

## Trigonometry Test Review 2017

*All work must be shown for full credit. This includes showing work for multiple choice problem and includes drawing pictures for problems that need them.*

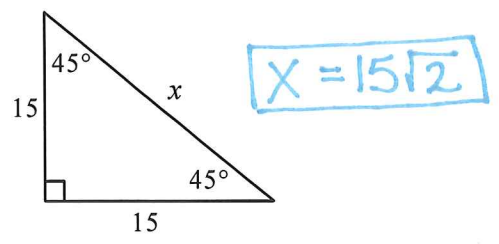
**Make sure your calculator is in the correct mode.**

**If it is not stated, round all final answers to the nearest tenth or nearest degree.**

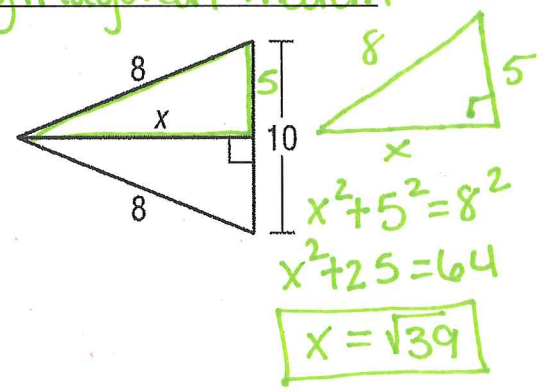
For each of the pictures below, state what method below you use to find the missing side:  
 Pythagorean Theorem, 45-45-90 Shortcut, or 30-60-90 Shortcut

You do not need to solve!  
 (Ms. Schmidt solved)

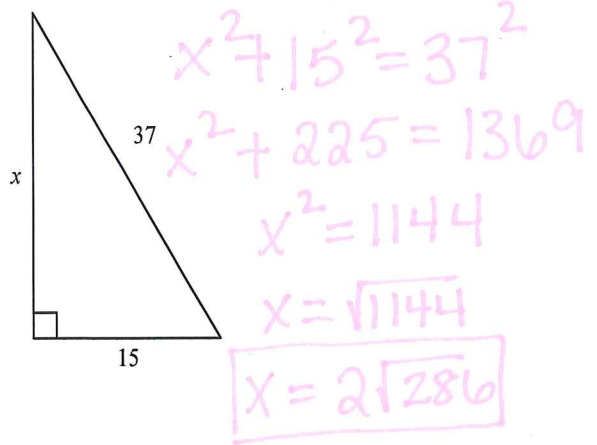
1. 45-45-90



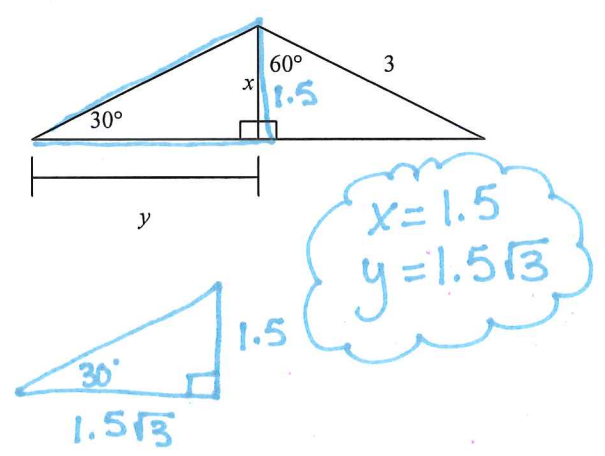
2. Pythagorean Theorem



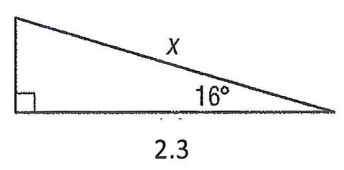
3. pyth. theorem



4. 30-60-90



5. Find x to the nearest tenth.



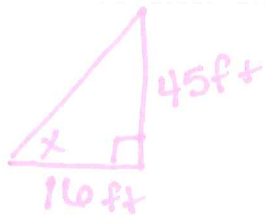
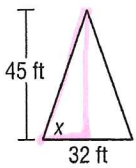
$\cos(16^\circ) = \frac{2.3}{x}$

$x \cos(16^\circ) = 2.3$

$x = \frac{2.3}{\cos(16^\circ)}$

$x \approx 2.4$

6. An A-frame house is 45 feet high and 32 feet wide. Find the measure of the angle that the roof makes with the floor. Round to the nearest degree.



