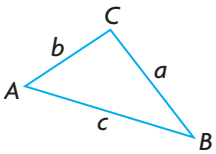
5 Chapter Review

FREQUENTLY ASKED Questions

Q: What is the cosine law, and how do you use it to determine angles and sides in triangles?

A: The cosine law is a relationship that is true for *all* triangles:



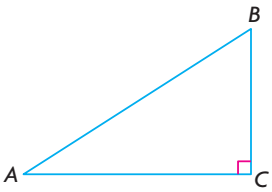
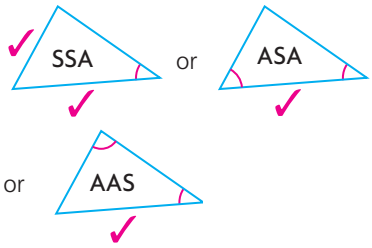
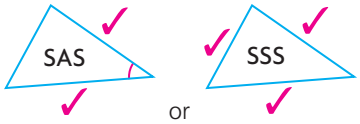
$$a^2 = b^2 + c^2 - 2\,bc\cos A$$
$$b^2 = a^2 + c^2 - 2\,ac\cos B$$
$$c^2 = a^2 + b^2 - 2\,ab\cos C$$

If you don't know a side and an angle opposite it, use the cosine law. The sine law can be used only if you know a side and the angle opposite that side. You can use the cosine law in combination with the sine law and other trigonometric ratios to solve a triangle.

Study Aid
- See Lesson 5.4, Examples 1, 2, and 3.
- Try Chapter Review Questions 7 and 8.

Q: How do you know which strategy to use to solve a trigonometry problem?

A:

Given	Use
A right triangle with any two pieces of information 	Primary trigonometric ratios: $\sin A = \frac{\text{opposite}}{\text{hypotenuse}}$ $\cos A = \frac{\text{adjacent}}{\text{hypotenuse}}$ $\tan A = \frac{\text{opposite}}{\text{adjacent}}$
A triangle with information about sides and opposite angles 	The sine law: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ or $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$
A triangle with no information that allows you to use the sine law 	The cosine law: $a^2 = b^2 + c^2 - 2bc\cos A$ $b^2 = a^2 + c^2 - 2ac\cos B$ $c^2 = a^2 + b^2 - 2ab\cos C$

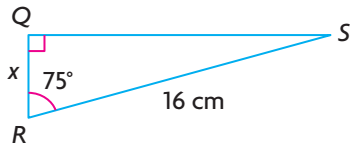
Study Aid
- See Lesson 5.5, Examples 1 to 4.
- Try Chapter Review Questions 9 and 10.

PRACTICE Questions

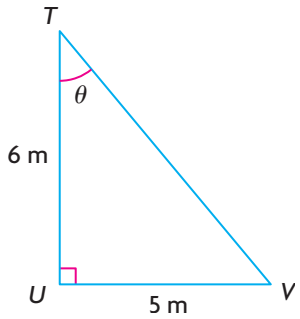
Lesson 5.1

1. Determine x to the nearest unit and angle θ to the nearest degree.

a)



b)



2. From Tony's seat in the classroom, his eyes are 1.0 m above ground. On the wall 4.2 m away, he can see the top of a blackboard that is 2.1 m above ground. What is the angle of elevation, to the nearest degree, to the top of the blackboard from Tony's eyes?

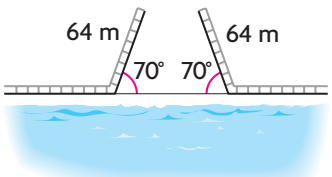
Lesson 5.2

3. A triangular garden has two equal sides 3.6 m long and a contained angle of 80°.

a) How much edging, to the nearest metre, is needed for this garden?

b) How much area does the garden cover? Round your answer to the nearest tenth of a square metre.

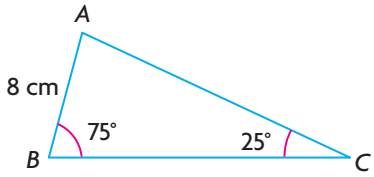
4. A Bascule bridge is usually built over water and has two parts that are hinged. If each part is 64 m long and can fold up to an angle of 70° in the upright position, how far apart, to the nearest metre, are the two ends of the bridge when it is fully open?



