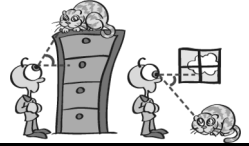
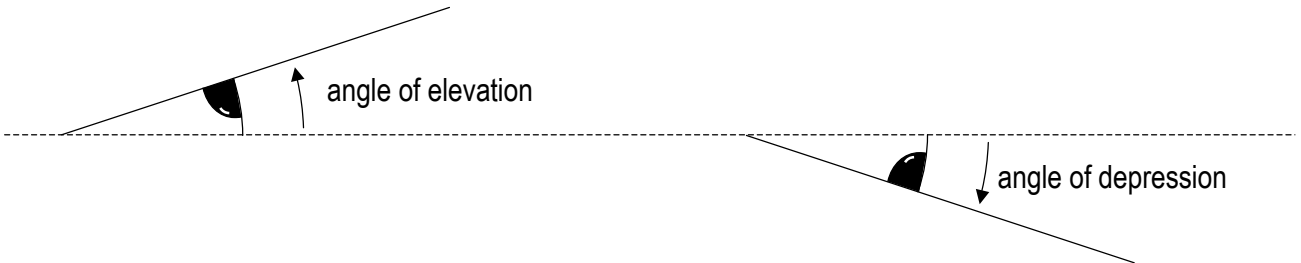


Name _____ Per _____

LO: I can solve for unknown values by using sine, cosine, and tangent ratios.


 DO NOW On the back of this packet

 (1) **Angle of elevation and angle of depression**
calculator


The eyes above illustrate what is meant by an angle of elevation and an angle of depression. For each situation below, put an "E" next to ones that would involve an angle of elevation and a "D" next to the ones that involve an angle of depression.

_____ Faith looked out the window of the airplane at the airport on the ground.

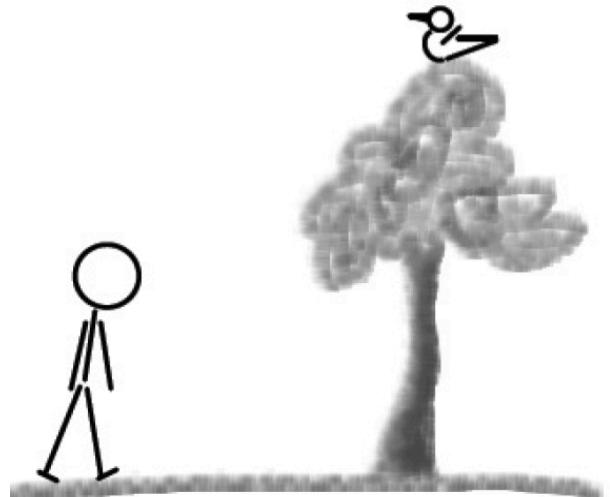
_____ Daundre looked at a bird in the tree.

_____ The angle formed by a plane and the ground as it takes off.

_____ The angle formed by a light beam shining into a lake from a boat.

 (2) **Tangent Applications**
calculator

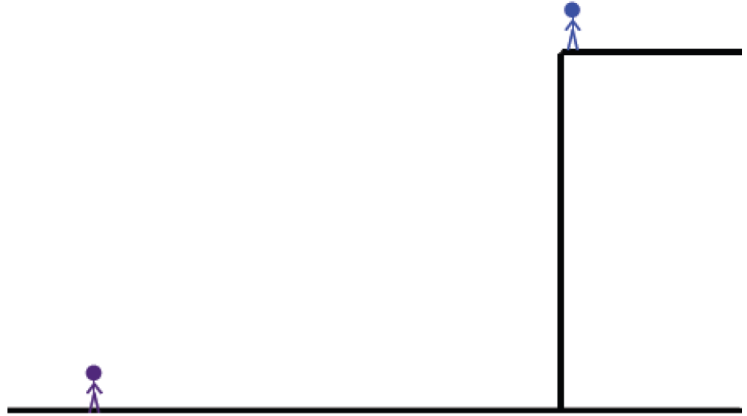
(a) Raekwon, whose eye level is 1.5m above the ground, stands 30 m from a tree. The angle of elevation of a bird at the top of the tree is 36° . How far above the ground is the bird?



