Name: Date: Per:

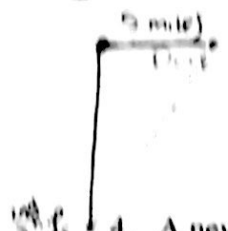
UNIT WK #4 ***Applications of the Pythagorean Theorem***

Directions: For each problem, **first draw a picture** if one is not provided and then solve the problem.

1. What is the length of the diagonal of a rectangle of side lengths 1 inch and 4 inches?

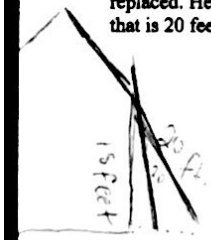
2. A square has a diagonal with a length of $2\sqrt{2}$ inches. What is the side length of the square?

3. Two ships leave a dock. The first ship travels 6 miles east and then 8 miles north and anchors for the night. The second ship travels 5 miles west and then 12 miles south and anchors for the night. How far are each of the ships from the dock when they anchor for the night?



4. A new restaurant is putting in a wheelchair ramp. The landing that people enter the restaurant from is 2 feet higher than street level. Safety standards require that for every 1 foot of rise on a wheelchair ramp there must be a run of 12 feet. How long will the ramp have to be to meet safety standards? Round your answer to the nearest tenth.

5. Ray is a contractor that needs to access his client's roof in order to assess whether the roof needs to be replaced. He sees that he can access a portion of the roof that is 15 feet from the ground. He has a ladder that is 20 feet long.



$a^2+15^2=20^2$

$a^2+225=460$

$-225\ \ -225$

$\sqrt{a^2}\ \sqrt{175}$

a. How far from the base of the house should Ray place the ladder so that it just hits the top of the roof? Round your answer to the nearest tenth of a foot.

13.2 feet away

b. How far should he place the ladder from the base of the house if he wants it to sit 3 feet higher than the top of the roof? Round your answer to the nearest tenth of a foot.

$a^2+15^2=17^2$

$a^2+225=289$

$-225\ \ -225$

$\sqrt{a^2}=\sqrt{64}$

a = 8 feet

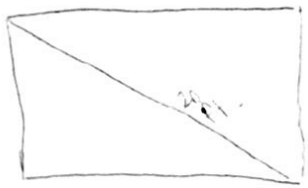
6. Melanie is having a rectangular-shaped patio built in her backyard. It is very important to Melanie that the corners of the patio are right angles. The contractor built a patio with a width of 10 feet and a length of 15 feet. The diagonal measures 20 feet. Does the patio have the right angles that Melanie requested?

$15^2+10^2=20^2$

$225+100=400$

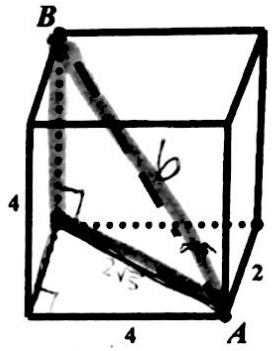
$325=400$

15 ft



No it does not

7. A spider has taken up residence in a small cardboard box which measures 2 inches by 4 inches by 4 inches. What is the length, in inches, of a straight spider web that will carry the spider from the lower right front corner of the box to the upper left back corner of the box?



The drawing can't show the right angle created but the blue triangle BAH we know it is. How can I get the length of that hypotenuse? Find the Red triangles hypotenuse 1st

$4^2+2^2=c^2$

$16+4=c^2$

$\sqrt{20}=\sqrt{c^2}$

$2\sqrt{5}=c$

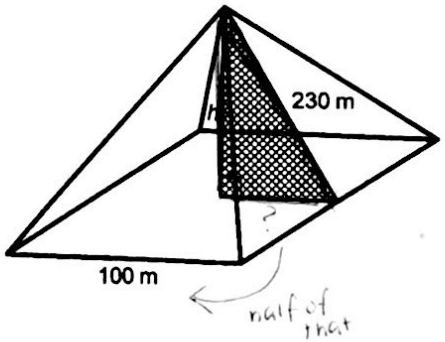
$(2\sqrt{5})^2+4^2=x^2$

$20+16=x^2$

$\sqrt{36}=\sqrt{x^2}$

6 = x inches for the spider's web

8. In the movie Despicable Me, an inflatable model of The Great Pyramid of Giza in Egypt was created by Vector to trick people into thinking that the actual pyramid had not been stolen. When inflated, the false Great Pyramid had a square base of side length 100 m. and the height of one of the side triangles was 230 meters. This is also called the slant height of the pyramid. What is the volume of gas that was used to fully inflate the fake Pyramid? (Hint: Recall the formula for the volume of a pyramid is $\frac{1}{3}Bh$ where B is the area of the base and h is the height of the pyramid (the distance from the base to the apex).



$h^2+50^2=230^2$

$h^2+2500=52900$

$\sqrt{h^2}=\sqrt{50400}$

$\sqrt{100}\ \sqrt{504}$

$\sqrt{4}\ \sqrt{126}$

$2\sqrt{126}$

$h = 20\sqrt{126}$

$V=\frac{1}{3}BH$

$V=\frac{1}{3}(100)(100)(20\sqrt{126})$

$V=748331.5\ m^3$