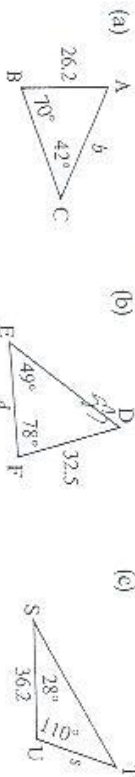


10.9 The Law of Sines

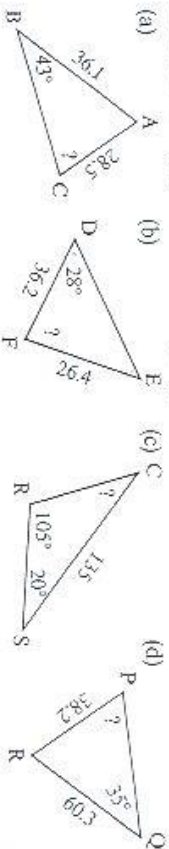
A The Law of Sines can be used in either form.

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \qquad \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

1 For each triangle, find the missing side indicated.

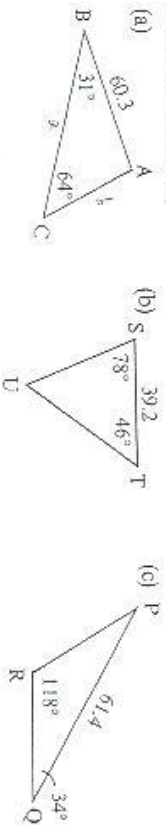


2 For each triangle, find the missing angle indicated.



B3 Sketch the triangle before answering the question.

3 Solve each triangle.



4 (a) $\triangle ABC$, $\angle A = 31^\circ$, $\angle C = 81^\circ$, $c = 96.3$. Find a .

(b) $\triangle DEF$, $e = 3$, $\angle F = 64^\circ$, $\angle E = 46^\circ$. Find $\angle D$.

(c) $\triangle PQR$, $\angle P = 46^\circ$, $\angle Q = 26^\circ$, $r = 123$. Find p and q .

5 In $\triangle PQR$, find the value of q if $\angle R = 83^\circ$, $\angle Q = 40^\circ$ and $r = 25$.

6 In $\triangle PQR$, $p = 24$, $\angle Q = 49^\circ$, $\angle R = 45^\circ$. Find q , r , and $\angle P$.

7 If $0^\circ \leq A \leq 180^\circ$, find two values for $\angle A$ for which

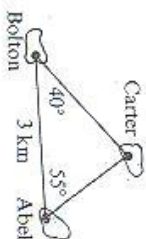
(a) $\sin A = 0.7431$ (b) $\sin A = 0.3907$

(c) $\sin A = 0.7169$ (d) $\sin A = 0.8686$

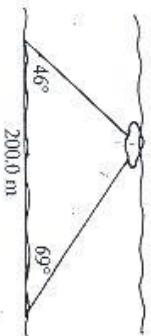
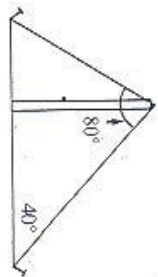
10.10 Exercise

B Use an appropriate form of the Law of Sines to solve each problem.

1 Abel Island and Bolton Island are 3.0 km apart. How far is Carter Island from Abel Island and Bolton Island on the given map?



2 A post is supported by two wires, as shown, in opposite directions forming an angle of 80° at the top of the post. The ends of the wire at the ground are 12.0 m apart with one wire forming an angle of 40° with the ground. Find the lengths of the wires.



3 Along one bank of a river with parallel banks, a surveyor places a base line measuring 200.0 m as shown. From each end of the base line, a rock is sighted on the other bank of the river. The lines of sight of the rock make angles of 46° and 69° with the base line. Find the width of the river.

C 4 To avoid heavy snow loads on the roof, a ski chalet plan calls for a 36° vertical angle. Assuming the width of the base of the chalet to be 14.0 m, determine the slant height of the roof. (The chalet is in the shape of an isosceles triangle.)

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1.a) $b = 36.8$ b) $d = 34.4$ c) $s = 25.4$ 2.a) 60° b) 112° c) 55°

4) 65° 3.a) $\angle A = 85^\circ$, $b = 34.6$, $a = 60.8$ b) $\angle U = 56^\circ$

$s = 46.3$, $t = 34.0$ c) $\angle P = 28^\circ$, $p = 32.7$, $q = 38.9$

4.a) 50.2 b) 70° c) $p = 93.0$, $q = 56.7$ 5. 16.2 6. $q = 18.2$

$r = 17.0$, $\angle P = 86^\circ$ 7.a) 48° , 132° b) 23° , 157° c) 46° , 134°

d) 60° , 120° 8. 6

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1. 1.9 km; 2.5 km 2. 7.8 m, 10.6 m 3. 148.2 m 4. 22.7 m