(3)
calculator

Tangent Applications

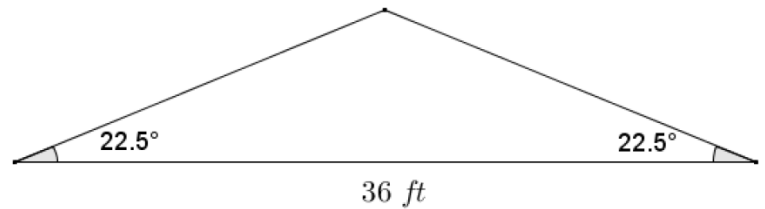
From an angle of depression of 40° , Brandon watches his friend approach his building while standing on the rooftop. The rooftop is 16m from the ground, and Brandon's eye level is at about 1.8m from the rooftop. What is the distance between Brandon's friend and the building?



(4)
calculator

Tangent Applications

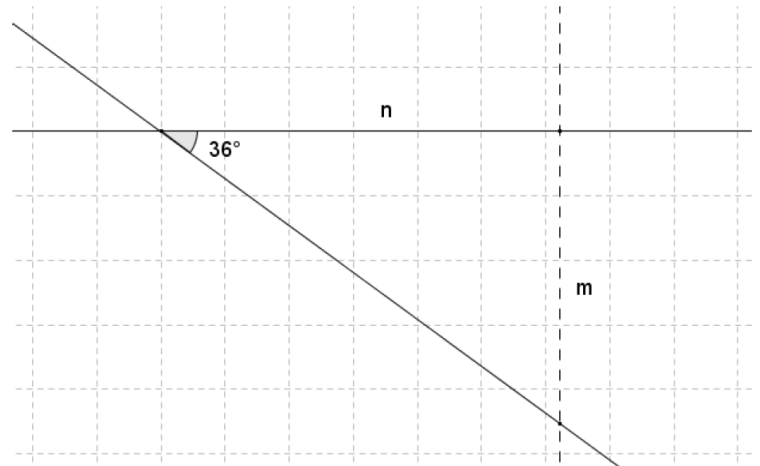
The pitch of a roof on a home is expressed as a ratio of vertical rise to horizontal run where the run has a length of 12 units. If a given roof design includes an angle of elevation of 22.5° , and the roof spans 36 ft. as shown in the diagram, determine the pitch of the roof. Then, determine the distance along one of the two sloped surfaces of the roof.



(5)
calculator

Tangent Applications

A line on the coordinate plane makes an angle of depression of 36° . Find the slope of the line, correct to four decimal places.



(6)
calculator

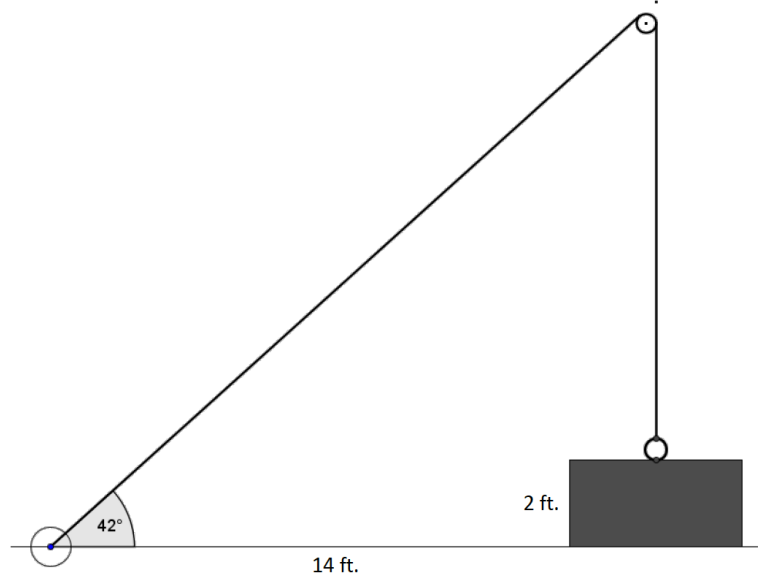
Tangent Applications

- A line in the coordinate plane has an angle of elevation of 53° . Find the slope of the line correct to four decimal places.
- A line in the coordinate plane has an angle of depression of 25° . Find the slope of the line correct to four decimal places.
- In Problems 1 and 2, why do the lengths of the legs of the right triangles formed not affect the slope of the line?
- Given the angles of depression below, determine the slope of the line with the indicated angle correct to four decimal places.
 - 35° angle of depression
 - 49° angle of depression
 - 80° angle of depression
 - 87° angle of depression
 - 89° angle of depression
 - 89.9° angle of depression
 - What appears to be happening to the slopes (and tangent values) as the angles of depression get closer to 90° ?
 - Find the slopes of angles of depression that are even closer to 90° than 89.9° . Can the value of the tangent of 90° be defined? Why or why not?

