

What's Going On?

Checking In

F.F.M.

Minds on

Think, Pair, Share

Action!

Solving Right Triangles

Consolidation

Assignment

Learning Goal - I will use trigonometry to 'solve' right triangles.

Checking In

F.F.M.

Name: _____

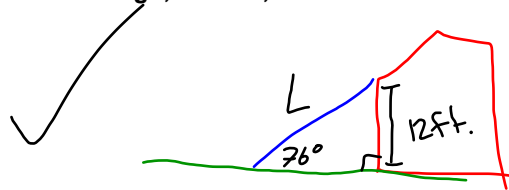
Date: _____

Mr. Gilbert is preparing for Halloween.

He knows that a few of his 2Ps are planning on TPing his house. He needs to buy a ladder so he can get onto his roof and remove the toilet paper on November 1st.

The recommended angle of elevation for a ladder is 76° and Mr. Gilbert's eaves trough is 12 feet above the ground.

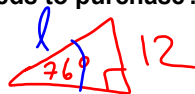
a) Draw a rough, labeled, sketch of the situation.



b) Will the ladder need to be longer or shorter than 12 feet? Explain how you know this.

longer because the ladder is the hypotenuse in a right triangle

c) What is the minimum length of ladder that Mr. Gilbert needs to purchase?



$$\sin(76^\circ) = \frac{12}{l}$$

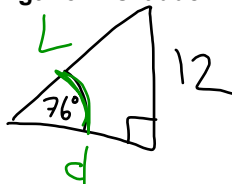
$$0.9702 = \frac{12}{l}$$

$$\frac{0.9702 l = 12}{0.9702} \quad \frac{12}{0.9702}$$

$$l = 12.4 \text{ ft.}$$

\therefore the ladder needs to be 12.4 ft. long

d) How far away from the house will Mr. Gilbert place the length of his ladder?



toa

$$\tan(76^\circ) = \frac{12}{d}$$

$$4.0107 = \frac{12}{d}$$

$$\frac{4.0107 d = 12}{4.0107} \quad \frac{12}{4.0107}$$

$$d = 3 \text{ ft.}$$

Checking In

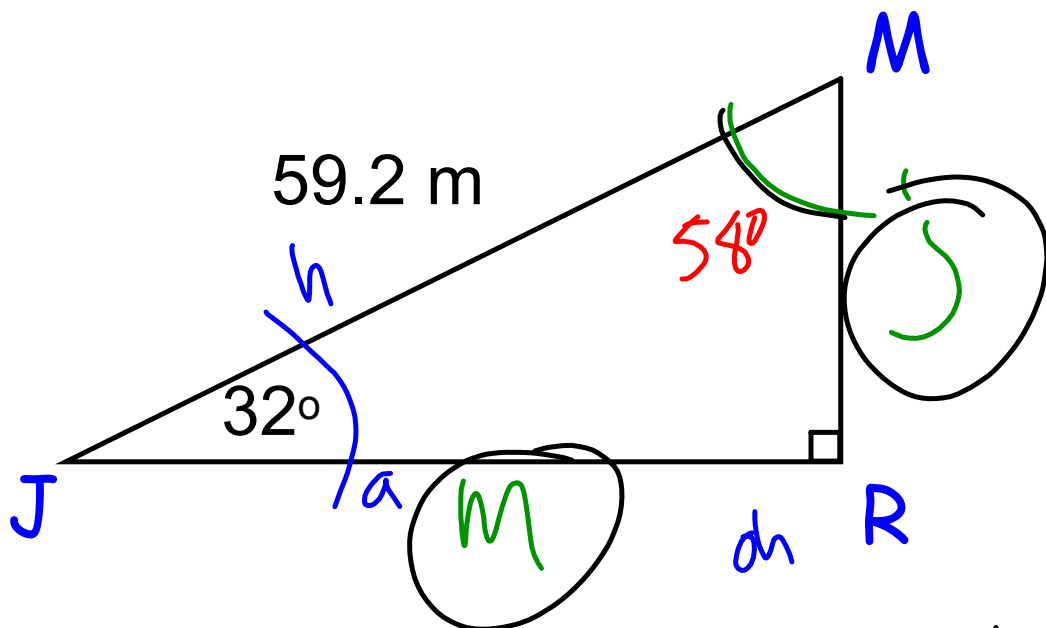
Unit Test Wednesday

Minds on

What would you do?

