Math 5C: Homework 14
Homework #14 is due January 27.

Square-Root

The square-root of a is a number whose square is equal to a. For example: the square-root of 25 is 5 because $5^2 = 25$. Notation: square-root of a number, a, is commonly denoted as $\sqrt{a}$.
Similarly tob^n $(ab)^n = a^n b^n$,$\sqrt{ab} = \sqrt{a}\sqrt{b}$.
For example, $\sqrt{36} = \sqrt{9 \times 4} = \sqrt{9} \times \sqrt{4} = 3 \times 2 = 6$. And we also know that $\sqrt{36} = 6$.

Theorem (Pythagorean theorem). In a right triangle with legs a, b and hypotenuse c, one has:

$$a^2 + b^2 = c^2$$

$$c = \sqrt{a^2 + b^2}$$

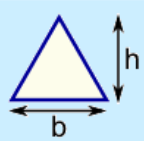
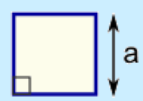
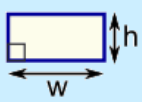
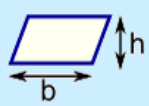
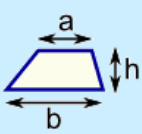
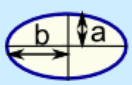
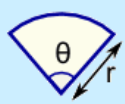
For example, in a square with side 1, the diagonal has length $\sqrt{2}$.

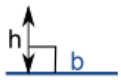
It is possible – but not easy – to find a right triangle where all the sides are whole numbers. The easiest such triangle is one with a,b,c = 3,4,5.

For more info on areas please go to http://www.mathsisfun.com/area.html

Area of Plane Shapes

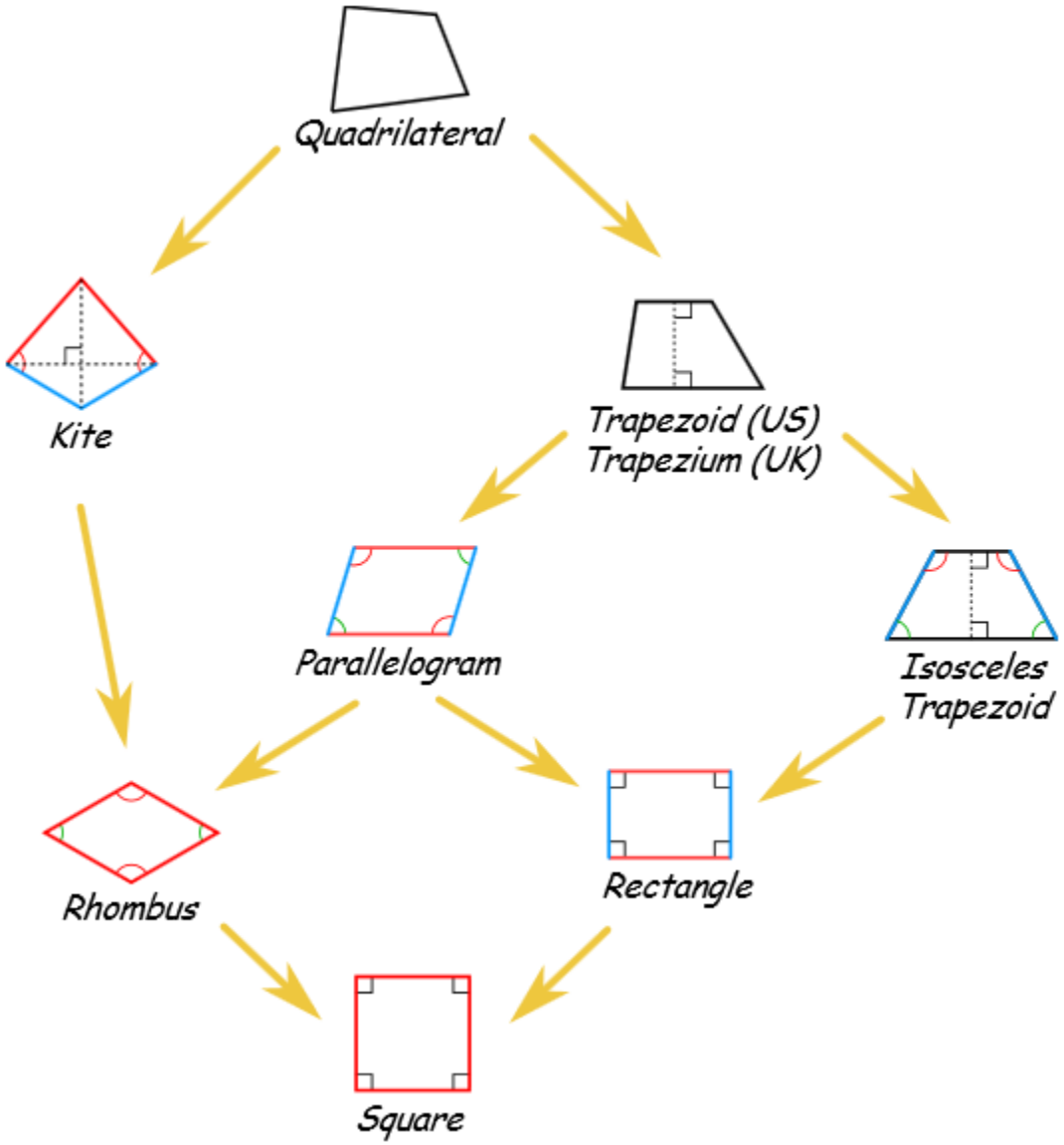
Area is the size of a surface!
Learn more about Area, or try the Area Calculator.