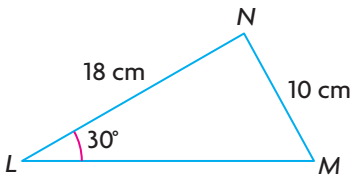
Lesson 5.3

5. Use the sine law to solve each triangle. Round each length to the nearest centimetre and each angle to the nearest degree.

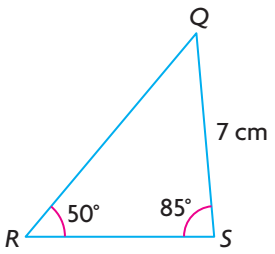
a)



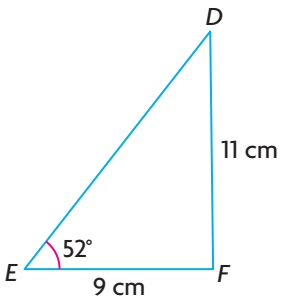
b)



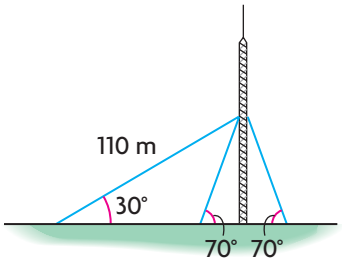
c)



d)



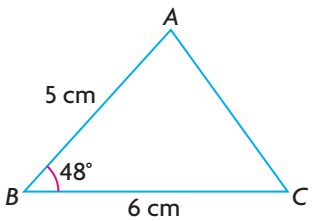
6. A temporary support cable for a radio antenna is 110 m long and has an angle of elevation of 30°. Two other support cables are already attached, each at an angle of elevation of 70°. How long, to the nearest metre, is each of the shorter cables?



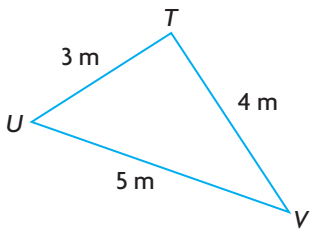
Lesson 5.4

7. Use the cosine law to calculate each unknown side length to the nearest unit and each unknown angle to the nearest degree.

a)



b)



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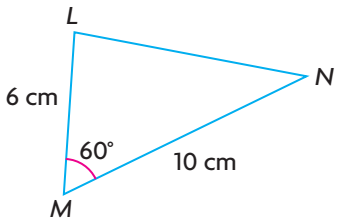
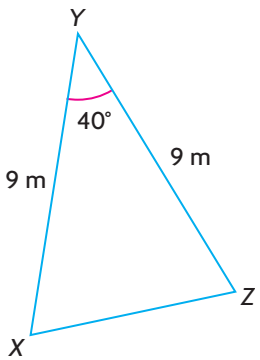
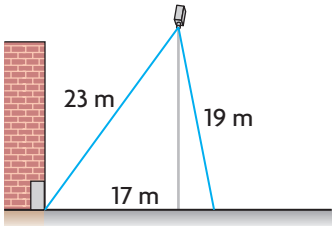


d)



8. A security camera needs to be placed so that both the far corner of a parking lot and an entry door are visible at the same time. The entry door is 23 m from the camera, while the far corner of the parking lot is 19 m from the camera. The far corner of the parking lot is 17 m from the entry door. What angle of view for the camera, to the nearest degree, is required?



Lesson 5.5

9. Sketch and solve each triangle. Round your answers to the nearest degree and to the nearest tenth of a centimetre.

a) $\triangle ABC$: $\angle B = 90°$, $\angle C = 33°$, $b = 4.9$ cm

b) $\triangle DEF$: $\angle E = 49°$, $\angle F = 64°$, $e = 3.0$ cm

c) $\triangle GHI$: $\angle H = 43°$, $g = 7.0$ cm, $i = 6.0$ cm

d) $\triangle JKL$: $j = 17.0$ cm, $k = 18.0$ cm, $l = 21.0$ cm

10. Two sides of a parallelogram measure 7.0 cm and 9.0 cm. The longer diagonal is 12.0 cm long.

a) Calculate all the interior angles, to the nearest degree, of the parallelogram.

b) How long is the other diagonal? Round your answer to the nearest tenth of a centimetre.