8.1-8.6 Intervention Acc Geometry

Find the geometric mean between the two numbers.

1. $\frac{2\sqrt{2}}{5}$ and $\frac{3\sqrt{2}}{5}$

2. 3 and 24

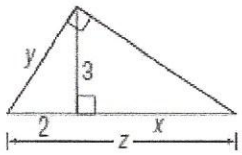
The geometric mean and one extreme are given. Find the other extreme.

3. $\sqrt{24}$ is the geometric mean between a and b. Find b if $a = 2$.

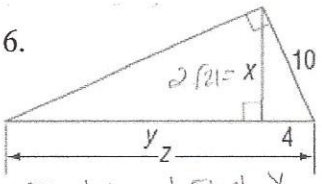
4. $\sqrt{12}$ is the geometric mean between a and b. Find b if $a = 3$.

Use EXACT values for #5-18 to find EACH variable. For #19-24 round to nearest tenth

5.



6.



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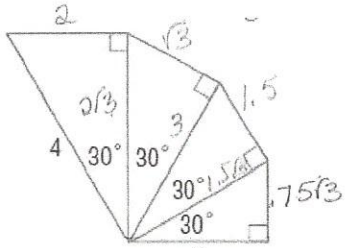

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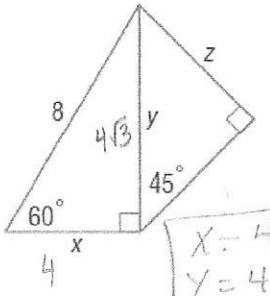

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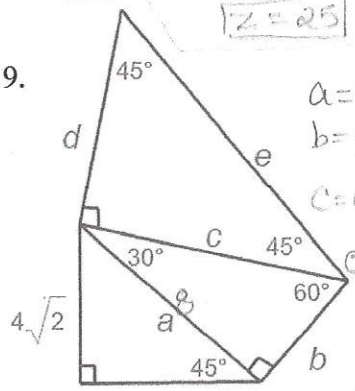
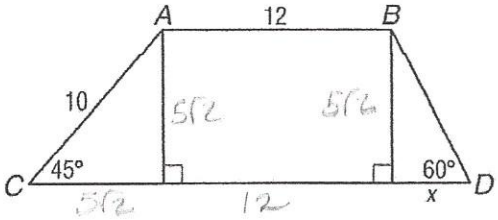
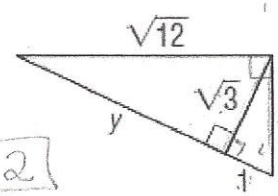


10.



11.



$x = 2$

$(\sqrt{3})^2 + 1^2 = x^2$

$3 + 1 = x^2$

$4 = x^2$

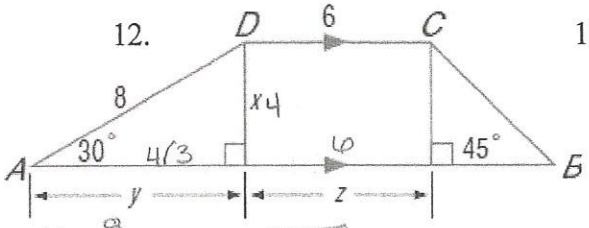
$2 = x$

$\frac{\sqrt{3}}{y} = \frac{1}{\sqrt{3}}$

$(\sqrt{3})^2 = y$

$3 = y$

12.



$x = \frac{8}{2}$

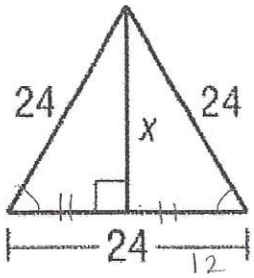
$x = 4$

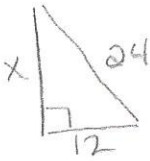
$y = x\sqrt{3}$

$y = 4\sqrt{3}$

$z = 6$

13.



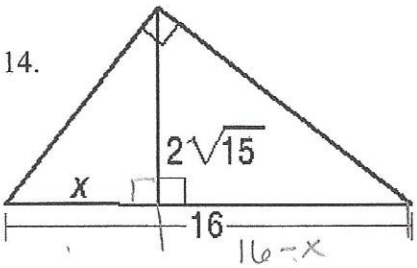


$12^2 + x^2 = 24^2$

$x^2 = 432$

$x = 12\sqrt{3}$

14.



