Honors Geometry
8-1 to 8-3 Worksheet

Name Key

Be sure to give exact answers for each final answer – no decimals!

Simplify:

1. $\sqrt{20}$ → $2\sqrt{5}$

2. $2\sqrt{8}$ → $4\sqrt{2}$

3. $\sqrt{\frac{5}{9}}$ → $\frac{\sqrt{5}}{3}$

4. $\sqrt{\frac{3}{10}}$ → $\frac{\sqrt{3}}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{\sqrt{30}}{10}$

Find the geometric mean of:

5. $\frac{1}{2}$ and $\frac{2}{5}$ → $x = \frac{\sqrt{5}}{5}$

$\frac{\frac{1}{2}}{x} = \frac{x}{\frac{2}{5}}$ $\quad x^2 = \frac{2}{10} = \frac{1}{5}$

$x = \frac{\sqrt{2}}{\sqrt{10}} \cdot \frac{\sqrt{10}}{\sqrt{10}} = \frac{2\sqrt{5}}{10} = \frac{\sqrt{5}}{5}$

6. 16 and 27 → $x = 12\sqrt{3}$

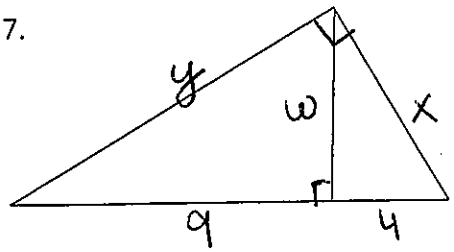
$\frac{16}{x} = \frac{x}{27}$ $\quad x^2 = 16 \cdot 27$

$x = \sqrt{16 \cdot 27}$

$x = \sqrt{16 \cdot 9 \cdot 3}$

Find the value of each variable.

7.

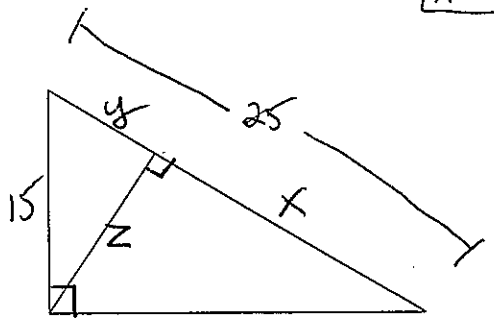


$\frac{4}{x} = \frac{x}{13}$ → $x^2 = 52$ → $x = 2\sqrt{13}$

$\frac{9}{y} = \frac{y}{13}$ → $y^2 = 9 \cdot 13$ → $y = 3\sqrt{13}$

$\frac{4}{w} = \frac{w}{9}$ → $w^2 = 4 \cdot 9$ → $w = 6$

8.

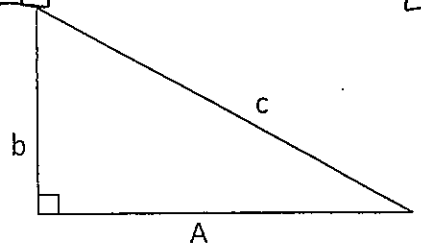


$\frac{x}{15} = \frac{15}{25}$ → $25x = 15^2$ → $25x = 225$ → $x = 9$

$x = 25 - 9$ → $x = 16$

$\frac{9}{z} = \frac{z}{16}$ → $z^2 = 9 \cdot 16$ → $z = 12$

For #9-10, use the diagram to the right.



9. If a=6 and b=3, find the value of c.

$6^2 + 3^2 = c^2$ $\quad 36 + 9 = 45 = c^2$ → $3\sqrt{5} = c$

10. If $b=\sqrt{17}$ and c=9, find the value of a.

$9^2 = \sqrt{17}^2 + a^2$

$81 = 17 + a^2$ → $8 = a$

$64 = a^2$

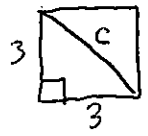
Determine whether the following triangles are acute, obtuse, or right given the lengths of three sides of the triangle.

