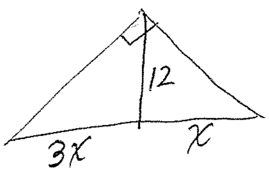
Geometry (H) Name: KEY

Section – More Problems - Review #2

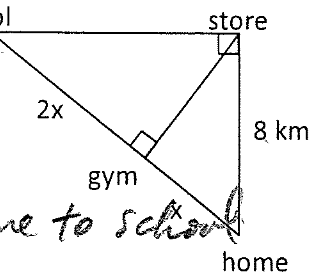
1. A 12 cm long altitude of a right triangle divides the hypotenuse into two segments, one three times as long as the other. How long is the hypotenuse?



$\frac{3x}{12} = \frac{12}{x}$ $x^2 = 48$ hyp $= 4x$

$3x^2 = 144$ $x = 4\sqrt{3}$ $= 16\sqrt{3}$

2. How far is it from home, past the gym, to school?



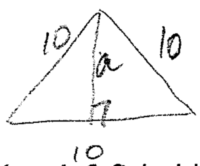
(find hyp)

$\frac{x}{8} = \frac{8}{3x}$ $x = \frac{8}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{8\sqrt{3}}{3}$

$3x^2 = 64$

$x^2 = \frac{64}{3}$ $3 \cdot \frac{8\sqrt{3}}{3} = 8\sqrt{3}$ home to school

3. Find the altitude of an equilateral triangle with side length ten.

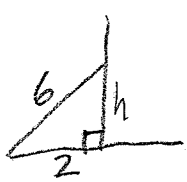


$5^2 + a^2 = 10^2$

$a^2 = 75$

$a = 5\sqrt{3}$

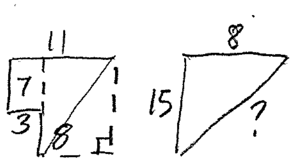
4. A 6 ft ladder is placed against a wall with its base 2 ft from the wall. How high above the ground is the top of the ladder?



$2^2 + h^2 = 6^2$ $h = 4\sqrt{2}$

$h^2 = 32$

5. A person travels 8 mi due north, 3 mi due west, 7 mi due north and 11 mi due east. How far is that person from the starting point?

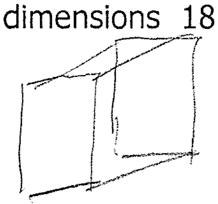


$15^2 + 8^2 = D^2$

$225 + 64 = D^2$

$17 = D$ 17 miles

6. Will a fishing rod that collapses to a length of 80 cm fit into a suitcase with dimensions 18 cm x 46 cm x 66 cm?



$d = \sqrt{18^2 + 46^2 + 66^2}$ Yes, it will!

$\sqrt{324 + 2116 + 4356}$ $d > 80$ cm.

$\sqrt{6796} \approx 82.437$

7. Classify each triangle with the given side lengths as acute, right or obtuse.

a. $\sqrt{3}, \sqrt{2}, \sqrt{5}$

$\sqrt{3}^2 + \sqrt{2}^2 \quad \sqrt{5}^2$

$3 + 2 = 5$

Right Δ

b. $\frac{3}{5}, \frac{4}{5}, 1$

$\left(\frac{3}{5}\right)^2 + \left(\frac{4}{5}\right)^2 \quad 1^2$

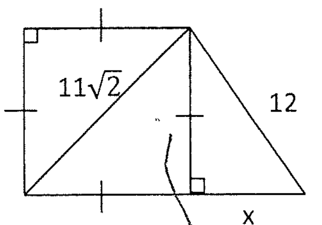
$\frac{9}{25} + \frac{16}{25}$

$\frac{25}{25} = 1$

Right Δ

8. Find x.

a.



$2x^2 = (11\sqrt{2})^2$

$2x^2 = 121(2)$

$x^2 = 121$

$x = 11$

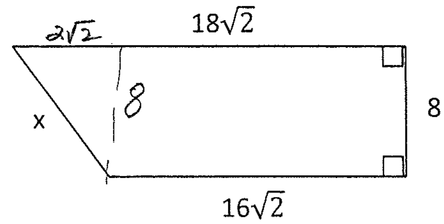
$11^2 + x^2 = 12^2$

$121 + x^2 = 144$

$x^2 = 23$

$x = \sqrt{23}$

b.