$\frac{2\sqrt{15}}{x} = \frac{16 - x}{2\sqrt{15}}$

$4 \cdot 15 = 16x - x^2$

$60 = 16x - x^2$

$x^2 - 16x + 60 = 0$

$(x - 6)(x - 10) = 0$

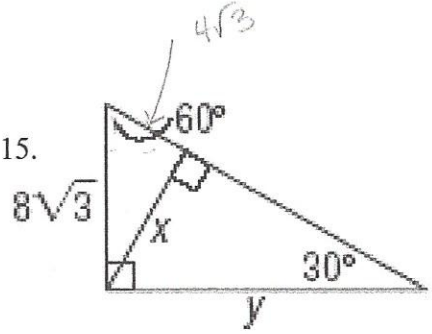
$x - 6 = 0$

$x = 6$

$x - 10 = 0$

$x = 10$

15.



$x = (4\sqrt{3})\sqrt{3}$

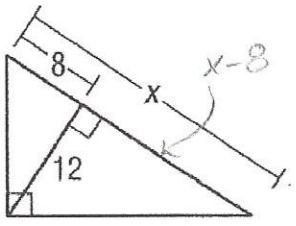
$x = 4 \cdot 3$

$x = 12$

$y = 2(12)$

$y = 24$

16.



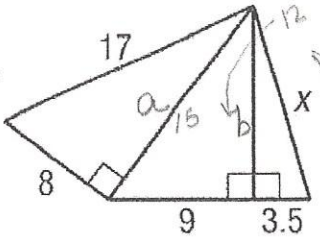
$\frac{12}{x-8} = \frac{8}{12}$

$144 = 8x - 64$

$208 = 8x$

$26 = x$

17.



NO GCD mean b/c NOT the RT width, drop.

$8^2 + a^2 = 17^2$

$a^2 = 225$

$a = 15$

$a^2 + b^2 = 15^2$

$b^2 = 144$

$b = 12$

Find x

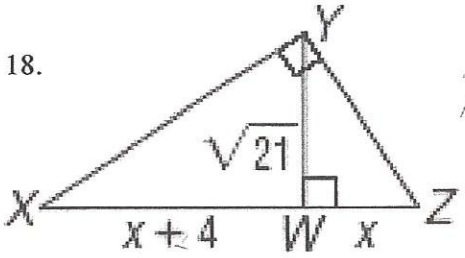
$12^2 + 3.5^2 = x^2$

$\sqrt{156.25} = \sqrt{x^2}$

$x = \sqrt{156.25}$

$x = 12.5$

18.



$\frac{\sqrt{21}}{x+4} = \frac{x}{\sqrt{21}}$

$(\sqrt{21})^2 = x(x+4)$

$21 = x^2 + 4x$

$0 = x^2 + 4x - 21$

$0 = (x - 3)(x + 7)$

$x - 3 = 0$

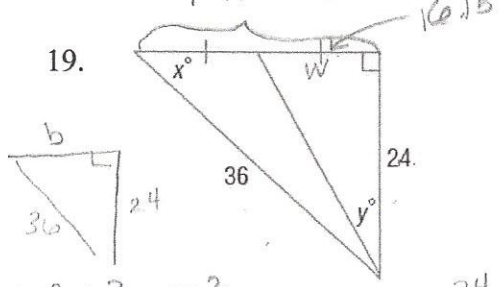
$x = 3$

$x + 7 = 0$

$x = -7$

can't be neg. distance

19.



$24^2 + b^2 = 36^2$

$b^2 = 720$

$b = 12\sqrt{5}$

$w = 6\sqrt{5}$

$\sin x = \frac{24}{36}$

$x = \sin^{-1}\left(\frac{24}{36}\right)$

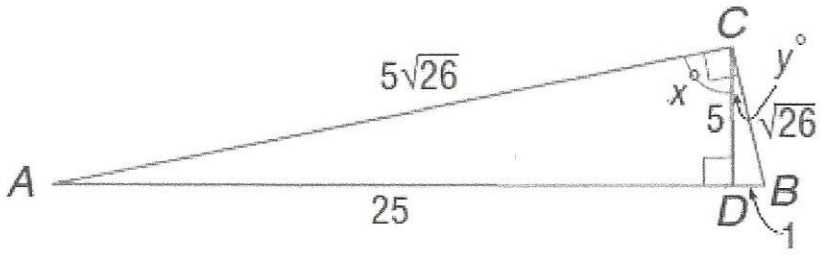
$x \approx 41.8°$

$\tan y = \frac{6\sqrt{5}}{24}$

$y = \tan^{-1}\left(\frac{6\sqrt{5}}{24}\right)$

$y \approx 29.8°$

20.



