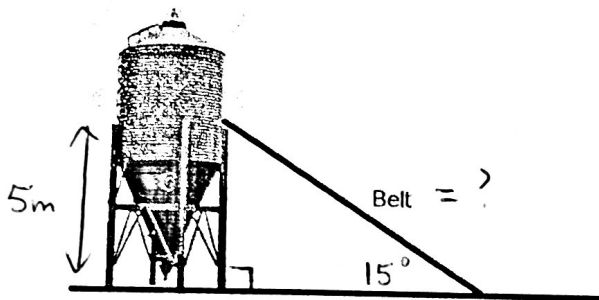


## Review: Solving Right Angle Triangles for Sides

Mr. Smith's friend Ryan works as a millwright, and is constructing a conveyor belt to transport wheat grains from the ground to a window in a silo. This time, the window is 5 m off of the ground, and the conveyor belt needs to be at a  $15^\circ$  angle. How long should the belt be?

Here is a picture of the situation:



Why can't we use the Pythagorean Theorem?

We need 2 sides  
to use the Pythagorean  
Theorem.

We need a different tool to help us solve these problems. Fortunately you learned about another tool in your grade 10 course:

$$S \frac{O}{H} C \frac{A}{H} T \frac{O}{A}$$

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

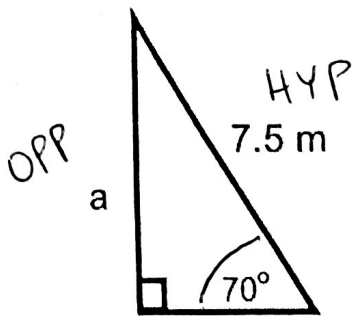
$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

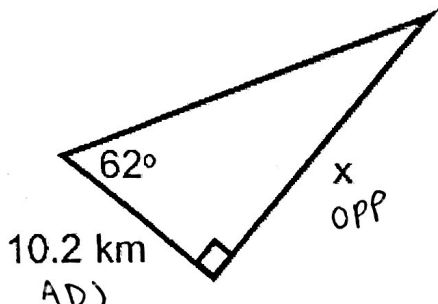
Follow along with Mr. Smith as we use one of these ratios to find the length of the belt.

<p>Diagram:</p>	<p>Solution:</p> $\sin \theta = \frac{\text{opp}}{\text{hyp}}$ $\sin 15^\circ = \frac{5}{x}$ $\frac{0.2588}{1} = \frac{5}{x}$ $x = 1 \times 5 \div 0.2588$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <math>x \approx 19.32 \text{ m}</math> </div>
<p>Choose:</p> <p style="text-align: center;"> <math>\left( S \frac{O}{H} \right) C \frac{A}{H} T \frac{O}{A}</math> </p>	

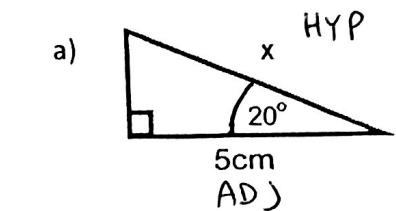
# Review: Solving Right Angle Triangles for Sides

Let's try a couple more where Mr. Smith gives you the structure:

<p>Diagram:</p> 	<p>Solution:</p> $\sin \theta = \frac{\text{opp}}{\text{hyp}}$ $\sin 70^\circ = \frac{a}{7.5}$ $0.9397 = \frac{a}{7.5}$ $a = 7.5 \times 0.9397 \div 1$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <math>a = 7.05 \text{ m}</math> </div>
<p>Choose:</p> <p style="text-align: center;"> <math>\left( \frac{S}{H} \right)</math>   <math>\frac{C}{H}</math>   <math>\frac{T}{A}</math> </p>	

<p>Diagram:</p> 	<p>Solution:</p> $\tan \theta = \frac{\text{opp}}{\text{adj}}$ $\tan 62^\circ = \frac{x}{10.2}$ $1.8807 = \frac{x}{10.2}$ $x = 10.2 \times 1.8807 \div 1$ <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <math>x = 19.18 \text{ km}</math> </div>
<p>Choose:</p> <p style="text-align: center;"> <math>\frac{S}{H}</math>   <math>\frac{C}{H}</math>   <math>\left( \frac{T}{A} \right)</math> </p>	

Try the following two on your own!



$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

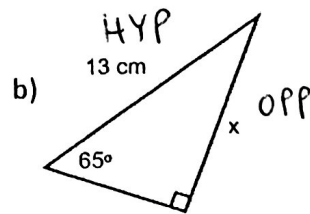
$$\cos 20^\circ = \frac{5}{x}$$

$$0.9397 = \frac{5}{x}$$

$$x = 5 \times 1 \div 0.9397$$

$x = 5.32 \text{ cm}$

~~$x = 4.10 \text{ cm}$~~



$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\sin 65^\circ = \frac{x}{13}$$

$$0.9063 = \frac{x}{13}$$

$x = 11.78 \text{ cm}$