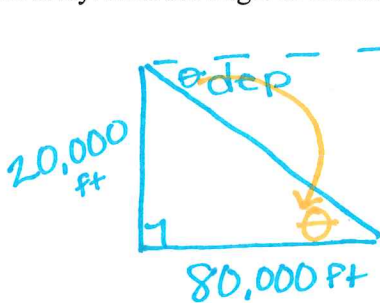
$$\tan x = \frac{45}{16}$$

$$x = \tan^{-1}\left(\frac{45}{16}\right)$$

$$x \approx 70^\circ$$

(70.42687)

7. A plane flying at an altitude of 20,000 feet begins descending when the end of the runway is below a point 80,000 feet away. Find the angle of descent (depression) to the nearest degree.



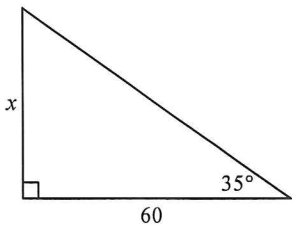
( $\angle$  of elev.  $\cong$   $\angle$  of dep.)  
by alt. int.  $\angle$ s.

$$\tan \theta = \frac{20,000}{80,000}$$

$$\theta = \tan^{-1}\left(\frac{20,000}{80,000}\right)$$

$$\theta \approx 14^\circ$$

8. Find the value of  $x$  in the figure below.

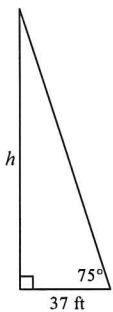


$$\tan(35^\circ) = \frac{x}{60}$$

$$60 \cdot \tan(35^\circ) = x$$

$$42.0 = x$$

9. Beth is measuring the height of a tree. She stands 37 feet from the base of the tree. The angle formed by the ground and the line to the top of the tree is  $75^\circ$ . Find the height of the tree.