$\tan x = \frac{25}{5}$

$x = \tan^{-1}\left(\frac{25}{5}\right)$

$x \approx 78.7°$

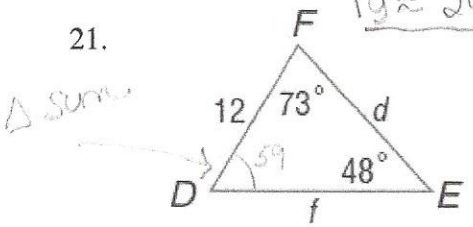
$\tan y = \frac{1}{5}$

$y = \tan^{-1}\left(\frac{1}{5}\right)$

$y = 11.3°$

Ask your self if this makes sense.

21.



△ sum

$\frac{\sin 59}{d} = \frac{\sin 48}{12}$

$\frac{12 \sin 59}{\sin 48} = d$

$13.8 \approx d$

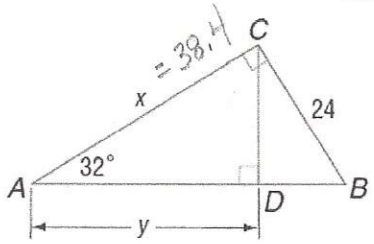
$\frac{\sin 73}{f} = \frac{\sin 48}{12}$

$12 \sin 73 = f$

$\sin 48$

$15.4 \approx f$

22.



Find x

$\tan 32 = \frac{24}{x}$

$x = \frac{24}{\tan 32}$

$x \approx 38.4$

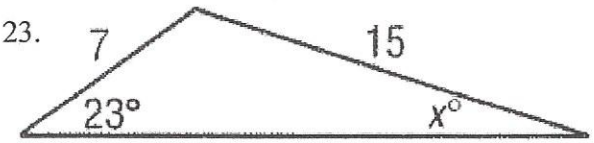
Find y

$\cos 32 = \frac{y}{38.4}$

$38.4 \cdot \cos 32 = y$

$32.6 \approx y$

23.



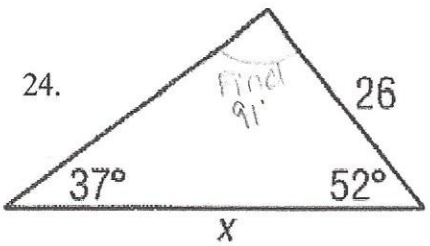
$\frac{\sin x}{7} = \frac{\sin 23}{15}$

$\sin x = \frac{7 \cdot \sin 23}{15}$

$x = \sin^{-1}\left(\frac{7 \cdot \sin 23}{15}\right)$

$x \approx 10.5°$

24.

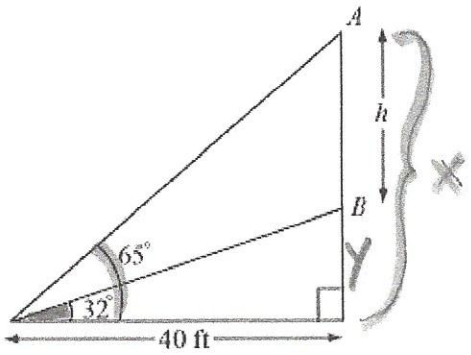


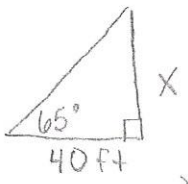
$\frac{\sin 91}{x} = \frac{\sin 37}{26}$

$x = \frac{26 \cdot \sin 91}{\sin 37}$

$x \approx 43.2$

25. In the figure below, A and B represent the top and the bottom of a large balloon floating directly above the street. Arnold is standing 40 feet from a point on the street directly beneath the balloon. Find the height h of the balloon.