11. 7, 8, 10 inches $10^2 \square 8^2 + 7^2$; $100 \square 64 + 49$; $100 < 113$ Acute

12. 8, $8\sqrt{3}$, 16 inches $16^2 \square 8^2 + (8\sqrt{3})^2$; $256 \square 64 + 64 \cdot 3$; $256 = 256$ Right

13. 3, 5, 7 inches $7^2 \square 5^2 + 3^2$; $49 \square 25 + 9$; $49 > 34$ obtuse

14. If the length of the side of a square is 3, what is the length of a diagonal?

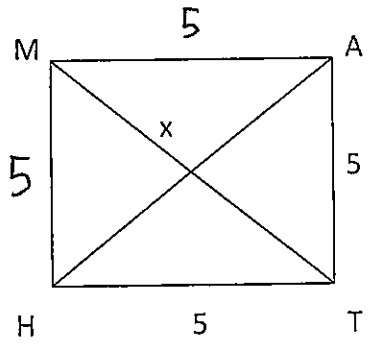


$3^2 + 3^2 = c^2$

$2(3)^2 = c^2$

$3\sqrt{2} = c$

15. Find the value of x in square MATH.



$5^2 + 5^2 = (2x)^2$

$25 + 25 = 4x^2$

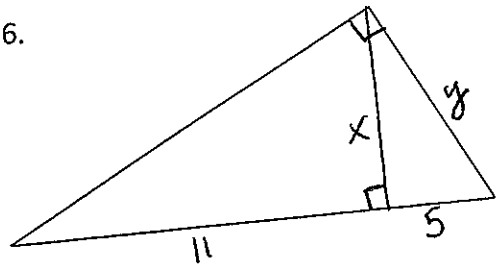
$50 = 4x^2$

$\frac{25}{2} = x^2$

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

Find the value of the missing variable(s).

16.

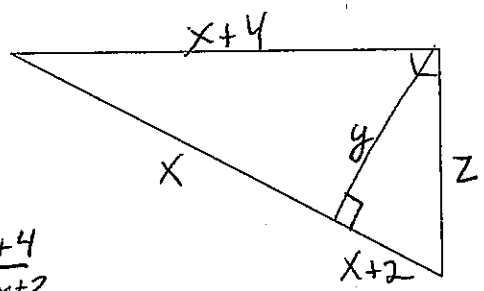


$\frac{11}{x} = \frac{x}{5}$ $\frac{5}{y} = \frac{y}{16}$

$y^2 = 5 \cdot 16$

$x = \sqrt{55}$ $y = 4\sqrt{5}$

17.



$\frac{x}{x+4} = \frac{x+4}{2x+2}$

$2x^2 + 2x = x^2 + 8x + 16$

$x^2 - 6x - 16 = 0$

$(x-8)(x+2) = 0$

$x = 8$ $y = 4\sqrt{5}$ $z = 6\sqrt{5}$

$\frac{10}{z} = \frac{z}{18}$

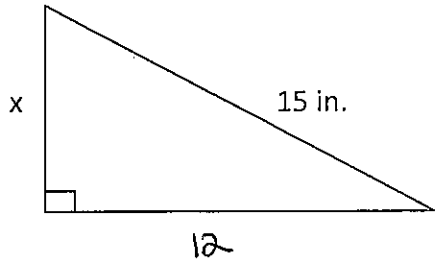
$180 = z^2$

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

$y^2 = 80$

$y = \sqrt{80}$

18.



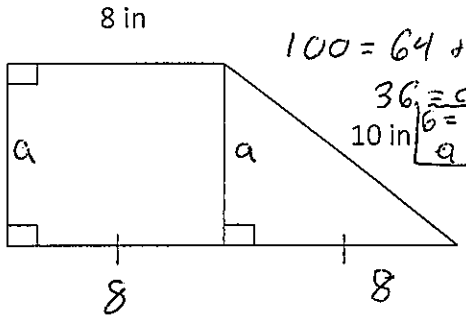
$x^2 + 12^2 = 15^2$

$x^2 + 144 = 225$

$x^2 = 81$

$x = 9$

19.



$10^2 = 8^2 + a^2$

$100 = 64 + a^2$

$36 = a^2$

$6 = a$

$a = 6$

Simplify:

20. $5\sqrt{27} + 2\sqrt{108}$

$15\sqrt{3} + 12\sqrt{3}$

$27\sqrt{3}$

21. $5\sqrt{6} \cdot 3\sqrt{3}$

$15\sqrt{18}$

$45\sqrt{2}$

22. $\sqrt{180}$

$6\sqrt{5}$

23. $\frac{4\sqrt{2}}{5\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{4\sqrt{10}}{25}$