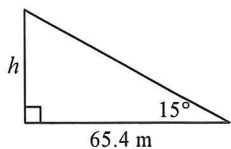
$$\tan(75^\circ) = \frac{h}{37}$$

Plug in  $37 \cdot \tan(75^\circ) = h$

$$138.1 \text{ ft} \approx h$$

If I give you units, you give me units or points are taken off

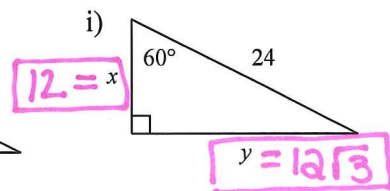
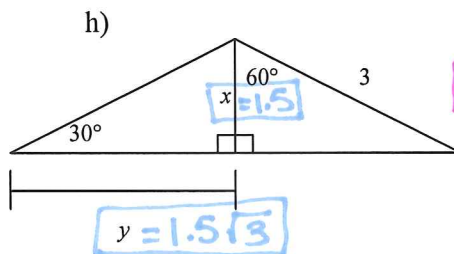
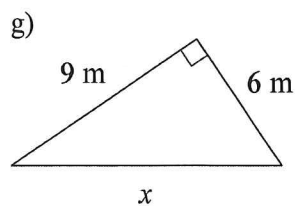
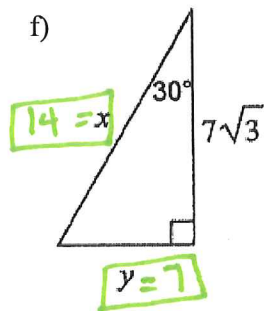
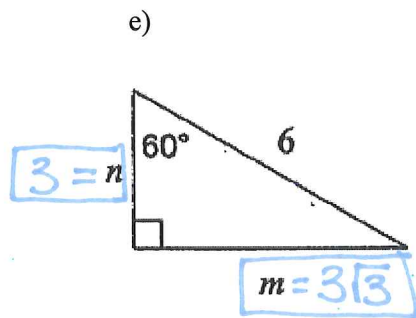
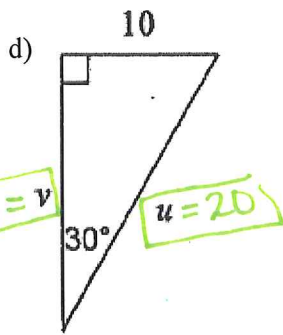
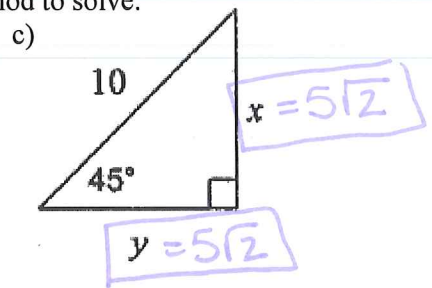
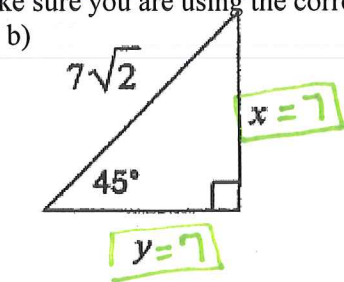
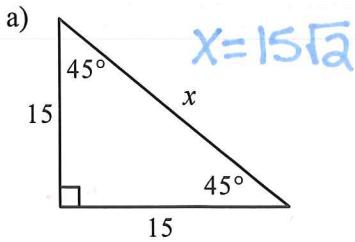
10. The angle formed by the base and the line to the top of a waterslide is about  $15^\circ$ . The slide extends horizontally about 65.4 meters. Find the height  $h$  of the slide.



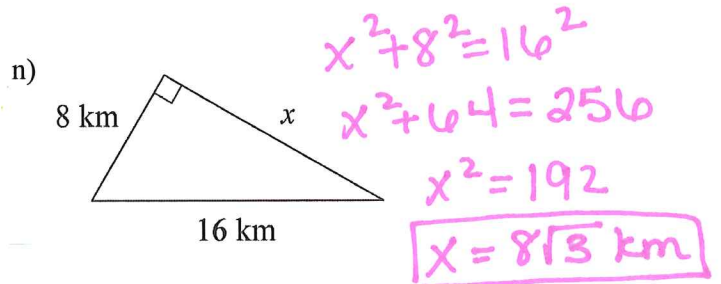
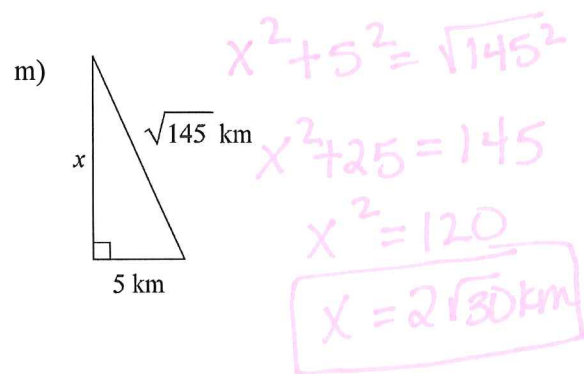
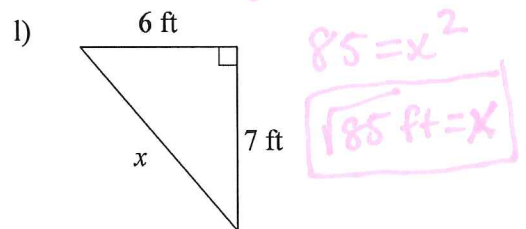
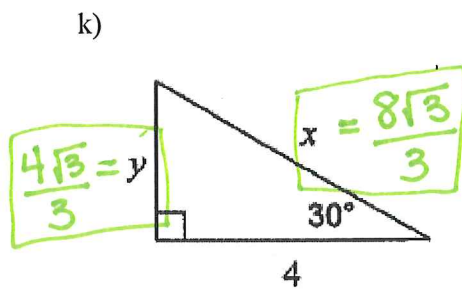
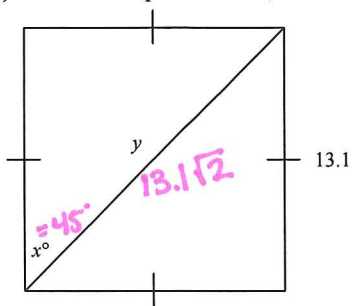
$$\tan(15^\circ) = \frac{h}{65.4}$$

