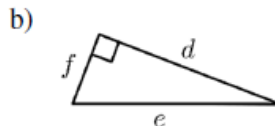
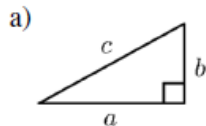


# Solutions

Page 270 #s 1ab, 2ac, 3a, 4,  
5bd, 7ac, 10, 12, 14a, 16

1. Identify the hypotenuse for each of the following right triangles.

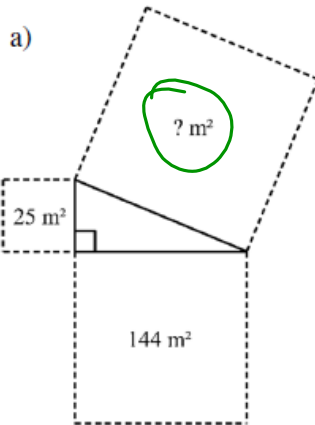


a) Side c

b) Side e

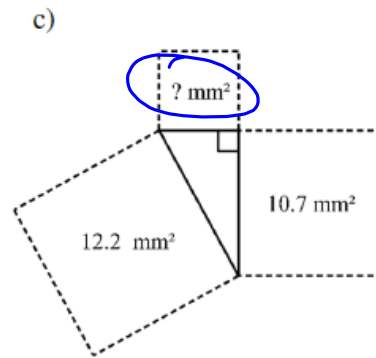
Hypotenuse is the side opposite  
the right angle

2. Determine the area of the indicated square in each of the following diagrams.



$$? = 25 + 144$$

$$? = 169 \text{ m}^2$$

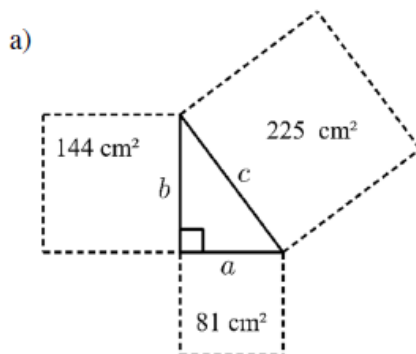


$$? + 10.7 = 12.2$$

$$? + 10.7 - 10.7 = 12.2 - 10.7$$

$$? = 1.5 \text{ mm}^2$$

3. For each of the following, use the given areas to determine side lengths  $a$ ,  $b$  and  $c$ .



$$a = \sqrt{81}$$

$$a = 9 \text{ cm}$$

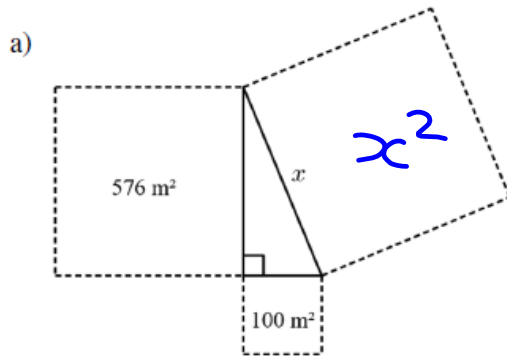
$$b = \sqrt{144}$$

$$b = 12 \text{ cm}$$

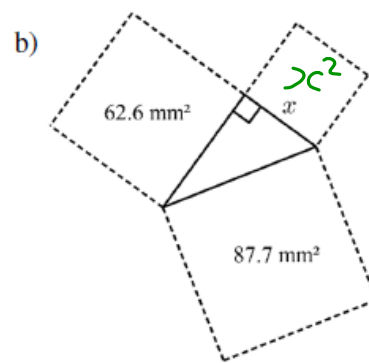
$$c = \sqrt{225}$$

$$c = 15 \text{ cm}$$

4. Use the given areas to determine the side length  $x$  in each of the following diagrams.

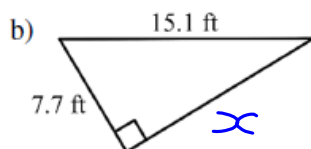


$$\begin{aligned} 576 + 100 &= x^2 \\ 676 &= x^2 \\ \sqrt{676} &= \sqrt{x^2} \\ 26 &= x \\ \Rightarrow x &= 26 \text{ m} \end{aligned}$$

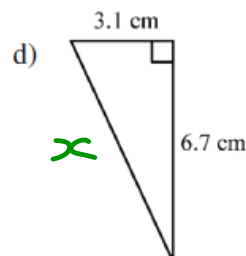


$$\begin{aligned} x^2 + 62.6 &= 87.7 \\ x^2 + 62.6 - 62.6 &= 87.7 - 62.6 \\ x^2 &= 25.1 \\ \sqrt{x^2} &= \sqrt{25.1} \\ x &= 5.0 \text{ mm} \end{aligned}$$

5. Determine the unknown side length in each triangle.



$$\begin{aligned} x^2 + 7.7^2 &= 15.1^2 \\ x^2 + 59.29 &= 228.01 \\ x^2 + 59.29 - 59.29 &= 228.01 - 59.29 \\ x^2 &= 168.72 \\ \sqrt{x^2} &= \sqrt{168.72} \\ x &= 12.989 \\ \Rightarrow x &= 13.0 \text{ ft} \end{aligned}$$



$$\begin{aligned} x^2 &= 3.1^2 + 6.7^2 \\ x^2 &= 9.61 + 44.89 \\ x^2 &= 54.5 \\ \sqrt{x^2} &= \sqrt{54.5} \\ x &= 7.38 \\ \Rightarrow x &= 7.4 \text{ cm} \end{aligned}$$