(7)
calculator

Tangent Applications

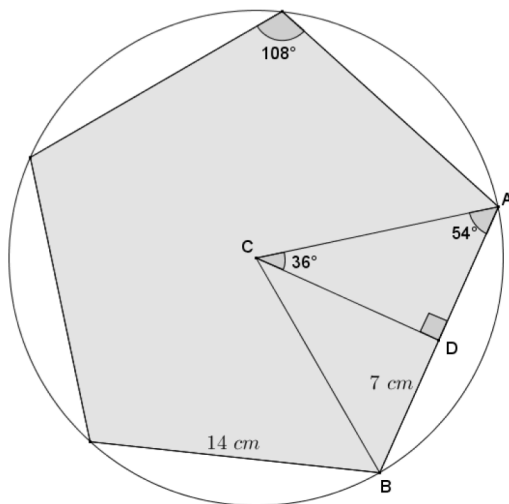
A winch is a tool that rotates a cylinder, around which a cable is wound. When the winch rotates in one direction, it draws the cable in. Joey is using a winch and a pulley (as shown in the diagram) to raise a heavy box off the floor and onto a cart. The box is 2 ft. tall, and the winch is 14 ft. horizontally from where cable drops down vertically from the pulley. The angle of elevation to the pulley is 42° . What is the approximate length of cable required to connect the winch and the box?



(8)
calculator

Tangent Applications

A regular pentagon with side lengths of 14 cm is inscribed in a circle. CD is called an apothem and is the altitude to base AB for triangle ABC . Find the length of CD , the area of triangle ABC and the area of the regular pentagon.



(9)
calculator

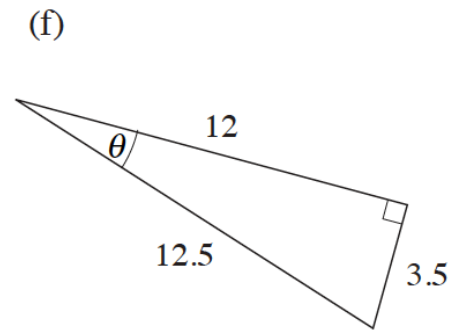
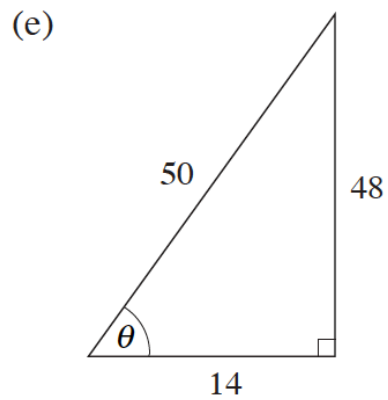
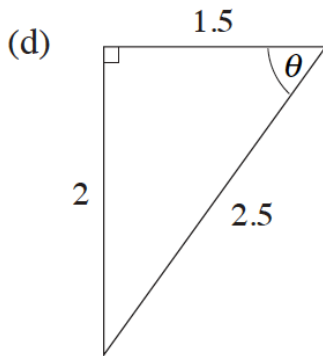
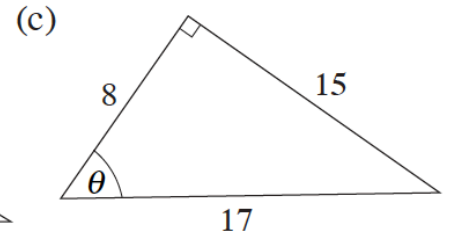
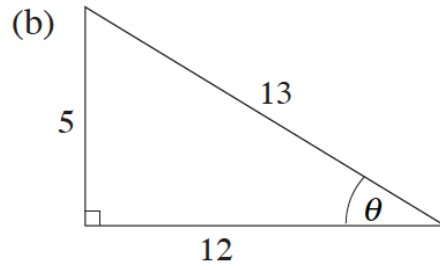
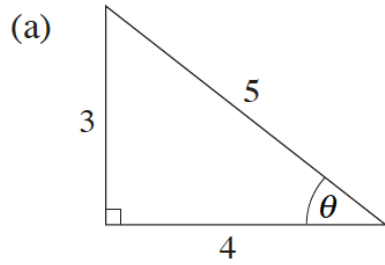
Exit Ticket

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(10)
calculator

Homework

(1) For each triangle, write $\sin \theta$, $\cos \theta$ and $\tan \theta$ as fractions.