$$h \approx 17.5 \text{ m}$$

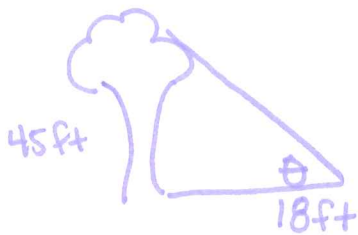
11. Find the missing side length(s) below. Make sure you are using the correct method to solve.



j) Given the square below, find x and y.



12. A 45-foot tree casts a 18-foot shadow. Find the angle of elevation of the sun to the nearest degree.

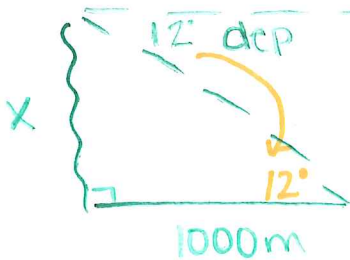


$$\tan \theta = \frac{45}{18}$$

$$\theta = \tan^{-1}\left(\frac{45}{18}\right)$$

$$\theta \approx 68^\circ$$

13. A boat is 1000 meters from a cliff. If the angle of depression from the top of the cliff to the boat is  $12^\circ$ , how tall is the cliff? Round your answer to the nearest tenth.

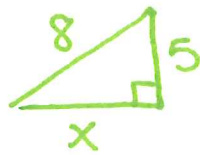
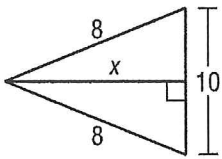


$$\tan(12) = \frac{x}{1000}$$

$$1000 \cdot \tan(12) = x$$

$$x \approx 212.6 \text{ m}$$

14. Find  $x$  (Hint: we do not know the angles)



$$x^2 + 5^2 = 8^2$$

$$x = \sqrt{39}$$

15. Which set of measures below could represent the sides of a right triangle?

a) 5, 12, 13  $\leftarrow 5^2 + 12^2 = 169 \quad 13^2 = 169 \text{ yes!}$

b)  $\sqrt{3}, \sqrt{5}, \sqrt{15}$   $\leftarrow \sqrt{3}^2 + \sqrt{5}^2 = 8 \quad \sqrt{15}^2 = 15 \quad 8 \neq 15 \text{ NO!}$

c) 7, 17, 24  $7^2 + 17^2 = 338 \quad 24^2 = 576 \quad 338 \neq 576 \text{ NO!}$

d) 8, 15, 16  $8^2 + 15^2 = 289 \quad 16^2 = 256 \quad 289 \neq 256 \text{ NO!}$

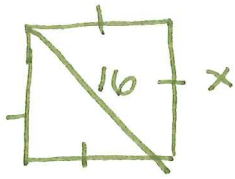
e) 8, 10, 12  $8^2 + 10^2 = 164 \quad 12^2 = 144 \quad 164 \neq 144 \text{ NO!}$

