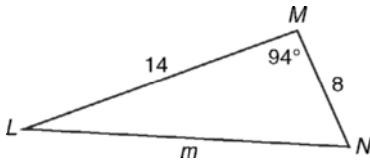


LESSON
13-6

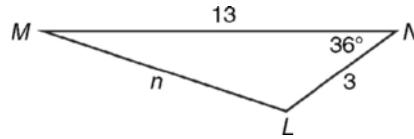
Practice B
The Law of Cosines

Use the given measurements to solve each triangle. Round to the nearest tenth.

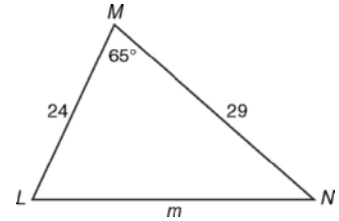
1.



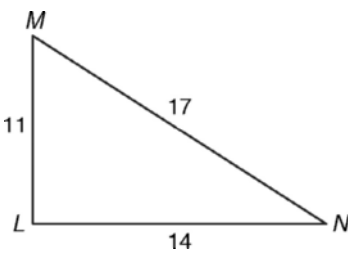
2.



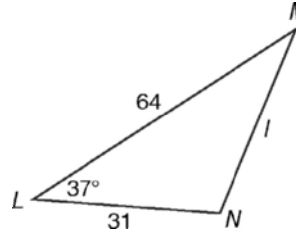
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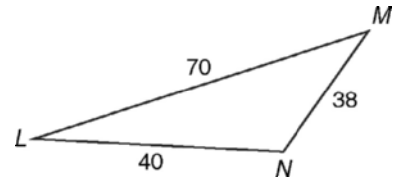
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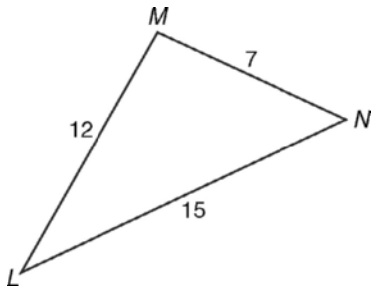
5.



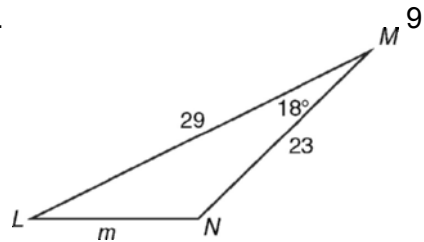
6.



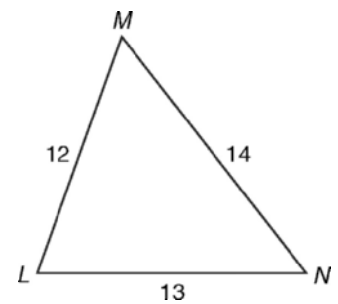
7.



8.

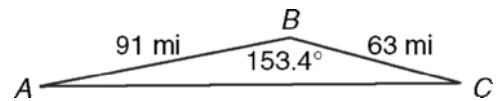


9.



Solve.

10. A postal airplane leaves Island A and flies 91 miles to Island B. It drops off and picks up mail and flies 63 miles to Island C. After unloading and loading mail, the plane returns to Island A at an average rate of 300 miles per hour. How long does it take the pilot to travel from Island C to Island A?



11. A statue is erected on a triangular marble base. The lengths of the sides of the triangle are 12 feet, 16 feet, and 18 feet. What is the area of the region at the base of the statue?

the Law of Sines, $\frac{\sin A}{a} = \frac{\sin B}{b}$, and

$b = \frac{a \sin B}{\sin A}$. Substitute in the area formula:

$$\text{Area} = \frac{1}{2} \left(\frac{a \sin B}{\sin A} \right) (a \sin C) = \frac{a^2 \sin B \sin C}{2 \sin A}$$

Problem Solving

- $A = \frac{1}{2}(100)(53.2)\sin(40^\circ)$
 - 1709.8 yd²
- $221.6 - (100 + 53.2) = 68.4$ yd
 - $\frac{\sin S}{53.2} = \frac{\sin 40^\circ}{68.4}$; so $\angle S = 30^\circ$
 - Possible answer: $180^\circ - (30^\circ + 40^\circ) = 110^\circ$. Or, if student uses the Law of Sines, check the work.
- 45°
 - $\frac{40 \sin 80^\circ}{\sin 45^\circ} = 55.7$ yd
- B
- F