$\tan 65 = \frac{x}{40}$

$x \approx 85.8\text{ft}$

$\tan 32 = \frac{y}{40}$

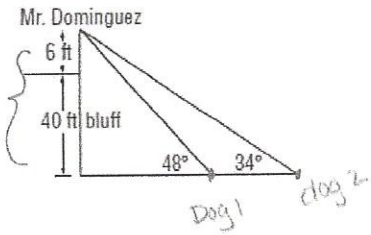
$y \approx 25\text{ft}$

$x - y = h$

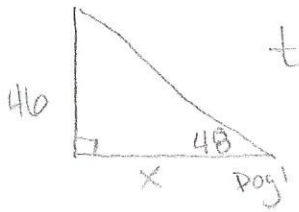
$85.8 - 25 = h$

$h = 60.8\text{ft}$

26. **INDIRECT MEASUREMENT** Mr. Dominguez is standing on a 40-foot ocean bluff near his home. He can see his two dogs on the beach below. If his line of sight is 6 feet above the ground and the angles of depression to his dogs are 34° and 48°, how far apart are the dogs to the nearest foot?



46



$\tan 48 = \frac{46}{x}$

$x \approx 41.4\text{ft}$

$\tan 34 = \frac{46}{y}$

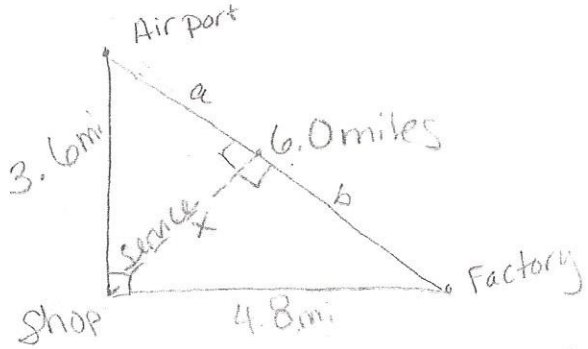
$y \approx 68.2\text{ft}$

$y - x$

$68.2 - 41.4$

The dogs are 27ft away

27. **CIVIL ENGINEERING** An airport, a factory, and a shopping center are at the vertices of a right triangle formed by three highways. The airport and factory are 6.0 miles apart. Their distances from the shopping center are 3.6 miles and 4.8 miles, respectively. A service road will be constructed from the shopping center to the highway that connects the airport and factory. What is the shortest possible length for the service road? Round to the nearest hundredth.



$\frac{3.6}{a} = \frac{6.0}{3.6}$

$a = 2.16$

$b = 3.84$

$\frac{6.0}{\text{Hypt.}}, \frac{3.6, 4.8}{\text{Legs}}$

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

$\frac{x}{2.16} = \frac{3.84}{x}$

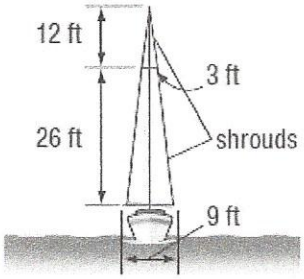
$x^2 = 8.2944$

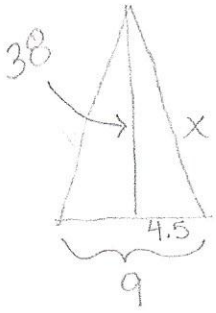
$x = \sqrt{8.2944}$

$x = 2.88\text{miles}$

This is ok because we started with decimals.

28. **SAILING** The mast of a sailboat is supported by wires called *shrouds*. What is the total length of wire needed to form these shrouds?



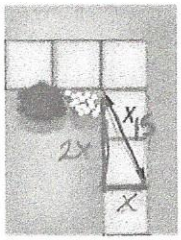


$x = \sqrt{1464.25}$ ← No exact value b/c we started w/ a decimal.

$2x = 2\sqrt{1464.25}$

Total wire needed is about 76.53 ft

29. **LANDSCAPING** Six congruent square stones are arranged in an L-shaped walkway through a garden. If $x = 15$ inches, then find the area of the L-shaped walkway.



x is one side of square

$(2x)^2 + x^2 = 15^2$

$4x^2 + x^2 = 225$

$5x^2 = 225$

$x^2 = 45$

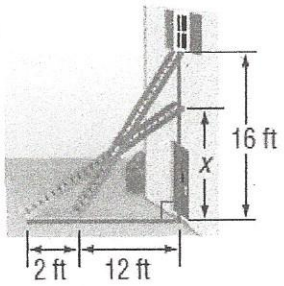
$x = 3\sqrt{5}$

$6A = 6(l \cdot h) = 6(3\sqrt{5} \cdot 3\sqrt{5})$

$= 6 \cdot 9 \cdot 5$

$A = 270 \text{ in}^2$

30. **PAINTING** A painter sets a ladder up to reach the bottom of a second-story window 16 feet above the ground. The base of the ladder is 12 feet from the house. While the painter mixes the paint, a neighbor's dog bumps the ladder, which moves the base 2 feet farther away from the house. How far up the side of the house does the ladder reach?