7. For each of the following, the side lengths of a triangle are given. Determine if the triangle is a right triangle.

a) 39 cm, 80 cm, 89 cm

c) 140.5 ft, 80 ft, 115.5 ft

To be a right triangle  $a^2 + b^2 = c^2$   
 where  $c$  is the longest of the three sides.

$$39^2 + 80^2 = 89^2$$

$$1521 + 6400 = 7921$$

$$7921 = 7921$$

True  
 $\Rightarrow$  It is a right triangle

$$80^2 + 115.5^2 = 140.5^2$$

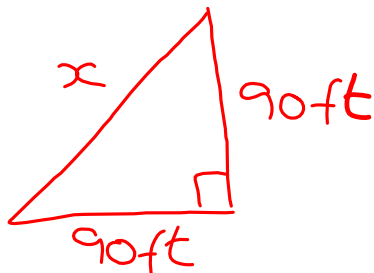
$$6400 + 13340.25$$

$$= 19740.25$$

$$19740.25 = 19740.25$$

True  
 $\Rightarrow$  It is a right triangle

10. In the game of baseball, the distance from one base to the next is 90 feet, as shown in the diagram below. Determine the distance from home plate to second base.



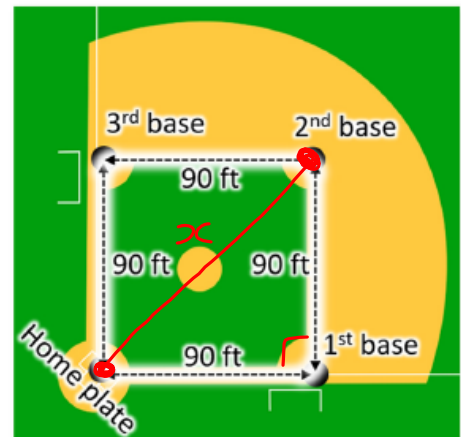
$$90^2 + 90^2 = x^2$$

$$8100 + 8100 = x^2$$

$$16200 = x^2$$

$$\sqrt{16200} = \sqrt{x^2}$$

$$127.28 = x$$

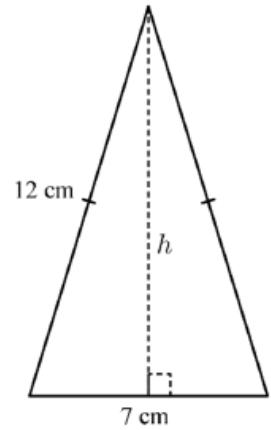


$\Rightarrow$  Home plate to second base is about 127 feet.

12. Determine the height,  $h$ , of the isosceles triangle shown on the right.



Perpendicular line  
will cut the base  
in half  
 $7 \div 2 = 3.5 \text{ cm}$



$$h^2 + 3.5^2 = 12^2$$

$$h^2 + 12.25 = 144$$

$$h^2 + 12.25 - 12.25 = 144 - 12.25$$

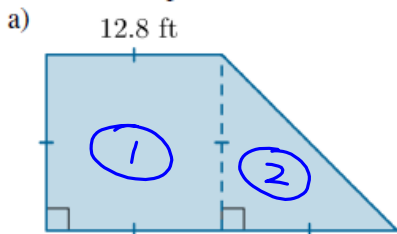
$$h^2 = 131.75$$

$$\sqrt{h^2} = \sqrt{131.75}$$

$$h = 11.478$$

$\Rightarrow$  Height  $h$  is about  
11.5 cm

14. Determine the perimeter and area of each figure.



+ lengths are all 12.8 ft

$$P = 4(12.8) + 18.1$$

$$P = 51.2 + 18.1$$

$$P = 69.3 \text{ ft}$$

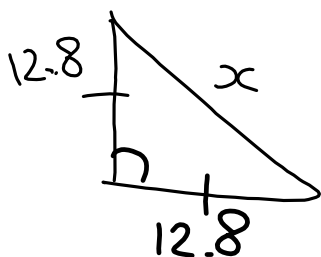
$$A_1 = 12.8 \times 12.8$$

$$A_1 = 163.84$$

$$A_2 = \frac{12.8 \times 12.8}{2}$$

$$A_2 = \frac{163.84}{2} = 81.92$$

$$\text{Area} = 163.84 + 81.92 = 245.76 \text{ ft}^2$$



$$12.8^2 + 12.8^2 = x^2$$

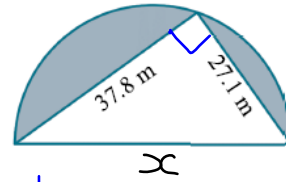
$$163.84 + 163.84 = x^2$$

$$327.68 = x^2$$

$$\sqrt{327.68} = \sqrt{x^2}$$

$$18.1 = x$$

16. When a triangle is inscribed in a semicircle, a right angle is always formed at the point on the circular arc. Calculate the area of the shaded region in the diagram below.



$$\begin{aligned} \text{Shaded area} &= \text{Area of Semicircle} - \text{Area of right triangle} \\ &= \frac{\pi r^2}{2} - \frac{b \times h}{2} \end{aligned}$$

We need the radius of the circle

The diameter is "x"

$$x^2 = 37.8^2 + 27.1^2$$

$$x^2 = 1428.84 + 734.41$$

$$x^2 = 2163.25$$

$$\sqrt{x^2} = \sqrt{2163.25}$$

$$x = 46.5$$

$$\Rightarrow r = \frac{46.5}{2}$$

$$r = 23.25 \text{ m}$$

$$\Rightarrow \text{Area} = \frac{\pi(23.25)^2}{2} - \frac{37.8 \times 27.1}{2}$$

$$= 849.1 - 512.2$$

$$= 336.9 \text{ m}^2$$