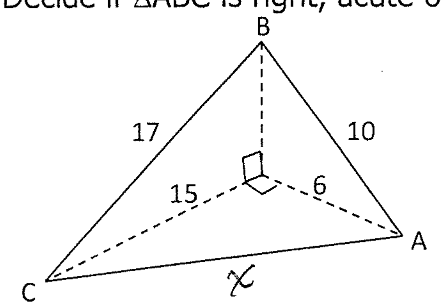
$8^2 + (2\sqrt{2})^2 = x^2$

$64 + 4(2) = x^2$

$\sqrt{72} = x$

$6\sqrt{2} = x$

9. Decide if ΔABC is right, acute or obtuse. Explain.



$6^2 + 15^2 = x^2$

$36 + 225 = x^2$

$\sqrt{261} = x$

$3\sqrt{29} = x$

$16.2 \approx x$

$\sqrt{261}^2 + 10^2 \quad 17^2$

$261 + 100 \quad 289$

$361 > 289$

$a^2 + b^2 > c^2$

ΔABC is acute b/c $a^2 + b^2 > c^2$.

10. The shortest side of a triangle has length 14. The other two sides have lengths x + 1 and x + 3. Find the value of x that would make the triangle a right triangle an give the lengths of each side.

$\underbrace{x+3}_{\text{largest}}, x+1, 14$

$(x+1)^2 + 14^2 = (x+3)^2$

$x^2 + 2x + 1 + 196 = x^2 + 6x + 9$

$188 = 4x$

$47 = x$

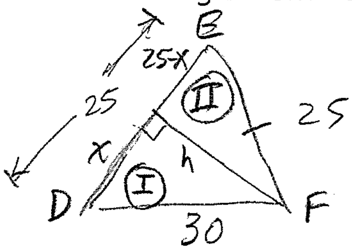
ck

14, 48, 50

$14^2 + 48^2 = 50^2$

$2500 = 2500$ ✓

11. In isosceles $\triangle DEF$, $DE = EF = 25$ and $DF = 30$. Find the length of the altitude of the triangle from vertex F.



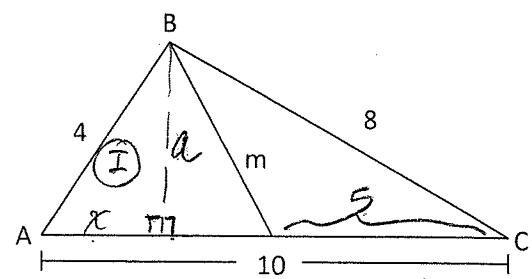
$$\text{I} \quad x^2 + h^2 = 30^2$$
$$h^2 = 900 - x^2$$

$$\text{II} \quad (25-x)^2 + h^2 = 25^2$$
$$625 - 50x + x^2 + 900 - x^2 = 625$$
$$900 = 50x$$
$$18 = x$$

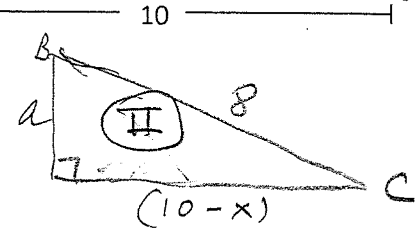
$$h^2 = 900 - 18^2$$
$$h^2 = 576$$

altitude $\rightarrow$ $h = 24$

12. Find the length, of the median m of the triangle below. (Hint: Draw the altitude of the triangle from B.



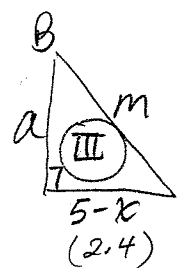
$$\text{I} \quad x^2 + a^2 = 4^2$$
$$a^2 = 16 - x^2$$



$$\text{II} \quad a^2 + (10-x)^2 = 8^2$$
$$a^2 = 64 - (100 - 20x + x^2)$$
$$a^2 = 64 - 100 + 20x - x^2$$

$$a_{I}^2 = a_{II}^2$$
$$16 - x^2 = -36 + 20x - x^2$$
$$x = 2.6$$

$$\text{I} \quad (2.6)^2 + a^2 = 4^2$$
$$a = \sqrt{9.24}$$



$$\text{III} \quad 9.24 + 2.4^2 = m^2$$
$$15 = m^2$$
$$\sqrt{15} = m$$