f) 4, 2, 3  $4^2 = 16 \quad 2^2 + 3^2 = 13 \quad 16 \neq 13 \text{ NO!}$

g) 9, 15, 12  $9^2 + 12^2 = 225 \quad 15^2 = 225 \quad 225 = 225 \text{ yes!}$

h) 11, 7, 14  $11^2 + 7^2 = 170 \quad 14^2 = 196 \quad 170 \neq 196 \text{ NO!}$

16. Find the perimeter of a square if the length of its diagonal is 16 mm.

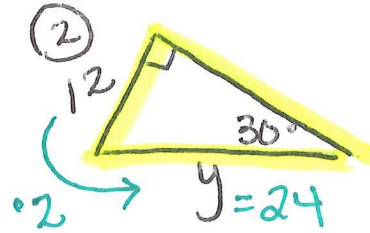
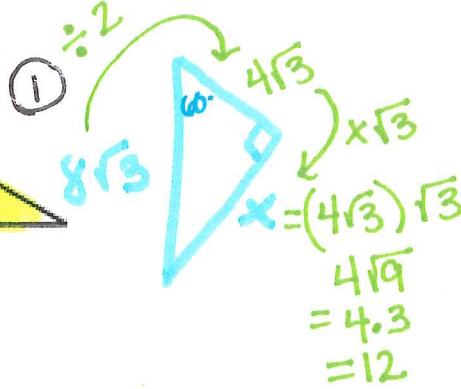
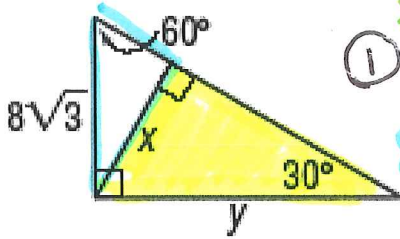


$$x = 8\sqrt{2} \text{ mm}$$

$$P = 8\sqrt{2} + 8\sqrt{2} + 8\sqrt{2} + 8\sqrt{2}$$

$$P = 32\sqrt{2} \text{ mm}$$

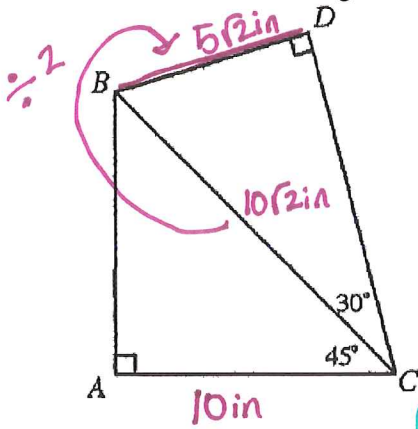
17. Find x and y.



$$x = \underline{12}$$

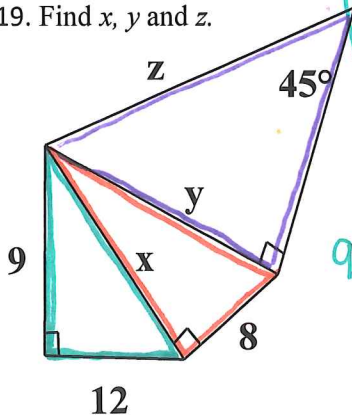
$$y = \underline{24}$$

18. If AC = 10 in the figure below, find BD.

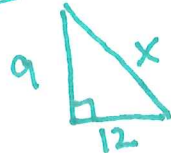


$$BD = 5\sqrt{2} \text{ in}$$

19. Find x, y and z.



Pyth. to find  
Find x



$$9^2 + 12^2 = x^2$$

$$225 = x^2$$

$$15 = x$$

Pyth. to  
find y

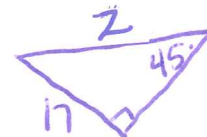


$$15^2 + 8^2 = y^2$$

$$289 = y^2$$

$$17 = y$$

45-45-90  
to find z



$$z = 17\sqrt{2}$$

$$x = \underline{15}$$

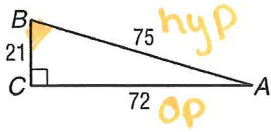
$$y = \underline{17}$$

$$z = \underline{17\sqrt{2}}$$

**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

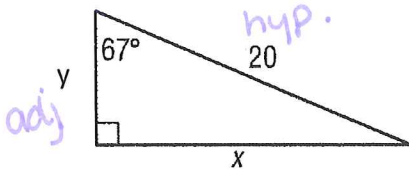
D 20. Find  $\sin B$  in  $\triangle ABC$ .



