

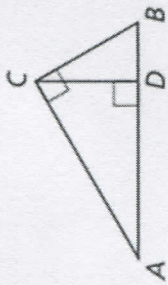
Lesson Title 9.2 Special Right Triangles NOTES

HGEO

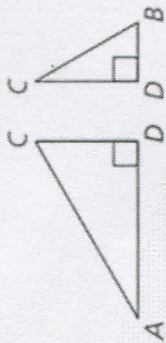
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OBJECTIVE 1: Right Triangle Similarity Theorem

If the altitude is drawn to the hypotenuse of a right triangle, then the two triangles formed are similar to the original triangle and to each other.



$\triangle CBD \sim \triangle ABC$, $\triangle ACD \sim \triangle ABC$,
and $\triangle CBD \sim \triangle ACD$.



OBJECTIVE 2: Geometric Mean

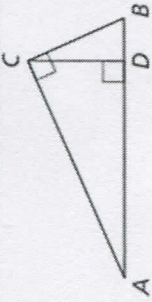
The geometric mean of two positive numbers a and b is the positive number x.

So,

1 $\circ \frac{a}{x} = \frac{x}{b}$

2 $\circ x^2 = ab$

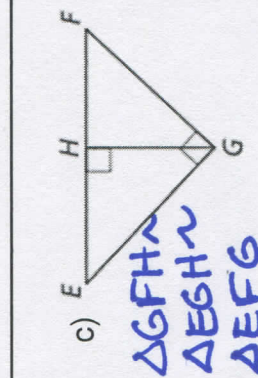
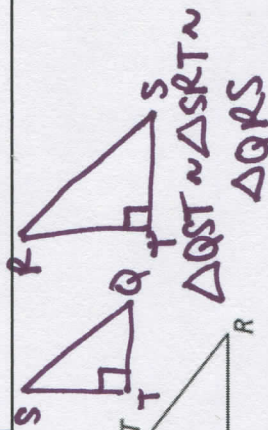
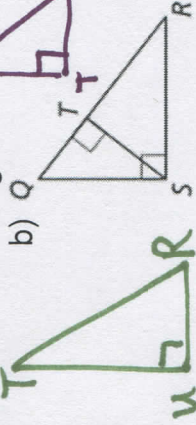
3 $\circ x = \sqrt{ab}$



TASK 1: Write the similarity statement for all three triangles.

- a) $\triangle TSU \sim \triangle RTU \sim \triangle RST$

b)



TASK 2: Find the geometric mean of the two numbers provided.

- a) 24 & 48

$x^2 = (24)(48) = 24\sqrt{2} \approx 33.9$

- c) 3 & 7

$x = \sqrt{(3)(7)} = \sqrt{21}$

②

- b) 8 & 10

$\frac{8}{x} = \frac{x}{10}$

$\sqrt{x} = \sqrt{80}$
 $x = \pm \sqrt{80} < 110$

$= 4\sqrt{5}$

③

Objective 2 continued...

$\frac{CD}{AD} = \frac{BD}{CD}$

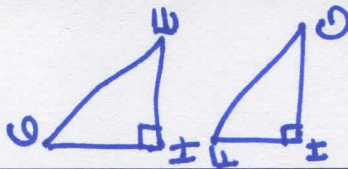
$\frac{CB}{DB} = \frac{AB}{CB}$

$CD^2 = AD \cdot BD$

$CB^2 = DB \cdot AB$

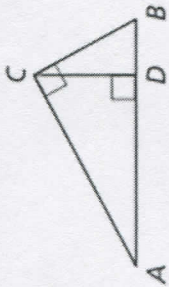
$\frac{AC}{AD} = \frac{AB}{AC}$

$AC^2 = AD \cdot AB$



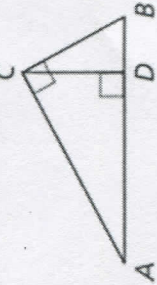
Objective 3: Geometric Mean Theorems

Altitude Theorem



$CD^2 = AD \cdot DB$

Leg Theorem

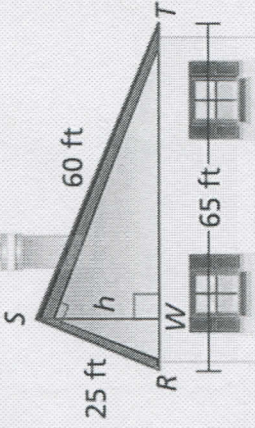


$CB^2 = DB \cdot AB$
 $AC^2 = AD \cdot AB$

OBJECTIVE 4: Real-World Application

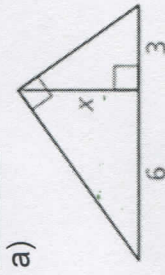
TASK 4:

a) A roof has a cross section that is a right triangle. The diagram shows the approximate dimensions of this cross section. Find the height h of the roof.



$\triangle RWS \sim \triangle SWT \sim \triangle RST$

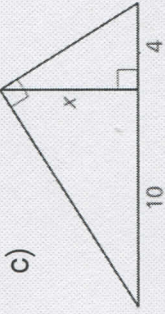
TASK 3: Find the value of each variable.



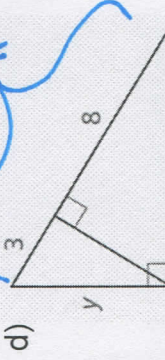
$x^2 = 6 \cdot 3$
 $x^2 = 18$
 $x = \pm \sqrt{18}$
 $x = 3\sqrt{2}$



$y = \sqrt{2 \cdot (5+2)}$
 $y = \sqrt{2 \cdot 7}$
 $y = \sqrt{14}$



$\frac{10}{x} = \frac{x}{4}$
 $x^2 = 40$
 $x = \sqrt{40}$
 $x = 2\sqrt{10}$



$y = \sqrt{3 \cdot (3+8)}$
 $y = \sqrt{3 \cdot 11}$
 $y = \sqrt{33}$

Task 4 continued...

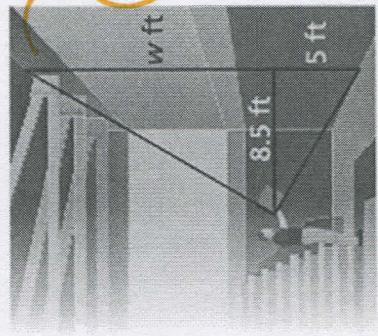
b) To find the cost of installing a rock wall in your school gym, you need to find the height of the gym wall. You use a cardboard square to line up the top and bottom of the gym wall. Your friend measures the vertical distance from the ground to your eye and the horizontal distance from you to the gym wall. Approximate the height of the gym wall.

Altitude Theorem

$8.5^2 = w \cdot 5$
 $72.25 = 5w$

$w = 14.45$

$h = w + 5$
 $h = 14.45 + 5$
 $h = 19.45 \text{ ft}$



Still need help with:

$\frac{SW}{RS} = \frac{ST}{RT}$
 $\frac{h}{25} = \frac{60}{65}$
 $65h = 1500$
 $h = \frac{300}{13}$
 $h \approx 23.1 \text{ ft}$

