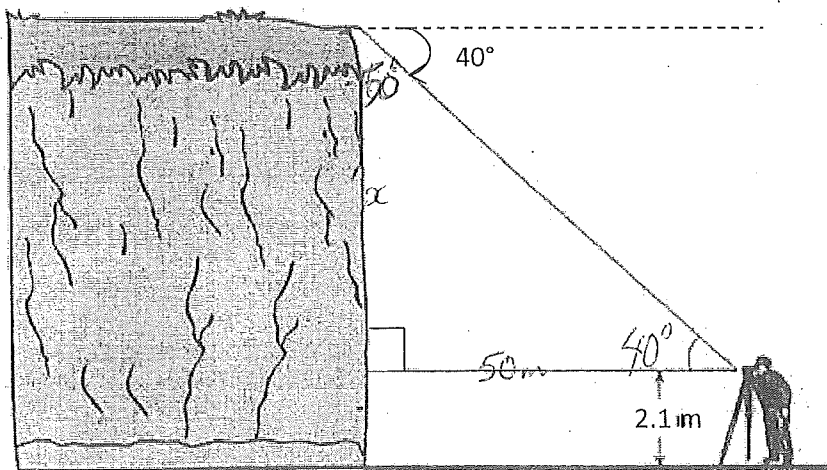
$$3^2 + 7^2 = 10^2$$

$$9 + 49 = 100$$

$$58 \neq 100$$

Therefore not a right triangle.

18. Determine the height of the cliff in the diagram below if the angle of depression is  $40^\circ$   $\cos = \frac{\text{adj}}{\text{hyp}}$



$$\tan 40 = \frac{x}{50}$$

$$x = \tan 40 \times 50$$

$$x = 42 \text{ m}$$

$$\text{height of cliff} = 42 + 2.1 = 44 \text{ m}$$

