

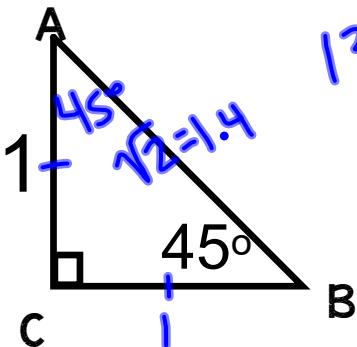
1.4 Special Right Triangles

EQ: How do I find the side lengths of 45-45-90 and 30-60-90 triangles?

Warm-Up

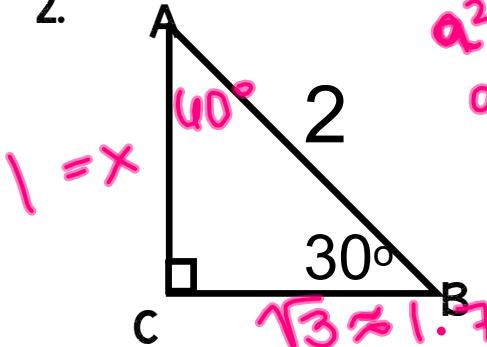
Find all missing sides & angles for the triangles below.

1.



$$\begin{aligned} l^2 + l^2 &= c^2 \\ \sqrt{2}l^2 &= c^2 \end{aligned}$$

2.



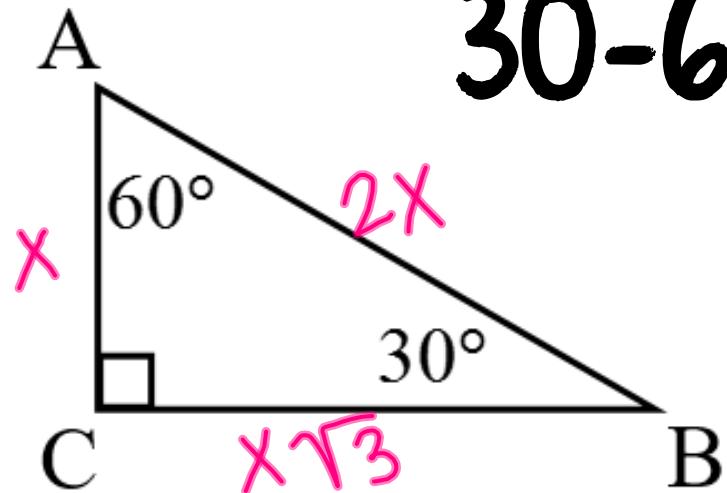
$$\begin{aligned} a^2 + l^2 &= 2^2 \\ a^2 + l^2 &= 4 \\ \sqrt{a^2 + l^2} &= \sqrt{4} \\ \sqrt{a^2 + x^2} &= 2 \\ \sqrt{a^2} &= \sqrt{3} \\ a &= \sqrt{3} \end{aligned}$$

About Me

1. What did you actually do over the long weekend?
2. Would you rather be invisible or be able to read minds?

1.4 Special Right Triangles

EQ: How do I find the side lengths of 45-45-90 and 30-60-90 triangles?



30-60-90

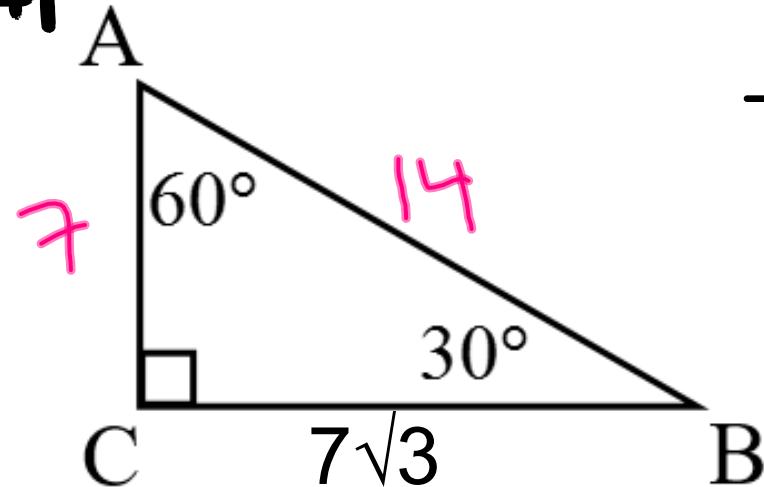
"scalene"

$$\begin{array}{c} 30 \quad 60 \quad 90 \\ \hline x \quad x\sqrt{3} \quad 2x \end{array}$$

1.4 Special Right Triangles

EQ: How do I find the side lengths of 45-45-90 and 30-60-90 triangles?

ex #1



$$\begin{array}{c}
 \text{AC} & \text{BC} & \text{AB} \\
 30 & 60 & 90 \\
 \hline
 x & x\sqrt{3} & 2x \\
 7 & 7\sqrt{3} & 14 \\
 \hline
 7 \cdot 7 = 14
 \end{array}$$

