1.2 Special Right Triangles

1. Each leg is $\frac{16}{\sqrt{2}} = \frac{16}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{16\sqrt{2}}{2} = 8\sqrt{2}$.
2. Short leg is $\frac{\sqrt{6}}{\sqrt{3}} = \sqrt{\frac{6}{3}} = \sqrt{2}$ and hypotenuse is $2\sqrt{2}$.
3. Short leg is $\frac{12}{\sqrt{3}} = \frac{12}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{12\sqrt{3}}{3} = 4\sqrt{3}$ and hypotenuse is $8\sqrt{3}$.
4. The hypotenuse is $4\sqrt{10} \cdot \sqrt{2} = 4\sqrt{20} = 8\sqrt{5}$.
5. Each leg is $\frac{5\sqrt{2}}{\sqrt{2}} = 5$.
6. The short leg is $\frac{15}{2}$ and the long leg is $\frac{15\sqrt{3}}{2}$.
7. If the diagonal of a square is 6 ft, then each side of the square is $\frac{6}{\sqrt{2}}$ or $3\sqrt{2} \approx 4.24\ ft$.
8. These are not dimensions for a special right triangle, so to find the diagonal (both are the same length) do the Pythagorean Theorem:

$$\begin{aligned} 10^2 + 20^2 &= d^2 \\ 100 + 400 &= d^2 \\ \sqrt{500} &= d \\ 10\sqrt{5} &= d \end{aligned}$$

   So, if each diagonal is $10\sqrt{5}$, two diagonals would be $20\sqrt{5} \approx 45\ ft$. Pablo needs 45 ft of lights for his yard.
9. $2 : 2 : 2\sqrt{3}$ does not fit into either ratio, so it is not a special right triangle. To see if it is a right triangle, plug these values into the Pythagorean Theorem:

$$\begin{aligned} 2^2 + 2^2 &= \left(2\sqrt{3}\right)^2 \\ 4 + 4 &= 12 \\ 8 &< 12 \end{aligned}$$

   this is not a right triangle, it is an obtuse triangle.
10. $\sqrt{5} : \sqrt{15} : 2\sqrt{5}$ is a $30-60-90$ triangle. The long leg is $\sqrt{5} \cdot \sqrt{3} = \sqrt{15}$ and the hypotenuse is $2\sqrt{5}$.