(1)

Ladder = 20 ft

$12^2 + 16^2 = L^2$

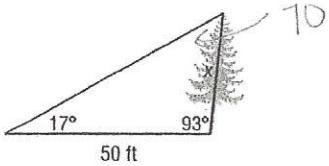
$400 = L^2$

$14^2 + x^2 = 20^2$

$x^2 = 204$

$x = 2\sqrt{51}$ ft

31. A tree grew at a 3° slant from the vertical. At a point 50 feet from the tree, the angle of elevation to the top of the tree is 17°. Find the length of the tree to the nearest tenth of a foot.



Not a Right △ use Law of Sines.

$\frac{\sin 17}{x} = \frac{\sin 70}{50}$

$\frac{50 \cdot \sin 17}{\sin 70} = x$

$15.6 \text{ ft} = x$

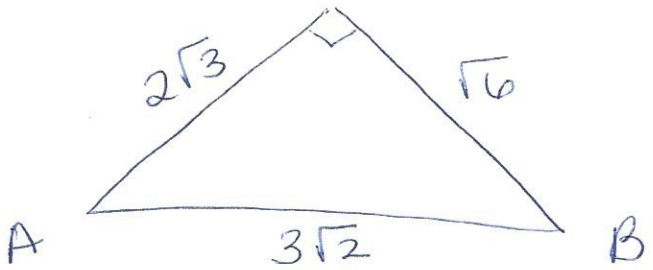
32. Do lengths 3, 4, 6 make a right $\triangle$? why or why not?

$3^2+4^2 \neq 6^2$

$25 \neq 36$

NO, because does not follow Pythagorean theorem

33. Find Sin, COS, & tan of $\angle A$ and $\angle B$.



$\sin\angle A = \frac{\sqrt{3}}{3}$

$\cos\angle A = \frac{\sqrt{6}}{3}$

$\tan\angle A = \frac{\sqrt{2}}{2}$

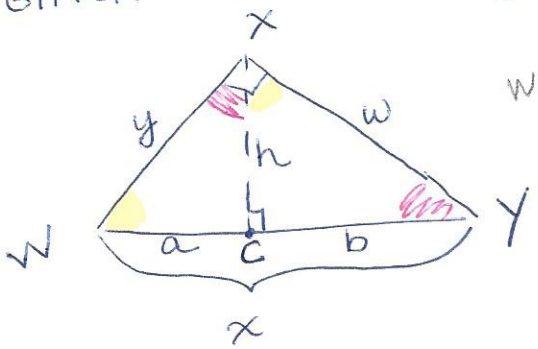
$\sin\angle B = \frac{\sqrt{6}}{3}$

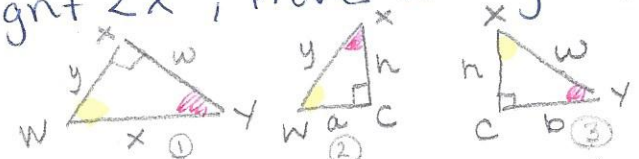
$\cos\angle B = \frac{\sqrt{3}}{3}$

$\tan\angle B = \sqrt{2}$

34. Write a proof of

Given $\triangle WXY$ w/ right $\angle X$, Prove $w^2+y^2=x^2$





$\triangle WXY \sim \triangle WCX \sim \triangle XCY$

① w ③ ①+②

$\frac{XY}{CY} = \frac{WY}{XY}$ $\frac{w}{b} = \frac{x}{w}$ $\frac{XW}{WC} = \frac{WY}{XW}$ $\frac{y}{a} = \frac{x}{y}$

$y^2 = ax$

$w^2 = xb$

$w^2+y^2 = xb+ax \Rightarrow w^2+y^2 = x(b+a) \Rightarrow$

$\boxed{w^2+y^2=x^2}$

35. In the figure, $\sin\theta = \frac{16}{20}$. Find $\cos\theta$ & $\tan\theta$.

multi step questions like this show up on Quizzes + tests!

You will not be given anything other than this $\triangle$

if $\sin\theta = \frac{opp.}{hyp.} = \frac{16}{20}$

Find missing side w/ Pyth. thm.

$16^2+x^2=20^2$ $x=12$

$\boxed{\cos\theta = \frac{12}{20} = \frac{3}{5}}$ $\boxed{\tan\theta = \frac{16}{12} = \frac{4}{3}}$