

Bell Ringer - Solve the quadratic.

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$$-3x^3 - 15x^2 - 12x = 0$$

$$-3x(x^2 + 5x + 4) = 0$$

$$-3x(x + 4)(x + 1) = 0$$

$$x = 0, -4, -1$$

Trigonometric Ratios Notes

Trigonometry - Greek for the measurement of triangles.

Trigonometric Ratio - a ratio of the lengths of two sides of a **right** triangle.

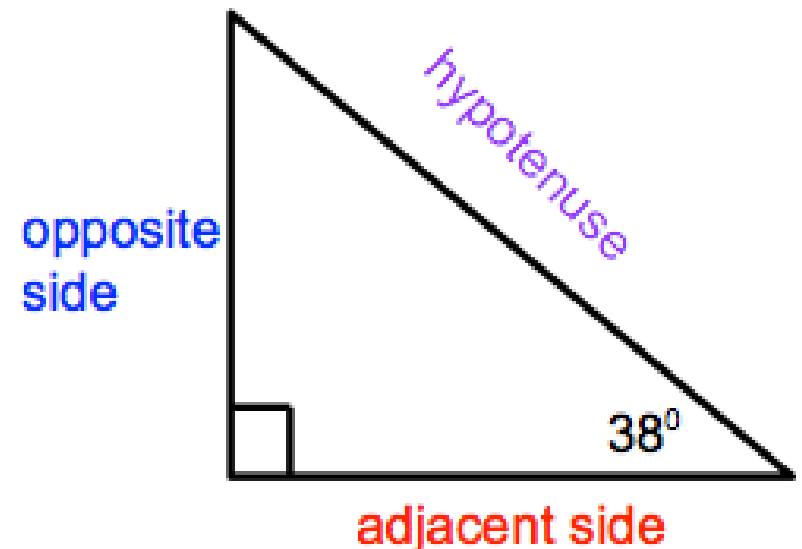
Three Basic Ratios are Sine (sin), Cosine (cos), and Tangent (tan).

SOH - CAH - TOA

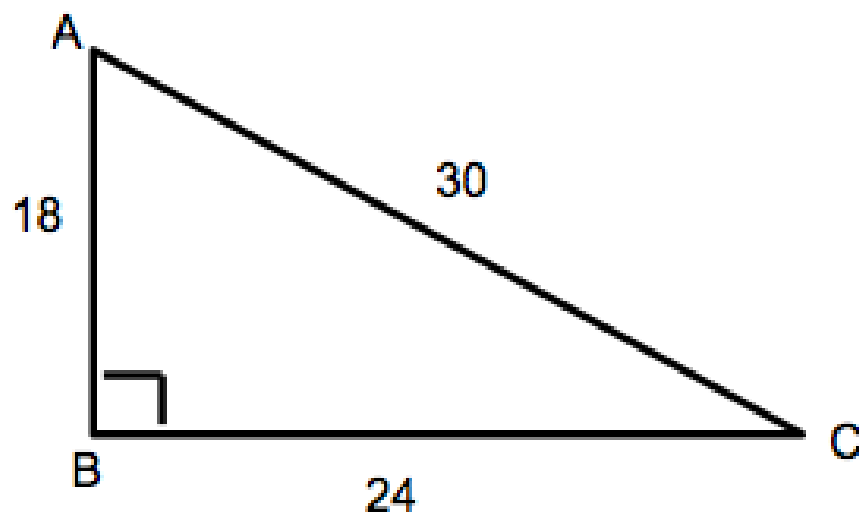
$$\text{Sin } \angle = \frac{\text{side opposite the angle}}{\text{hypotenuse}}$$

$$\text{Cos } \angle = \frac{\text{side adjacent the angle}}{\text{hypotenuse}}$$

$$\text{Tan } \angle = \frac{\text{side opposite the angle}}{\text{side adjacent the angle}}$$



For triangle ABC, find the **sine**, **cosine**, and **tangent** of each acute angle.