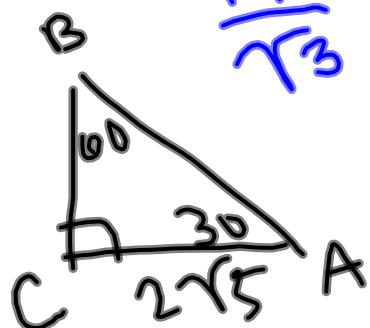
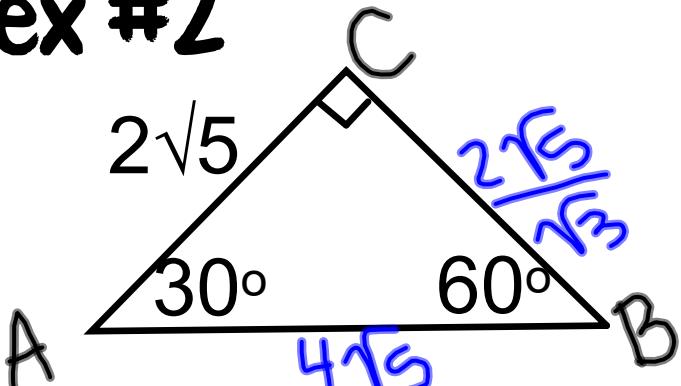
$$\frac{x\sqrt{3}}{\sqrt{3}} = \frac{7\sqrt{3}}{\sqrt{3}}$$

$$x = 7$$

1.4 Special Right Triangles

EQ: How do I find the side lengths of 45-45-90 and 30-60-90 triangles?

ex #2



$$\begin{array}{c}
 30 & 60 & 90 \\
 \hline
 x & x\sqrt{3} & 2x \\
 \frac{2\sqrt{5}}{\sqrt{3}} & 2\sqrt{5} & \frac{2 \cdot 2\sqrt{5}}{\sqrt{3}} = \frac{4\sqrt{5}}{\sqrt{3}}
 \end{array}$$

$$\frac{x\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{5}}{\sqrt{3}}$$

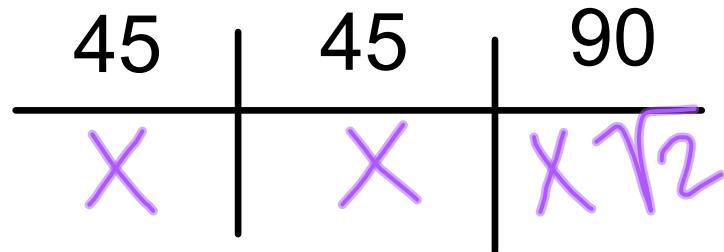
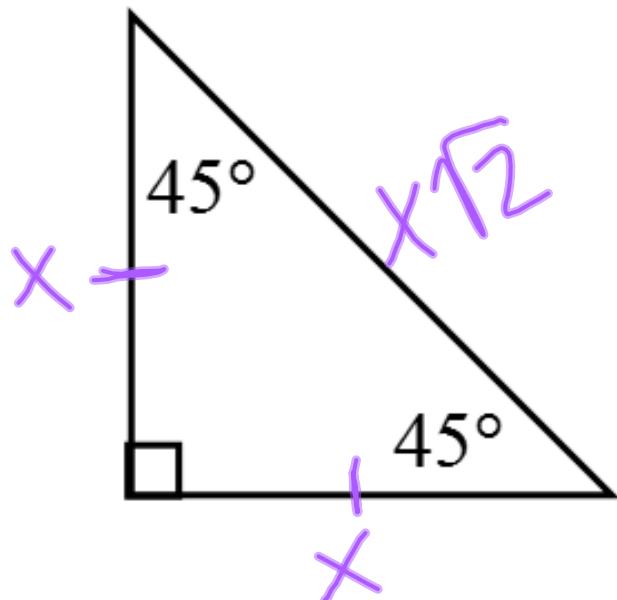
$$x = \frac{2\sqrt{5}}{\sqrt{3}}$$

1.4 Special Right Triangles

EQ: How do I find the side lengths of 45-45-90 and 30-60-90 triangles?

