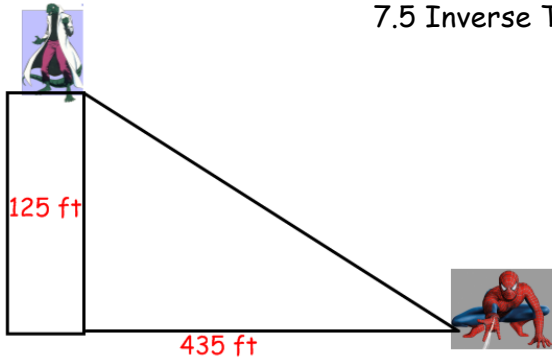# 7.5 Inverse Trig Functions
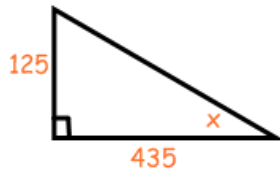
What angle of elevation should spiderman sling his web up in order to hit The Lizard?

125 ft

435 ft

$$\sin A = \frac{opposite}{hypotenuse} \qquad \cos A = \frac{adjacent}{hypotenuse} \qquad \tan A = \frac{opposite}{adjacent}$$

If we want to solve for the angle A we have to do the opposite (or inverse).

125

x

435

Ex 1:   Ex 2:

Ex 3:

<u>Angle of Depression:</u> an angle formed by a horizontal line and the line of sight to an object below the horizontal line.

A jet is coming in for a landing. It's currently 25,000 feet in the air and the landing strip is 45,000 feet directly ahead. In order to ensure a safe landing the plane needs to come in at no more than a 30° angle of depression. Will this be a safe landing?
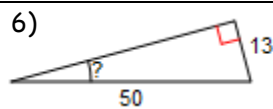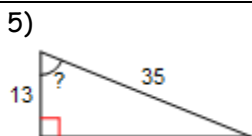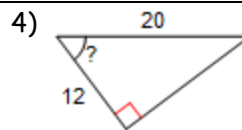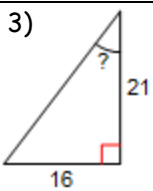
Try these on your own...
1)   2)
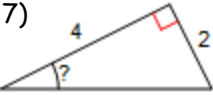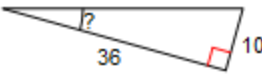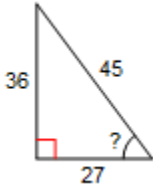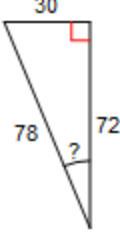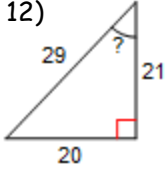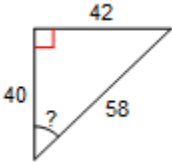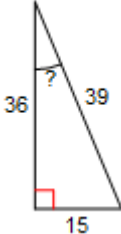
Summary:

_____

_____

_____

_____

7.5 Practice Problems

Directions: Find the measure of the indicated angle to the nearest degree.	
1) 15, 31, ?	2) 15, 30, ?
3) ?, 21, 16	4) 20, ?, 12
5) ?, 35, 13	6) 13, ?, 50

7)	8)
4, 2, ?	?, 36, 10

9)	10)
36, 45, ?, 27	30, 78, 72, ?

