

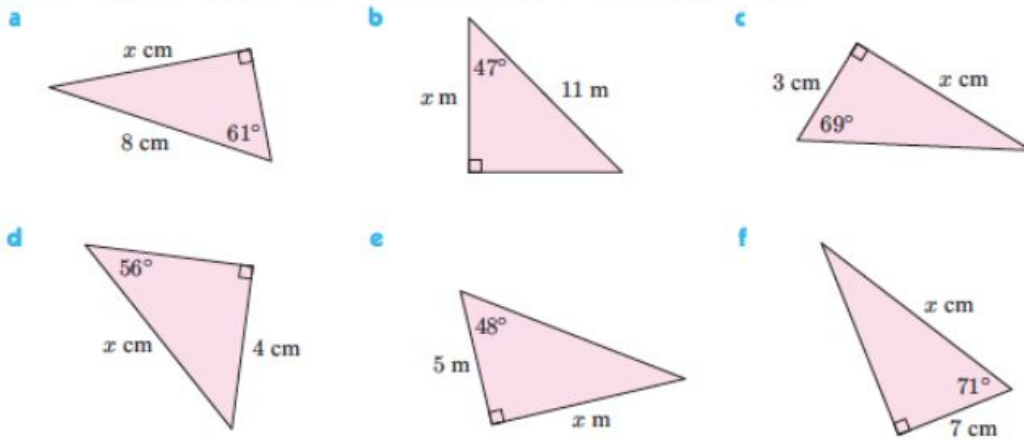
## IM2 Problem Set 2.5 - Applying All Trigonometric Ratios

<p><b>BIG PICTURE</b> of this UNIT:</p>	<ul style="list-style-type: none"> <li>● How do I determine the measure of angles in geometric shapes, without direct measurement?</li> <li>● How do I solve for sides or angles in right triangles?</li> <li>● How can I solve problems that require geometric models using right triangles??</li> </ul>
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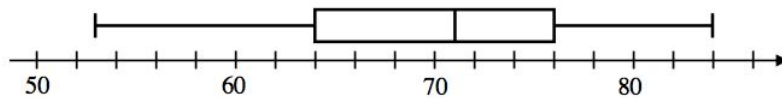
### Part 1 - Skills Review

1. Solve the following triangles for the unknown specified.

Find, to 3 significant figures, the unknown length in the following triangles:

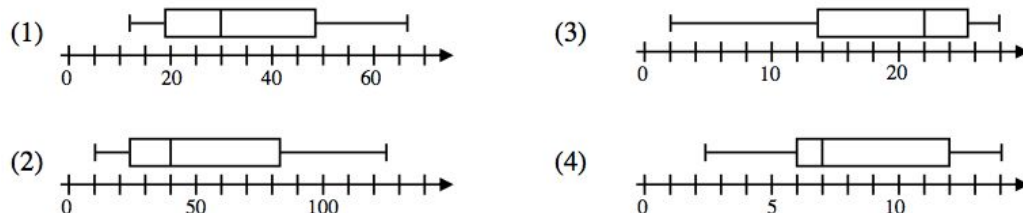


2. Twenty of Mr. Smith's physics students recently took a quiz. The results of this quiz are shown in the following box-and-whiskers diagram. Assume that all scores are whole numbers.



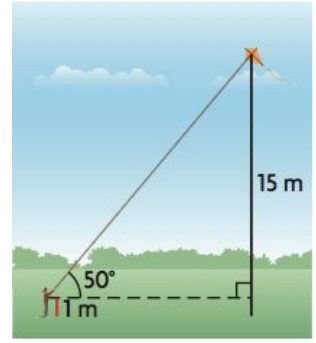
- a. What was the median score on Mr. Smith's math quiz?
- b. What was the range of the scores on Mr. Smith's math quiz?
- c. What score was greater than or equal to 75% of all other scores on this quiz?
- d. Mr. Smith regularly sets the passing grade on his quizzes to be the score of the lower quartile. What is the passing grade on this quiz?

3. Which of the following box-and-whiskers diagram shows a data set with the greatest median?

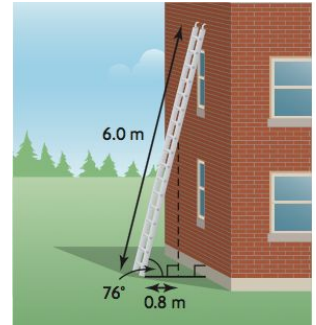


## Part 2 - Problems

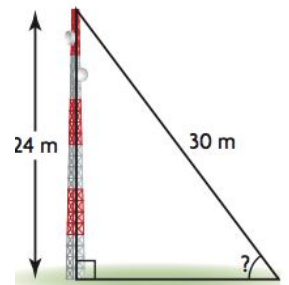
1. Isabelle is flying a kite on a windy day. When the kite is 15 m above ground, it makes an angle of  $50^\circ$  with the horizontal. If Isabelle is holding the string 1 m above the ground, how much string has she released? Round your answer to the nearest metre.