Reading Strategy

- Solve.
- Solve.
- No triangle
- 2 triangles
- Solve.
- No triangle

LESSON 13-6

Practice A

- $f^2 = 20^2 + 30^2 - 2(20)(30)\cos 33^\circ$
 - $f \approx 17.1$
 - $m\angle E \approx 72.5^\circ$
 - $m\angle D \approx 74.5^\circ$
- $d \approx 10.2$; $m\angle E \approx 94.7^\circ$; $m\angle F \approx 61.3^\circ$
- $d \approx 13.9$; $m\angle E \approx 32.6^\circ$; $m\angle F \approx 37.4^\circ$
- $e \approx 9.4$; $m\angle D \approx 23.5^\circ$; $m\angle F \approx 86.5^\circ$
- $12^2 = 15^2 + 10^2 - 2(15)(10)\cos D$
 - $m\angle D \approx 52.9^\circ$
 - $m\angle E \approx 41.6^\circ$
 - $m\angle F \approx 85.5^\circ$

- $m\angle D \approx 95.7^\circ$; $m\angle E \approx 33.6^\circ$; $m\angle F \approx 50.7^\circ$
- $m\angle D \approx 23.5^\circ$; $m\angle E \approx 20.2^\circ$; $m\angle F \approx 136.3^\circ$
- $m\angle D \approx 53^\circ$; $m\angle E \approx 102.5^\circ$; $m\angle F \approx 24.5^\circ$
- 129.8 m²
- 41.2 mi²

Practice B

- $m \approx 16.6$; $m\angle L \approx 28.7^\circ$; $m\angle N \approx 57.3^\circ$
- $n \approx 10.7$; $m\angle L \approx 134.5^\circ$; $m\angle M \approx 9.5^\circ$
- $m \approx 28.7$; $m\angle L \approx 65.9^\circ$; $m\angle N \approx 49.1^\circ$
- $m\angle L \approx 84.8^\circ$; $m\angle M \approx 55.1^\circ$; $m\angle N \approx 40.1^\circ$
- $l \approx 43.5$; $m\angle M \approx 25.4^\circ$; $m\angle N \approx 117.6^\circ$
- $m\angle L \approx 25.5^\circ$; $m\angle M \approx 26.9^\circ$; $m\angle N \approx 127.6^\circ$
- $m\angle L \approx 27.2^\circ$; $m\angle M \approx 101^\circ$; $m\angle N \approx 51.8^\circ$
- $m \approx 10.1$; $m\angle L \approx 44.7^\circ$; $m\angle N \approx 117.3^\circ$
- $m\angle L \approx 68^\circ$; $m\angle M \approx 59.4^\circ$; $m\angle N \approx 52.6^\circ$
- 30 min
- 94.1 ft²

Practice C

- $r \approx 13.3$; $m\angle S \approx 34.4^\circ$; $m\angle T \approx 102.6^\circ$
- $t \approx 13.5$; $m\angle R \approx 40.1^\circ$; $m\angle S \approx 61.9^\circ$
- $m\angle R \approx 127.2^\circ$; $m\angle S \approx 32.1^\circ$; $m\angle T \approx 20.7^\circ$
- $m\angle R \approx 47.7^\circ$; $m\angle S \approx 76.9^\circ$; $m\angle T \approx 55.4^\circ$
- $t \approx 12.4$; $m\angle R \approx 57.7^\circ$; $m\angle S \approx 84.3^\circ$
- $m\angle R \approx 32.8^\circ$; $m\angle S \approx 82.8^\circ$; $m\angle T \approx 64.4^\circ$
- $m\angle R \approx 57^\circ$; $m\angle S \approx 33.3^\circ$; $m\angle T \approx 89.7^\circ$
- $r \approx 34$; $m\angle S \approx 23.1^\circ$; $m\angle T \approx 49.1^\circ$
- $m\angle R \approx 51.4^\circ$; $m\angle S \approx 70.8^\circ$; $m\angle T \approx 57.8^\circ$
- 1 h 39 min
- 104.9 m²

Reteach

- 46°; 9; 7.
- $a = 6.5$
- $m\angle B \approx 83.9^\circ$
- $m\angle C \approx 49.1^\circ$
- 9; 12; 7.
- $s = 14$
- $A = 31\text{m}^2$

Challenge

- $c + e = a$, so $e = a - c$
- $\cos C = \frac{\text{adj.}}{\text{hyp.}} = \frac{d + b}{2a}$, so $2a \cos C = d + b$, and $2a \cos C - b = d$; the right side of the equation is the FOIL method.