$\sin B = \frac{72}{75}$  Simplify

- a.  $\frac{7}{24}$
- b.  $\frac{7}{25}$
- c.  $\frac{25}{24}$
- d.  $\frac{24}{25}$

A 21. Find  $y$  to the nearest tenth.

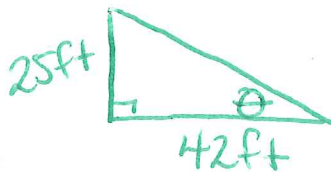


Find y  
 $\cos(67^\circ) = \frac{y}{20}$   
 $y = 7.8$

- a. 7.8
- b. 17.3
- c. 18.4
- d. 47.1

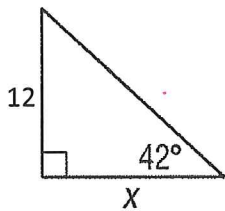
A 22. Find the angle of elevation of the sun when a pole 25 feet tall casts a shadow 42 feet long.

- a.  $30.8^\circ$
- b.  $36.5^\circ$
- c.  $53.5^\circ$
- d.  $59.2^\circ$



$\tan \theta = \frac{25}{42}$   
 $\theta = \tan^{-1}\left(\frac{25}{42}\right)$   
 $\theta \approx 30.8^\circ$

23. Find  $x$ .

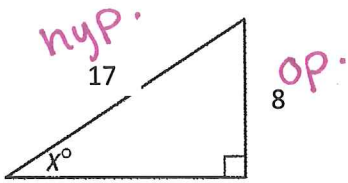


$x \cdot \tan(42^\circ) = \frac{12}{x}$   
 $\frac{x \cdot \tan(42^\circ)}{\tan(42^\circ)} = \frac{12}{\tan(42^\circ)}$

- a. 8.0
- b. 8.9
- c. 13.3
- d. 10.8

$x = \frac{12}{\tan(42^\circ)}$

D 24. Find  $x$  to the nearest degree.



$$\sin x = \frac{8}{17}$$

$$x = \sin^{-1}\left(\frac{8}{17}\right) \quad \boxed{x \approx 28^\circ}$$

- a. 57
- b. 55
- c. 33
- d. 28

C 25. If a 30-foot ladder makes a  $50^\circ$  angle with the ground, how many feet up a wall will it reach? Round your answer to the nearest tenth.

- a. 38.4 ft
- b. 20.8 ft
- c. 22.9 ft
- d. 12.7 ft



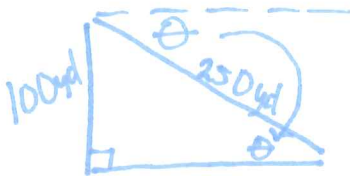
$$\sin(50^\circ) = \frac{x}{30}$$

$$30 \times \sin(50^\circ) = x$$

$$\boxed{22.9 \text{ ft} = x}$$

B 26. A ski slope is 250 yards long with a vertical drop of 100 yards. Find the angle of depression of the slope.

- a.  $21.8^\circ$
- b.  $23.6^\circ$
- c.  $66.4^\circ$
- d.  $68.2^\circ$



$$\sin \theta = \frac{100}{250}$$

$$\theta = \sin^{-1}\left(\frac{100}{250}\right)$$

$$\boxed{\theta \approx 23.6^\circ}$$

B 27. A bird watcher spied a woodpecker. The bird watcher is 40 yards lower than the woodpecker. The distance from the bird watcher to the woodpecker is 175 yards. What is the angle of elevation?