11)	12)
68, 85, ?, 51	29, ?, 21, 20
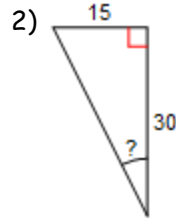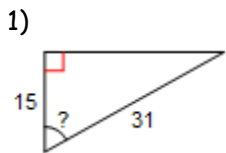
13)	14)
42, 40, ?, 58	36, ?, 39, 15
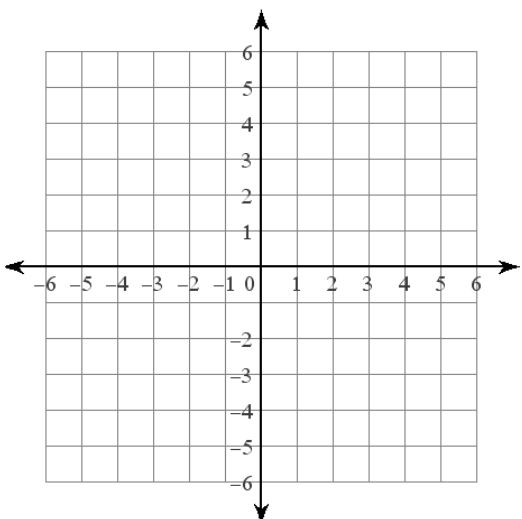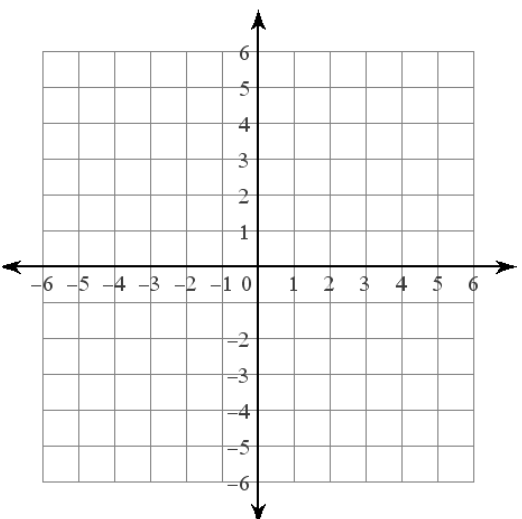
Directions: For each situation draw a picture and then solve. Round to the nearest whole degree.

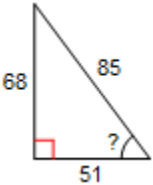15) A man standing on a cliff 50 yards above the water spots a boat that is 150 yards out on the water. What is the angle of depression from the man to the boat?

16) A man who climbed 20 feet into a tree shoots an arrow down towards a target at an angle of depression of 60°. How far is the target from the base of the tree?

17) A man climbs to the roof of his house 25 feet off the ground. He needs to run a wire to his satellite which is 10 feet from the base of his house. What angle of depression should the wire be at?

Solve: $\dfrac{2+x}{3} < 3$	Solve: $6(n-7) \le -84$	Factor: $n^2 + 14n + 49$
Factor: $5r^2 - 13r - 6$	Graph: 3x + y = 1	Graph: 2x – 3y = -6

7.5 APPLICATION and EXTENSION

Directions: Find the measure of the indicated angle to the nearest degree.

1)

18   ?   6

2)

55   ?   33
44
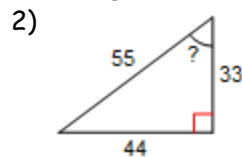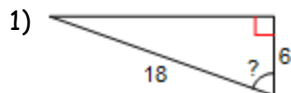
3) Mr. Brust loves ropes courses and one day he decides to make his own in his back yard. He buys 100 feet of wire that will be the line and he builds a platform that is 39 feet in the air. What is angle of depression that Mr. Brust should angle his wire at?

4) On a recent trip to New York City, Mr. Kelly went to the top of the Empire State Building. He knows that the Empire State building is 1250 feet high, but he wants to figure out how tall the building across the street is (its 100 feet across the street). He measures the angle of depression from the Empire State Building to the roof of the adjacent building to be 23°. How tall is the building across the street from the Empire State Building?

5) The Avengers are out on a nightly patrol making sure that all is safe in the city. At one of end of town Iron Man, who is 11,000 feet up on the air spots the evil Thanos wreaking havoc. Iron Man dives at an angle of depression of 15° to save the day. At the exact same time, Thor is patrolling at 20,000 and dives at an angle of depression of 29°. Assuming that they fly at the same speed, who will get to Thanos first and save the day!

6) Mr. Brust and Mr. Kelly go hot air ballooning one day. Well…Mr. Kelly gets to go air ballooning while Mr. Brust has to drive around and follow the hot air balloon to pick Mr. Kelly when he lands . Just being themselves they decide to do a little math right before they land. Mr. Kelly radios and tells Mr. Brust that the altimeter (machine that tells how high in the air he is) says that he is 100 feet off the ground. He then throws down a rope that is exactly 200 feet long and Mr. Brust attaches to his car so they can do some calculations. Mr. Kelly then radios down that he calculated the angle of depression to be 30°. Brust quickly responds "No you are wrong…the angle of ELEVATION is 30°. Who is right? Why?