$$\sin C = \frac{18}{30} = \frac{3}{5}$$

$$\cos C = \frac{24}{30} = \frac{4}{5}$$

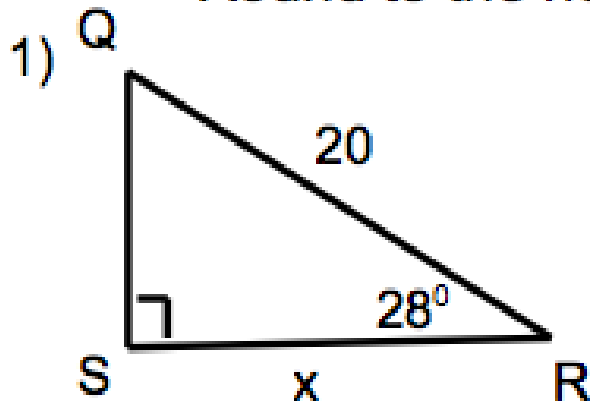
$$\tan C = \frac{18}{24} = \frac{3}{4}$$

$$\sin A = \frac{24}{30} = \frac{4}{5}$$

$$\cos A = \frac{18}{30} = \frac{3}{5}$$

$$\tan A = \frac{24}{18} = \frac{4}{3}$$

Using a trigonometric ratio, find the missing side measurement.
Round to the nearest hundredth.



You're given the hypotenuse
and an angle measurement.
Need to find the adjacent side.
Use COSINE.

$$\cos = \frac{A}{H}$$

$$\cos 28^\circ = \frac{x}{20}$$

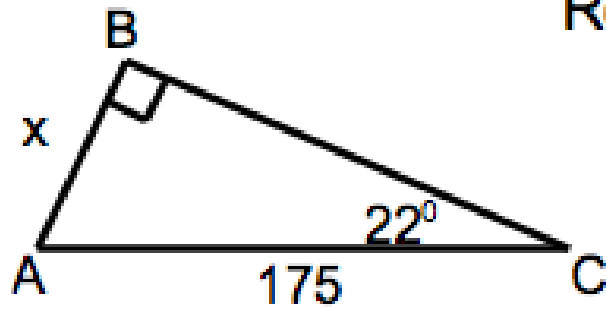
$$\cos 28^\circ \cdot 20 = x$$

$$17.66 = x$$

Using a trigonometric ratio, find the missing side measurement.

Round to the nearest hundredth.

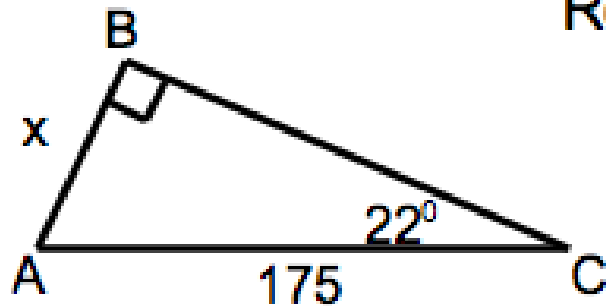
2)



Using a trigonometric ratio, find the missing side measurement.

Round to the nearest hundredth.

2)



You're given the hypotenuse and an angle measurement. Need to find the opposite side. Use SINE.

