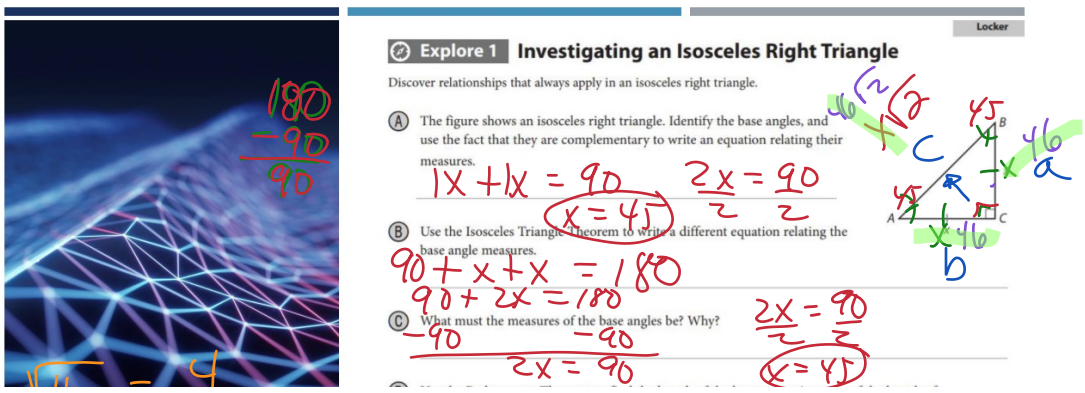
Lesson 9.2 Special Right Triangles

Sunday, March 6, 2022 6:17 PM

Click on link below for peardeck interactive lesson:
https://app.peardeck.com/student/tjtjglffq

special right



D Use the Pythagorean Theorem to find the length of the hypotenuse in terms of the length of each leg, x.

$a^2+b^2=c^2$ $x^2+x^2=c^2$ $2x^2=c^2$ $\sqrt{2x^2}=c$ $c=x\sqrt{2}$

$\sqrt{90}$ $x \cdot x$

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9.10

$3\sqrt{10}$

SSS SAS ASA AAS

Explore 2 Investigating Another Special Right Triangle

Discover relationships that always apply in a right triangle formed as half of an equilateral triangle.

A $\triangle ABD$ is an equilateral triangle and $\overline{BC}$ is a perpendicular from B to $\overline{AD}$. Determine all three angle measures in $\triangle ABC$.

$C=90$ $\angle B=30$ $A=60$

B Explain why $\triangle ABC \cong \triangle DBC$.

SAS $= AB = BD$ isosc. $\triangle$ $BC=BC$ Reflexive Prop $\angle B=\angle B$

C Let the length of $\overline{AC}$ be x. What is the length of $\overline{AB}$, and why?

AD is $2x$ because $AC=DC$ all 3 side = equilateral $\triangle$ all sides $= 2x$

D Using the Pythagorean Theorem, find the length of $\overline{BC}$.

$a^2+x^2=(2x)^2$ $a^2+1x^2=4x^2$ $-1x^2$ $-1x^2$

$180-3x$ $\frac{3}{3}$ $\frac{3}{3}$ $60-x$ $90+60=150$ $180-150$ 30 $2x$ $a=14\sqrt{3}$ $x\sqrt{3}$ 14 6

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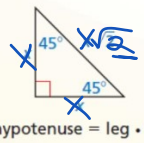
$a^2=3x^2$ $a=\sqrt{3x^2}$ $a=x\sqrt{3}$

Theorem

Theorem 9.4 45°-45°-90° Triangle Theorem

In a 45°-45°-90° triangle, the hypotenuse is $\sqrt{2}$ times as long as each leg.



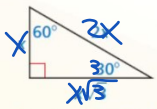
hypotenuse = leg • $\sqrt{2}$

Proof Ex. 19, p. 476

Theorem

Theorem 9.5 30°-60°-90° Triangle Theorem

In a 30°-60°-90° triangle, the hypotenuse is twice as long as the shorter leg, and the longer leg is $\sqrt{3}$ times as long as the shorter leg.