- a.  $12.9^\circ$
- b.  $13.2^\circ$
- c.  $76.8^\circ$
- d.  $77.1^\circ$



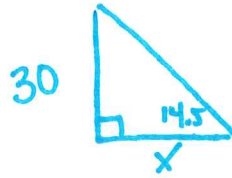
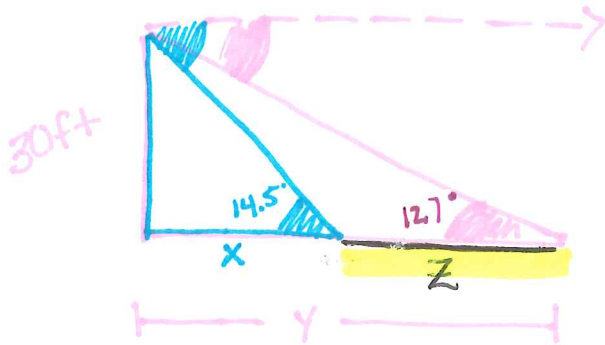
$$\sin \theta = \frac{40}{175}$$

$$\theta = \sin^{-1}\left(\frac{40}{175}\right)$$

$$\boxed{\theta \approx 13.2^\circ}$$

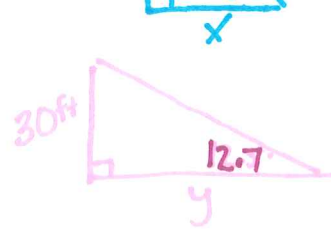
**D** 28. Two swimmers are observed by a lifeguard in a 30-foot tower above the water. The angles of depression are  $12.7^\circ$  and  $14.5^\circ$ . How far apart are the swimmers?

- a. 16.6 ft  
 b. 133.1 ft  
 c. 116.0 ft  
 d. 17.1 ft



$$\tan(14.5^\circ) = \frac{30}{x}$$

$$x \approx 116.0 \text{ ft}$$



$$\tan(12.7^\circ) = \frac{30}{y}$$

$$y \approx 133.1 \text{ ft}$$

$$z = y - x$$

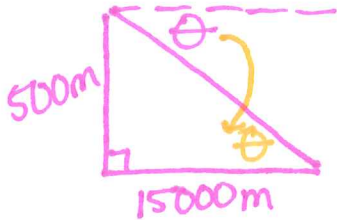
$$z = 133.1 - 116.0$$

$$z = 17.1 \text{ ft}$$

**B** 29. After flying at an altitude of 500 meters, a hang glider starts to descend when the ground distance from the landing pad is 15 kilometers. What is the angle of depression for this part of the flight?

- a.  $1.7^\circ$   
 b.  $1.9^\circ$   
 c.  $88.1^\circ$   
 d.  $88.3^\circ$

Recall  $15 \text{ km} = 15000 \text{ meters}$



$$\tan \theta = \frac{500}{15000}$$

$$\theta = \tan^{-1}\left(\frac{500}{15000}\right)$$

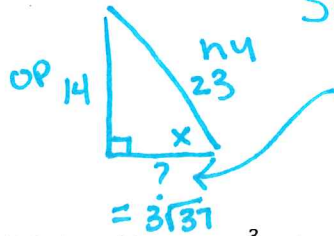
$$\theta \approx 1.9^\circ$$

30. In the right triangle below, if  $\sin x = \frac{14}{23}$ , what is  $\cos x$ ? What is  $\tan x$ ?



**DO NOT Find x!!**

$$\sin x = \frac{14}{23} = \frac{o}{h}$$



Find missing side w/ pyth.  
 $14^2 + b^2 = 23^2$   
 $196 + b^2 = 529$   
 $b = \sqrt{333} = 3\sqrt{37}$

$$\cos x = \frac{3\sqrt{37}}{23}$$

$$\tan x = \frac{14}{3\sqrt{37}} \cdot \frac{\sqrt{37}}{\sqrt{37}} = \frac{14\sqrt{37}}{3 \cdot 37} = \frac{14\sqrt{37}}{111}$$

31. In the right triangle below, if  $\tan x = \frac{3}{5}$ , what is  $\cos x$ ? What is  $\sin x$ ?

**DO NOT Find x!!**



Find hyp  
 $3^2 + 5^2 = ?^2$   
 $34 = c$

$$\cos x = \frac{5}{\sqrt{34}} \cdot \frac{\sqrt{34}}{\sqrt{34}} = \frac{5\sqrt{34}}{34}$$

$$\sin x = \frac{3}{\sqrt{34}} \cdot \frac{\sqrt{34}}{\sqrt{34}} = \frac{3\sqrt{34}}{34}$$