45-45-90

"isosceles"
2 sides =

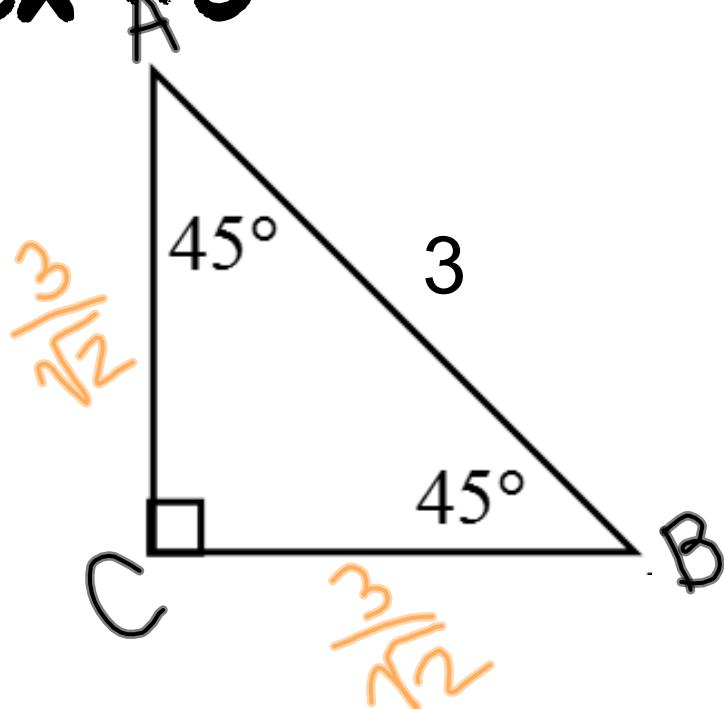


$$\begin{aligned} x^2 + x^2 &= c^2 \\ \sqrt{2}x^2 &= \sqrt{c^2} \\ x\sqrt{2} &= c \end{aligned}$$

1.4 Special Right Triangles

EQ: How do I find the side lengths of 45-45-90 and 30-60-90 triangles?

ex #3



$$\begin{array}{c}
 \text{45} & \text{45} & \text{90} \\
 \hline
 x & x & x\sqrt{2} \\
 \textcolor{orange}{3/\sqrt{2}} & \textcolor{orange}{3/\sqrt{2}} & \textcolor{blue}{3}
 \end{array}$$

$$\frac{x\sqrt{2}}{\sqrt{2}} = \frac{3}{\sqrt{2}}$$

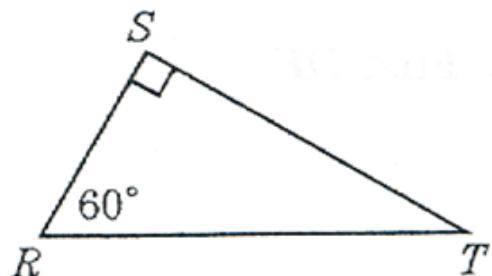
$$x = \frac{3}{\sqrt{2}}$$

I.4 Special Right Triangles

EQ: How do I find the side lengths of 45-45-90 and 30-60-90 triangles?

CLOSING

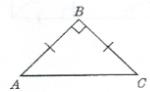
4. If $ST = 4$, find the lengths of SR and RT .



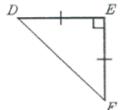
odds Name: _____

1.4 Special Right Triangles

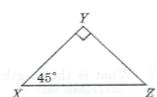
1. If
- $AB = 2\sqrt{2}$
- , find the length of
- AC
- .



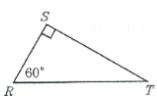
2. If
- $DF = 10$
- , find the length of
- EF
- .



3. If
- $YZ = 4k\sqrt{6}$
- , express
- XZ
- in terms of
- k
- .



4. If
- $ST = 4$
- , find the lengths of
- SR
- and
- RT
- .

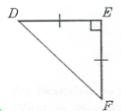


5. If
- $d = 3\sqrt{2}$
- , find the value of
- x
- .



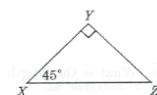
$$\begin{array}{r} 45 \mid 45 \mid 90 \\ x \quad x \quad x\sqrt{3} \\ \hline 3 \quad 3 \quad 3\sqrt{2} \end{array}$$

6. If
- $DE = 4$
- , find the length of
- DF
- .



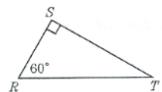
$$\begin{array}{r} 30 \mid 60 \mid 90 \\ x \quad x\sqrt{3} \quad 2x \end{array}$$

7. If
- $YZ = 2k\sqrt{14}$
- , express
- XY
- in terms of
- k
- .



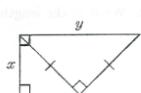
8. What is the altitude of an equilateral triangle with a perimeter of 30 units?

9. If $ST = 9\sqrt{3}$, find the length of SR and RT .

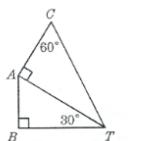


10. An isosceles right triangle has a leg of $8\sqrt{6}$ units. What is its perimeter?

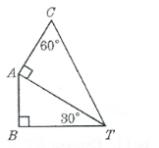
11. If $x = 12$, find the value of y .



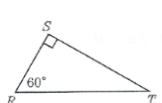
12. If $BT = 2\sqrt{3}$, find the length of CT .



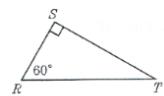
13. If $CT = 12$, find the length of AB .



14. If $SR = 5$, find the lengths of ST and RT .

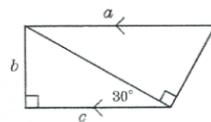


15. If $ST = 9$, find the length of SR and RT .

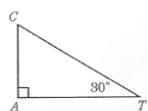


16. A square has a diagonal of length $10\sqrt{3}$. What is the perimeter of the square?

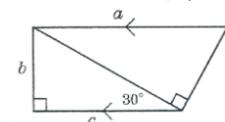
17. If $a = 16$, find the values of b and c .



18. If $CA = 3m\sqrt{3}$, express AT in terms of m .



19. If $a = 10\sqrt{3}$, find the values of b and c .



20. If $CT = 2x$, express BT in terms of x .