(10) **Homework**
calculator

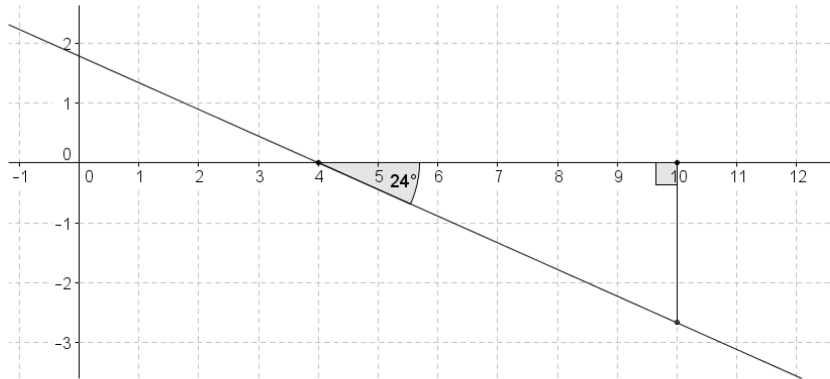
(2) Standing on the gallery of a lighthouse (the deck at the top of a lighthouse), Amanda spots a ship at an angle of depression of 20° . The lighthouse is 28m tall and sits on a cliff 45m tall as measured from sea level. What is the horizontal distance between the lighthouse and the ship? Sketch a diagram to support your answer.



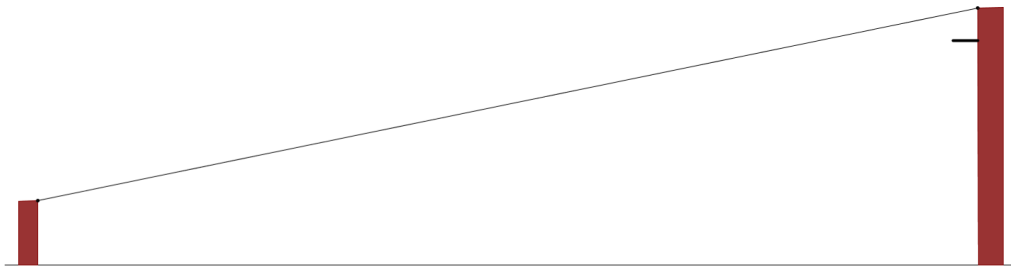
(3) An anchor cable supports a vertical utility pole forming a 51° angle with the ground. The cable is attached to the top of the pole. If the distance from the base of the pole to the base of the cable is 5 meters, how tall is the pole?

(1) The LO (Learning Outcomes) are written below your name on the front of this packet. Demonstrate your achievement of these outcomes by doing the following:

The line on the coordinate plane makes an angle of depression of 24° . Find the slope of the line, correct to four decimal places.



Samuel is at the top of a tower and will ride a trolley down a zip-line to a lower tower. The total vertical drop of the zip-line is 40 ft. The zip line's angle of elevation from the lower tower is 11.5° . What is the horizontal distance between the towers?



The table from lesson 7.6 is provided here for you with two additional rows.

- (a) Use a calculator to find the tangent of θ . Complete the bottom row of the chart by writing your answer correct to four decimal places.

θ	0	10	20	30	40	50	60	70	80	90
$\sin \theta$	0	0.1736	0.3420	0.5	0.6428	0.7660	0.8660	0.9397	0.9848	1
$\cos \theta$	1	0.9848	0.9397	0.8660	0.7660	0.6428	0.5	0.3420	0.1736	0
$\frac{\sin \theta}{\cos \theta}$										
$\tan \theta$.1763								

- (b). In the row labeled $\frac{\sin \theta}{\cos \theta}$, divide the sine values by the cosine values. What do you notice?

(2) What is meant to be humorous about the cartoon below?

$$\frac{\sin(\text{gerine})}{\cos(\text{gerine})} = \text{gerine}$$