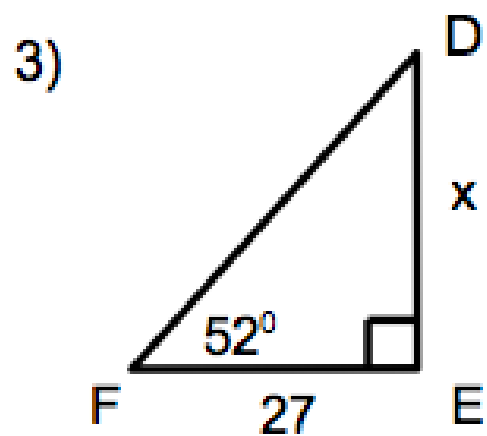
$$\sin = \frac{O}{H}$$

$$\sin 22^\circ = \frac{x}{175}$$

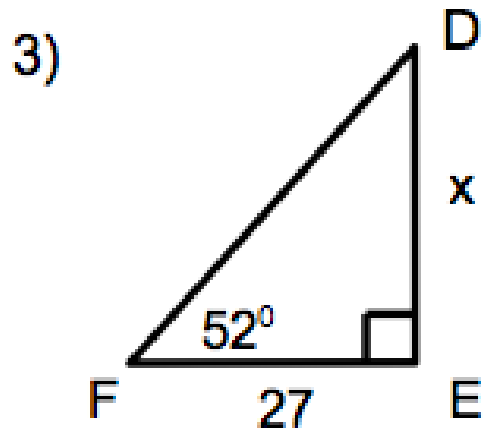
$$\sin 22^\circ \cdot 175 = x$$

$$65.56 = x$$

Using a trigonometric ratio, find the missing side measurement.
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Round to the nearest hundredth.



You're given the adjacent side
and an angle measurement.
Need to find the opposite side.
Use TANGENT.

$$\tan = \frac{O}{A}$$

$$\tan 52^\circ = \frac{x}{27}$$

$$\tan 52^\circ \cdot 27 = x$$

$$34.56 = x$$

Trigonometry Story Problems

- 1) Draw a picture. Remember that there must be a right angle created in the picture.
- 2) Decide what trigonometric ratio to use based on the information.
- 3) Write and solve an equation.
- 4) Label.

4) A sled hill is 70.3 meters long and makes a 19° angle with the ground. What is the height of the sled hill?
Round to the nearest tenth of a meter.

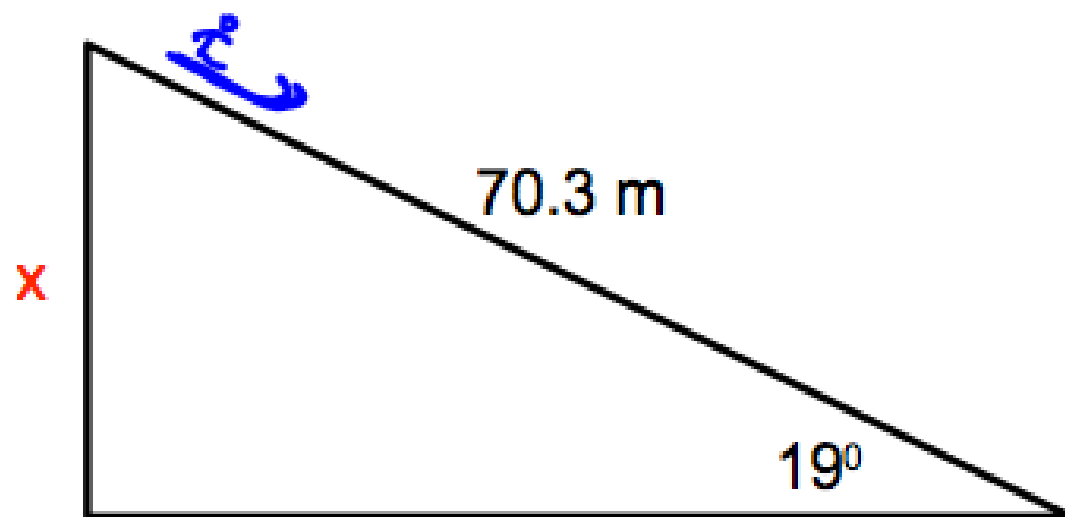
4) A sled hill is 70.3 meters long and makes a 19° angle with the ground. What is the height of the sled hill?
Round to the nearest tenth of a meter.

You're given the hypotenuse and an angle measurement. Need to find the opposite side. Use SINE.

$$\sin 19^\circ = \frac{x}{70.3}$$

$$\sin 19^\circ \cdot 70.3 = x$$

$$22.9\text{m} = x$$



5) You are standing 100 feet from a tree. You estimate the angle of elevation from your feet to the top of the tree is about 50° . Approximately how tall is the tree? Round to the nearest tenth of a foot.

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You're given the adjacent side and an angle measurement. Need to find the opposite side. Use TANGENT.

$$\tan 50^\circ = \frac{x}{100}$$

$$\tan 50^\circ \cdot 100 = x$$

$$119.2 \text{ ft} = x$$