Think, Pair, Share

Determine the measures of **ALL** sides and angles!



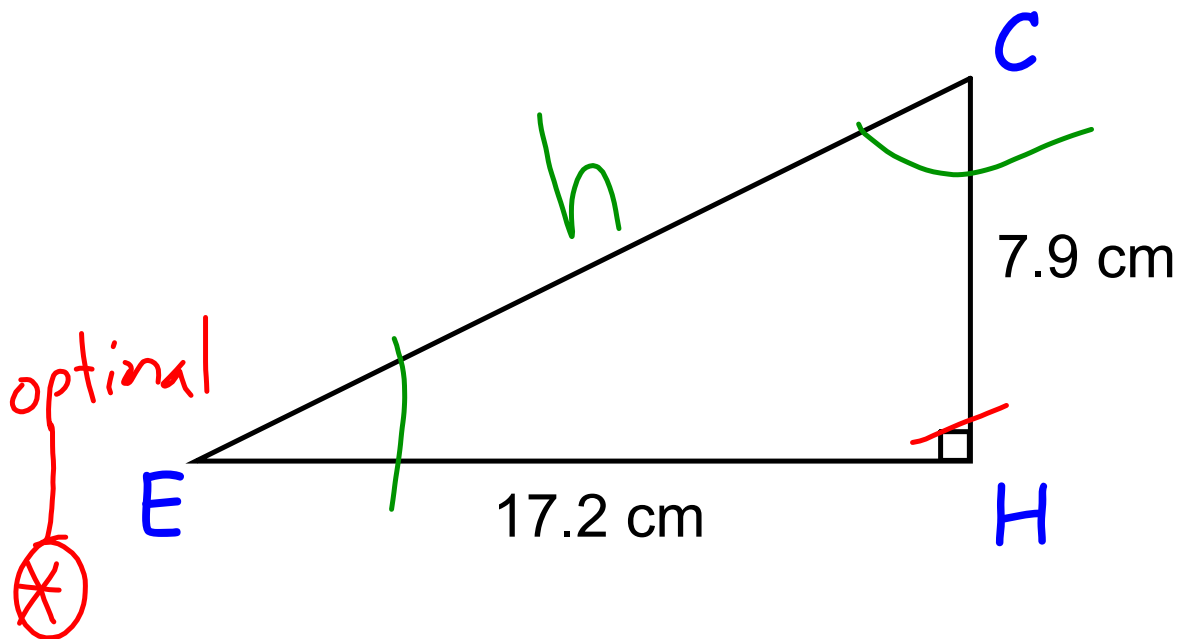
- Find angle M by subtracting
- find side m using $\sin(54)$ or $\cos(32)$
- use $\sin(32)$, $\cos(54)$ or Pythag

Minds on

What would you do?

Think, Pair, Share

Determine the measures of **ALL** sides and angles!



- use \tan^{-1} to find E or C
- Subtract from 90 to get other angle
- find missing side (h) using $\sin(E)$ or $\cos(C)$
- find h using Pythag.

Action!

Solving Right Triangles

To 'solve' a triangle means to find the lengths of all sides and the measures of all angles.

Basically, do everything!

We need to remember that we now have lots of tools to help us:

sin, **cos**, **tan**, **The Pythagorean Theorem**

sin⁻¹, **cos⁻¹**, **tan⁻¹**, **Subtraction**

There is usually more than one route to take when 'solving' a right triangle.

Action!

Solving Right Triangles

If you have one of the angles (and one side):

1. Determine the other angle by subtracting from 90!
2. Find one of the missing sides using sin, cos or tan.
3. Find the third side using sin, cos or tan.

