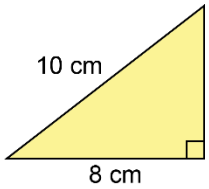
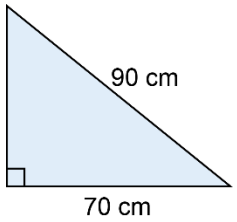
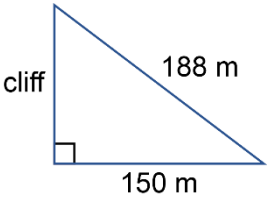
Shape and Space

Lesson 4 Assessment

Applying the Pythagorean Theorem to Solve Problems

Content: Applying the Pythagorean Theorem to Solve Problems

Describes how to use the Pythagorean theorem	Uses Pythagorean triples to solve a problem	Uses the Pythagorean theorem to determine an unknown side length	Uses the Pythagorean theorem to solve problems involving an unknown side length in a right triangle
I can substitute the known side lengths into $a^2 + b^2 = c^2$, where a and b are the lengths of the shorter sides and c is the length of hypotenuse, to find the unknown length in a right triangle.	 Since $10^2 - 8^2 = 36$ is a perfect square, the side lengths are a Pythagorean triple. The missing side length is 6 cm.	 $a^2 + b^2 = c^2$ $a^2 + 70^2 = 90^2$ $a^2 + 4900 = 8100$ $a^2 = 8100 - 4900$ $a^2 = 3200$ $a = \sqrt{3200}$ $a \approx 56.6$ The unknown side length is about 56.6 cm.	A surveyor measures the base of a vertical cliff to be 150 m away and the top of the cliff to be 188 m away. How high is the cliff? Draw a diagram.  $a^2 + b^2 = c^2$ $a^2 + 150^2 = 188^2$ $a^2 + 22\,500 = 35\,344$ $a^2 = 35\,344 - 22\,500$ $a^2 = 12\,844$ $a = \sqrt{12\,844}$ $a \approx 113.33$ The height of the cliff is about 113.33 m.

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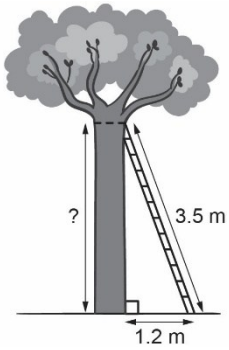
Competency: Problem Solving			
Recognizes that a problem involves a right triangle A family is building a tree fort. They have a ladder that is 3.5 m long. The bottom of the ladder is placed 1.2 m from the base of the tree. How high up the tree will the ladder reach? "The problem involves a right triangle. The angle between the ground and the tree is a right angle. The ladder represents the hypotenuse of the triangle."	Draws and labels a diagram that represents the problem, or interprets a given diagram  "The tree, ground, and ladder form a right triangle."	Records an equation that can be used to solve the problem "Let b represent the height of the tree in metres. I can represent the problem with the equation: $1.2^2 + b^2 = 3.5^2$"	Flexibly solves the equation to solve the problem, interprets the solution, and confirms that the solution is reasonable $1.2^2 + b^2 = 3.5^2$ $1.44 + b^2 = 12.25$ $b^2 = 12.25 - 1.44$ $b^2 = 10.81$ $b = \sqrt{10.81}$ $b \approx 3.3$ "The ladder will reach about 3.3 m up the tree. This seems reasonable because it is less than the hypotenuse, which is always the longest side."
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