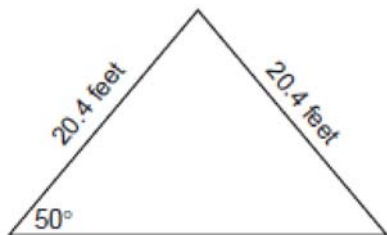
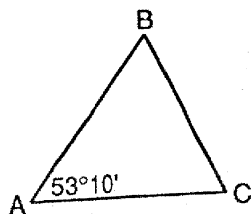


A2.A.74: Using Trigonometry to Find Area 5: Determine the area of a triangle or a parallelogram, given the measure of two sides and the included angle

- 1 The accompanying diagram shows the peak of a roof that is in the shape of an isosceles triangle. A base angle of the triangle is 50° and each side of the roof is 20.4 feet. Determine, to the *nearest tenth of a square foot*, the area of this triangular region.

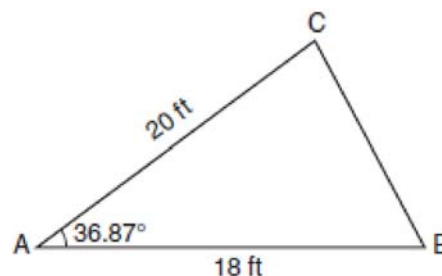


- 2 The building lot shown in the accompanying diagram is shaped like an isosceles triangle with $AB = AC$ and $m\angle BAC = 53^\circ 10'$. The area of the lot is one acre. Find the lengths of *each* of the three sides to the *nearest foot*. [One acre = 43,560 ft^2]



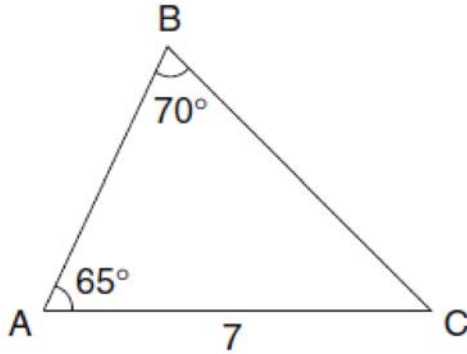
- 3 Gregory wants to build a garden in the shape of an isosceles triangle with one of the congruent sides equal to 12 yards. If the area of his garden will be 55 square yards, find, to the *nearest tenth of a degree*, the *three* angles of the triangle.

- 4 The accompanying diagram shows a triangular plot of land that is part of Fran's garden. She needs to change the dimensions of this part of the garden, but she wants the area to stay the same. She increases the length of side AC to 22.5 feet. If angle A remains the same, by how many feet should side AB be *decreased* to make the area of the new triangular plot of land the same as the current one?

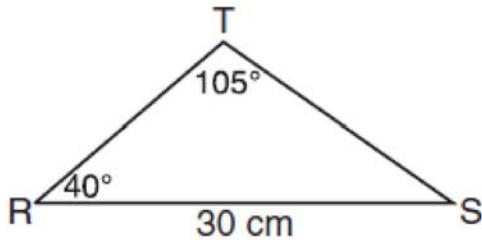


- 5 In $\triangle ABC$, $AC = 18$, $BC = 10$, and $\cos C = \frac{1}{2}$. Find the area of $\triangle ABC$ to the *nearest tenth of a square unit*.

- 6 In the accompanying diagram of $\triangle ABC$, $m\angle A = 65^\circ$, $m\angle B = 70^\circ$, and the side opposite vertex B is 7. Find the length of the side opposite vertex A , and find the area of $\triangle ABC$.



- 7 In the accompanying diagram of $\triangle RST$, $RS = 30$ centimeters, $m\angle T = 105^\circ$, and $m\angle R = 40^\circ$. Find the area of $\triangle RST$, to the nearest square centimeter.



- 8 A ranch in the Australian Outback is shaped like triangle ACE , with $m\angle A = 42^\circ$, $m\angle E = 103^\circ$, and $AC = 15$ miles. Find the area of the ranch, to the nearest square mile.

A2.A.74: Using Trigonometry to Find Area 5: Determine the area of a triangle or a parallelogram, given the measure of two sides and the included angle

Answer Section

1 ANS:
204.9

REF: 060825b

2 ANS:
 $AB = AC = 330, BC = 295$

REF: 089440siii

3 ANS:
 $49.8^\circ, 65.1^\circ, 65.1^\circ$

REF: 060121b

4 ANS:
2

REF: 080628b

5 ANS:
77.9

REF: 010723b

6 ANS:

$$\frac{a}{\sin 65} = \frac{7}{\sin 70}$$

$$6.75, 16.71. \quad a = \frac{7 \sin 65}{\sin 70}. \quad C = 180 - (65 + 70). \quad K = \frac{1}{2}(6.75)(7) \sin 45$$

$$a \approx 6.75 \quad \approx 16.71$$

REF: 080131b

7 ANS:
172

REF: 011027b

8 ANS:

$$\frac{15}{\sin 103} = \frac{a}{\sin 42} \cdot \frac{1}{2}(15)(10.3) \sin 35 \approx 44$$

$$a \approx 10.3$$

REF: 061337a2