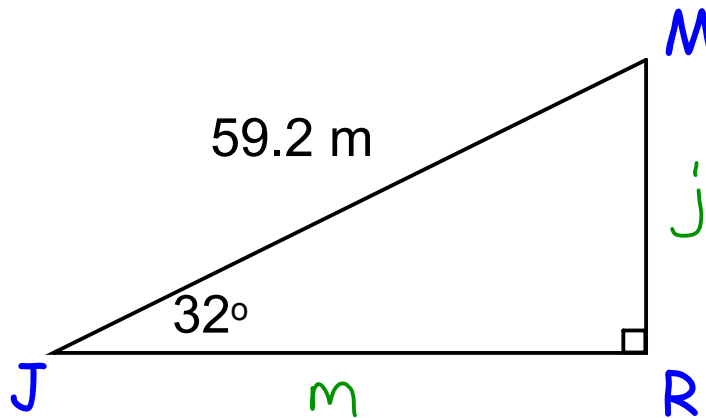
OR

Use The Pythagorean Theorem to find the third side.

4. List ALL sides and angles!

Action!

Solving Right Triangles



Find angle M: $90 - 32 = 58^\circ$
 $\angle M = 58^\circ$

Find m: $\cos(32^\circ) = \frac{m}{59.2}$
 $0.8480 = \frac{m}{59.2}$
 $m = 0.8480 \times 59.2$
 $m = 50.2 \text{ m}$

* also could have used $\sin(58^\circ) = \frac{m}{59.2}$

Find j: $\sin(32^\circ) = \frac{j}{59.2}$
 $0.5299 = \frac{j}{59.2}$
 $j = 0.5299 \times 59.2$
 $j = 31.4 \text{ m}$

* also could have used $\cos(58^\circ)$ or Pythagorean Theorem

Action!

Solving Right Triangles

If you have no angles (two sides):

1. Find one of the missing angles using \sin^{-1} , \cos^{-1} or \tan^{-1} .
2. Find the other angle by subtracting from 90.
3. Find the third side using \sin , \cos or \tan .

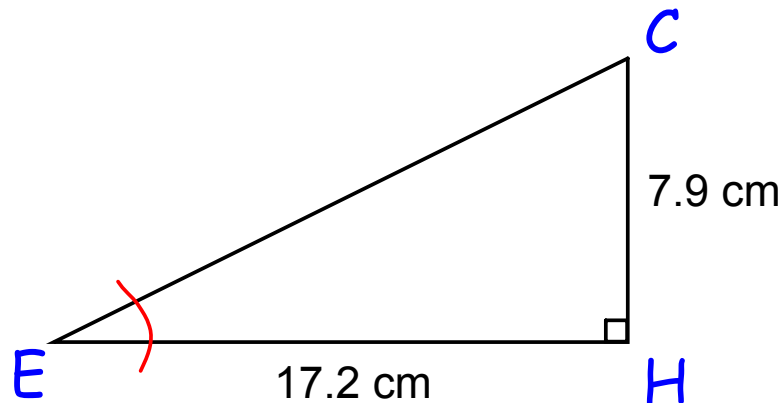
OR

Use The Pythagorean Theorem to find the third side.

4. List ALL sides and angles!

Action!

Solving Right Triangles



Find $\angle E$: $\tan E = \frac{7.9}{17.2}$
 $\tan E = 0.4593$
 $E = \tan^{-1}(0.4593)$
 $E = 25^\circ$

* Could have found $\angle C \Rightarrow \tan(C) = \frac{17.2}{7.9}$

Find C : $90 - 25 = 65$
 $C = 65^\circ$

Find h : $\cos(25^\circ) = \frac{17.2}{h}$
 $0.9063 = \frac{17.2}{h}$
 $h = \frac{17.2}{0.9063}$
 $h = 18.97 \Rightarrow 19.0m$

* also could have used:

① $\sin 25 = \frac{7.9}{h}$ ② $\cos 65 = \frac{7.9}{h}$ ③ $\sin 65 = \frac{17.2}{h}$

④ Pythagorean Theorem
 $h^2 = 7.9^2 + 17.2^2$

Consolidation

Assignment