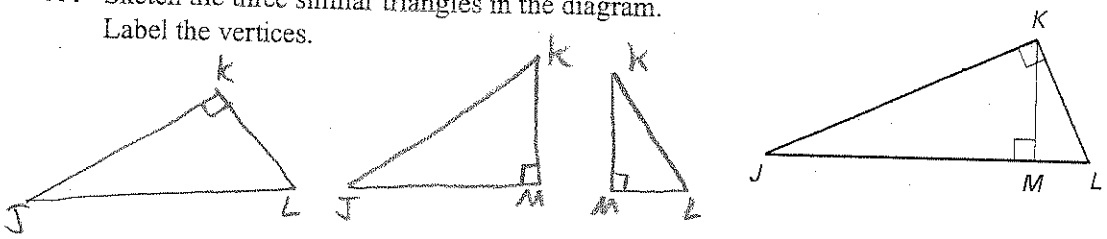
Adv. Geometry 7.3 - Similar Rt. Δ's

Key

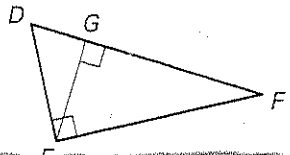
17. Sketch the three similar triangles in the diagram. Label the vertices.



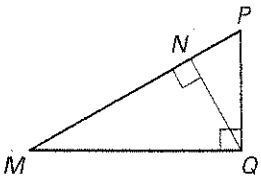
Write a similarity statement for the three similar triangles in the diagram. Then complete the proportion.

1. $\frac{DG}{EG} = \frac{?}{GF}$ GE

2. $\frac{MQ}{PQ} = \frac{MN}{?}$ NQ



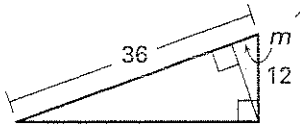
△DEG ~ △EFG ~ △DFE



△PMQ ~ △QMN ~ △PQN

Find the value of the variable.

4.

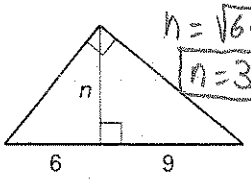


④ $12 = \sqrt{36 \cdot m}$

$144 = 36m$

$4 = m$

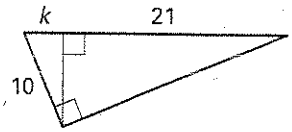
5.



$n = \sqrt{6 \cdot 9}$

$n = 3\sqrt{6}$

6.



⑥ $10 = \sqrt{k(k+21)}$

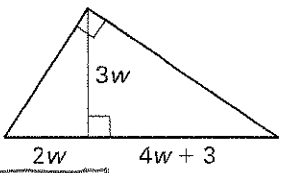
$100 = k^2 + 21k$

$0 = k^2 + 21k - 100$

$0 = (k+25)(k-4)$

$k = -25$ or $k = 4$

7.



$3w = \sqrt{(2w)(4w+3)}$

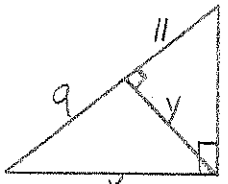
$9w^2 = 8w^2 + 6w$

$w^2 - 6w = 0$

$w(w-6) = 0$

$w \neq 0$, $w = 6$

8.

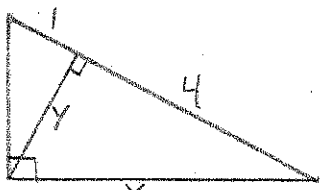


$y = \sqrt{9 \cdot 11} = 3\sqrt{11} = y$

$x = \sqrt{9 \cdot 20} = \sqrt{9 \cdot 4 \cdot 5}$

$x = 6\sqrt{5}$

9.

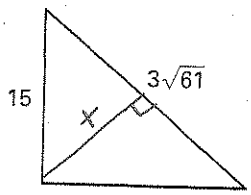


$y = \sqrt{1 \cdot 4} = 2 = y$

$x = \sqrt{4 \cdot 5} = 2\sqrt{5} = x$

Tell whether the triangle is a right triangle. If so, find the length of the altitude to the hypotenuse. Round decimal answers to the nearest tenth.

10.

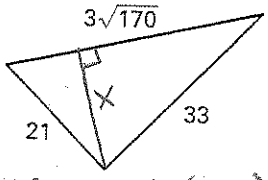


$15^2 + 18^2 \stackrel{?}{=} (3\sqrt{61})^2$ ✓

$\frac{x}{15} = \frac{18}{3\sqrt{61}}$

$x = 11.5$

11.

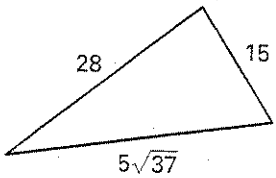


$21^2 + 33^2 \stackrel{?}{=} (3\sqrt{170})^2$ ✓

$\frac{x}{21} = \frac{33}{3\sqrt{170}}$

$x = 17.7$

12.

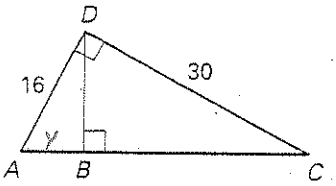


$15^2 + 28^2 \stackrel{?}{=} (5\sqrt{37})^2$

Not a right triangle

Use the Geometric Mean Theorems to find *AC* and *BD*.

13.



$16^2 + 30^2 = AC^2$

$\sqrt{1156} = \sqrt{AC^2}$

$34 = AC$

Let $AB = y$

$16 = \sqrt{y \cdot 34}$

$256 = 34y$

$\frac{256}{34} = y$

$\frac{128}{17} = y$

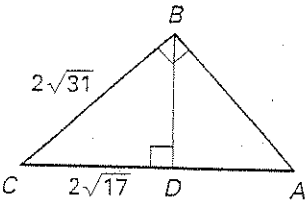
$DB^2 + \left(\frac{128}{17}\right)^2 = 16^2$ (256)

$DB^2 + \frac{16384}{289} = \frac{73984}{289}$

$DB^2 = \frac{57600}{289}$

$DB = \frac{240}{17}$

15.



$BD^2 + (2\sqrt{17})^2 = (2\sqrt{31})^2$

$BD^2 + 68 = 124$

$BD^2 = 56$

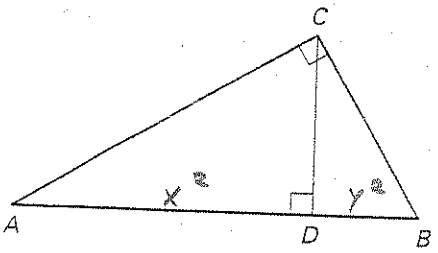
$BD = 2\sqrt{14}$

$2\sqrt{31} = \sqrt{(2\sqrt{17})AC}$

$\frac{124}{2\sqrt{17}} = \frac{(2\sqrt{17})AC}{2\sqrt{17}}$

$\frac{62}{\sqrt{17}} = AC = \frac{62\sqrt{17}}{17}$

18. If $AD = x^2$ and $BD = y^2$, use the Geometric Mean Theorems to find AC, BC, and CD in terms of x and y.



$CD = \sqrt{x^2 \cdot y^2} = \sqrt{x^2} \cdot \sqrt{y^2} = xy = CD$

$AC = \sqrt{x^2(x^2+y^2)} = \sqrt{x^2} \cdot \sqrt{x^2+y^2}$

$AC = x\sqrt{x^2+y^2}$

$BC = \sqrt{y^2(x^2+y^2)} = y\sqrt{x^2+y^2} = BC$