2. Bill was climbing a 6.0 m ladder, which was placed against a wall at a  $76^\circ$  angle. He dropped one of his tools directly below the ladder. The tool landed 0.8 m from the base of the ladder. How far from the top of the ladder was Bill?



3. A support wire is attached to a cellphone tower as shown at the left. The wire is 30 m long, and the cellphone tower is 24 m high. Determine the angle that is formed by the guy wire and the ground.

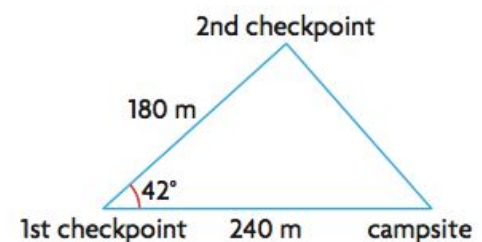


4. A building code states that a set of stairs cannot rise more than 72 cm for each 100 cm of run. What is the maximum angle at which the stairs can rise?

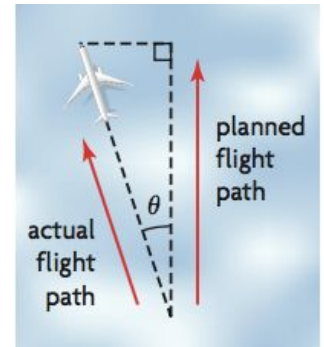


5. A contractor is laying a drainage pipe. For every 3.0 m of horizontal pipe, there must be a 2.5 cm drop in height. At what angle should the contractor lay the pipe? Round your answer to the nearest tenth of a degree.

6. A group of students are on an outdoor education trip. They leave their campsite and travel 240 m before reaching the first orienteering checkpoint. They turn, creating a  $42^\circ$  angle with their previous path, and travel another 180 m to get to the second checkpoint. They turn again and travel the shortest possible path back to their campsite. What area of the woods did their triangular route cover?

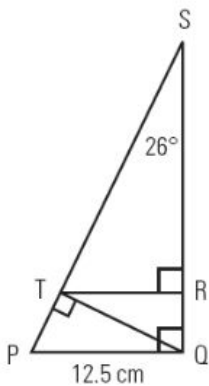
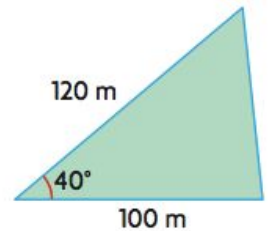


7. After 1 h, an airplane has travelled 350 km. Strong winds, however, have caused the plane to be 48 km west of its planned flight path. By how many degrees is the airplane off its planned flight path?



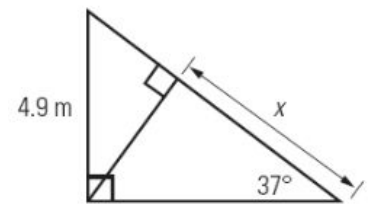
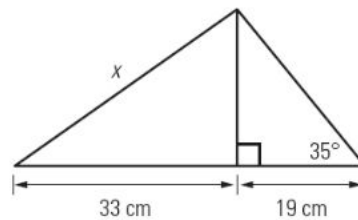
8. Determine the angle between the line  $y = \frac{3}{2}x + 4$  and the  $x$ -axis.

9. Élise drew a diagram of her triangular yard. She wants to cover her yard with sand. Calculate the cost, if sand costs  $\$1.50/\text{m}^2$ .



10. Solve for QS, ST, and RT in this diagram on the left.

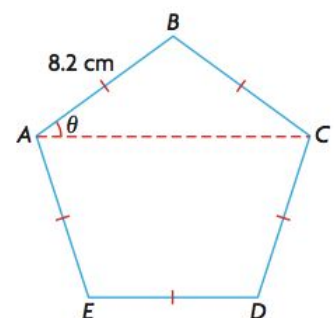
11. Solve for  $x$ .



12. Determine the measure of the acute angle at which the lines  $y = 2x - 1$  and  $y = 0.5x + 2$  intersect.

13. Each side length of regular pentagon  $ABCDE$  is 8.2 cm.

- Calculate the measure of  $\theta$  to the nearest degree.
- Calculate the length of diagonal  $AC$  to the nearest tenth of a centimetre.



14. **(HL EXTENSION)** Angles were measured from two points on opposite sides of a tree, as shown. How tall is the tree?