	Triangle Area = ½ × b × h b = base h = vertical height		Square Area = a^2 a = length of side
	Rectangle Area = w × h w = width h = height		Parallelogram Area = b × h b = base h = vertical height
	Trapezoid (US) Trapezium (UK) Area = ½(a+b) × h h = vertical height		Circle Area = π × r^2 Circumference = 2 × π × r r = radius
	Ellipse Area = πab		Sector Area = ½ × r^2 × θ r = radius θ = angle in **radians**

Note: **h** is at right angles to **b:** 

Quadrilaterals "family tree" flowchart

(for more info please visit https://www.mathsisfun.com/quadrilaterals.html)



Homework

1. Find the following square-roots: If you cannot find the number exactly, at least say between which two whole numbers the answer is (e.g. between 5 and 6)
   (a) $\sqrt{49}$

   (b) $\sqrt{169}$

   (c) $\sqrt{225}$

   (d) $\sqrt{121}$

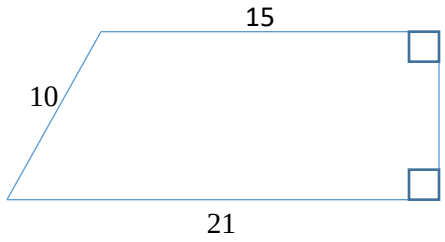
   (e) $\sqrt{64}$

   (f) $\sqrt{8}$

2. Can you find a right triangle where all sides are whole numbers and the hypotenuse is 13?

3. If, in a right triangle, one leg has length 1 and the hypotenuse has length 2, what is the other leg?

4. Find the height and area of the figure:
   Three sides are given and the two marked angles are right angles.



5. Find the following square-roots. If you cannot find the number exactly, at least say between which two whole numbers the answer is, e.g. between 5 and 6.
   (a) $\sqrt{91+9}$
   (b) $\sqrt{42+2}$
   (c) $\sqrt{36}+\sqrt{49}$
   (d) $\sqrt{49}-\sqrt{144}$
   (e) $\sqrt{11^2}$
   (f) $\left(\sqrt{11}\right)^2$
   (g) $\left(\sqrt{64}\right)^7$

6. A watermelon is three times as expensive as a honeydew. John can buy 2 watermelons and have 7 dollars left or 4 honeydews and have 13 dollars left. How much does the honeydew cost? How much is the watermelon?

7. Yesterday, Peter came to the store and gave the cashier 11 dollars for 3 pounds of grapes; he received some change. Today, Peter came to the same store again and gave the cashier 15 dollars for 5 pounds of grapes. He again received some change. How much does each pound of grapes cost, if the change he received is the same on both days?

8. Solve the following equations:

(g) $4\left(x-\frac{1}{6}\right)=\frac{4}{5}(x+5)-17$

(h) $3(x-9)-5(x+11-20)=-1$

(i) $7-\frac{x-6}{x+9}=3+\frac{-2x-15}{x+9}$

Powers of 4

n	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
4^n	***1***	***4***	***16***	***64***						

9. Base 4 numbers:
a) add two base 4 numbers together:

$$\begin{array}{r} 321 \\ \underline{+\,223} \end{array} \qquad \begin{array}{r} 2311 \\ \underline{+\,3332} \end{array}$$

$$\begin{array}{r} 321 \\ \underline{-\,223} \end{array} \qquad \begin{array}{r} 3311 \\ \underline{-2222} \end{array}$$

*[*Do not add in base 10 and translate the result to base 4, try performing addition in base 4, think base 4*]*

b) Write a formula, instruction, or algorithm on how to translate base 4 number abcd to base 10 number, where a, b, c, d can be 0, 1, 2, or 3.

c) Translate the numbers and the results from a) into the base-10 system