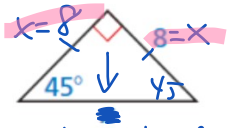
hypotenuse = shorter leg • 2

longer leg = shorter leg • $\sqrt{3}$

Proof Ex. 21, p. 476

Find the value of x. Write your answer in simplest form.

a.

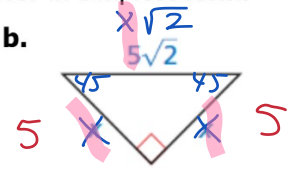


Hypotenuse

$x\sqrt{2}$

$8\sqrt{2}$

b.



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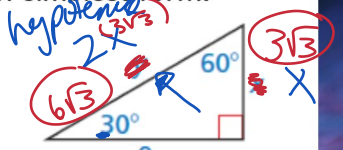
Find the values of x and y. Write your answer in simplest form.



$\frac{x\sqrt{3}}{\sqrt{3}} = \frac{9}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{9\sqrt{3}}{3} = 3\sqrt{3}$

$(x\sqrt{3})^2 = (9)^2$ $\sqrt{9}$

$x\sqrt{3} \cdot x\sqrt{3} = 81$

$3x^2 = 81$

$\frac{3x^2}{3} = \frac{81}{3}$

$x^2 = 27$

$x = \sqrt{27}$

$\sqrt{9}\sqrt{3}$

$3\sqrt{3}$

$x\sqrt{3}$

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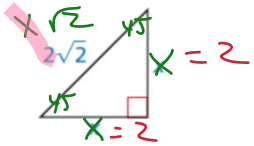
Find the value of the variable. Write your answer in simplest form.

1.



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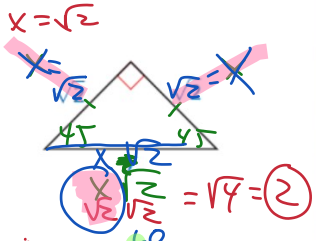
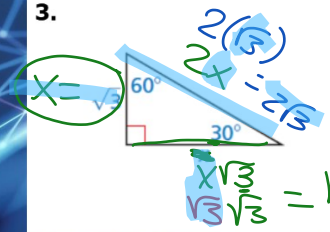


3.



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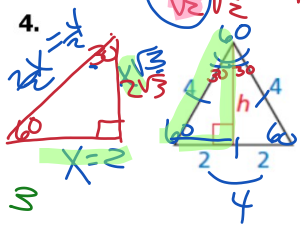

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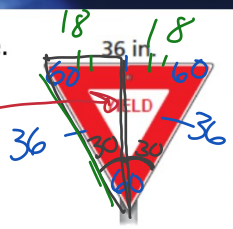
The road sign is shaped like an equilateral triangle. Estimate the area of the sign by finding the area of the equilateral triangle.



$A = \frac{1}{2}bh$

$A = \frac{1}{2}(36)(18\sqrt{3})$

$A = (18)(18\sqrt{3})$

$A = 324\sqrt{3}$

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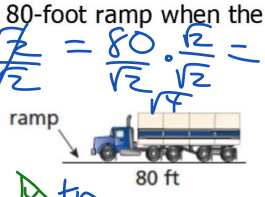
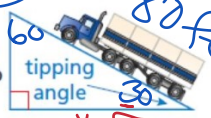
A tipping platform is a ramp used to unload trucks. How high is the end of an 80-foot ramp when the tipping angle is 30°? 45°?





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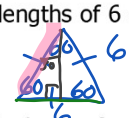
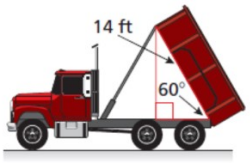
5. The logo on a recycling bin resembles an equilateral triangle with side lengths of 6 centimeters. Approximate the area of the logo.



6. The body of a dump truck is raised to empty a load of sand. How high is the 14-foot-long body from the frame when it is tipped upward by a 60° angle?



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