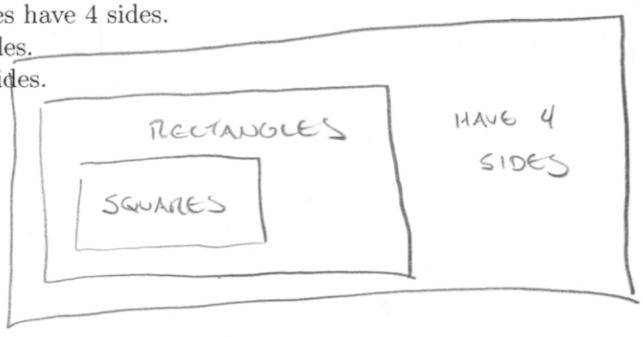
Name: *ANSWER KEY* 9/22/2014

**Math 150 Mathematics for the Contemporary World** **Quiz 1**

Please show all work and box your final answers. If you need more room, you may use the backs of the pages. Calculators are allowed, but cellphones are not. Good luck!

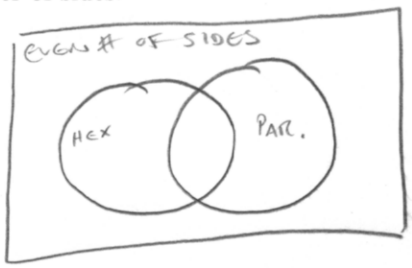
1. For each of the following, draw a Venn diagram that conveys the information contained in the premises. Then state whether the argument is valid or not. If the argument is valid, state whether the argument is sound or not.

   (a) (4 points) Premise: All rectangles have 4 sides.
   Premise: All squares are rectangles.
   Conclusion: All squares have 4 sides.



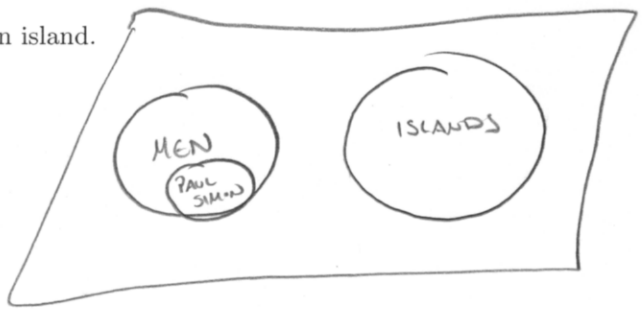

VALID.
SOUND.

   (b) (4 points) Premise: All hexagons have an even number of sides.
   Premise: All parallelograms have an even number of sides.
   Conclusion: All hexagons are parallelograms.




NOT VALID.

   (c) (4 points) Premise: No man is an island.
   Premise: Paul Simon is a man.
   Conclusion: Paul Simon is not an island.




VALID.
SOUND.

2. (4 points) Is it true for all real numbers $x$ and $y$ that $(x+y)^2 = x^2 + y^2$? If yes, explain why. If no, provide a specific counterexample.

NO. $(1+1)^2 \neq 1^2 + 1^2$

$4 \qquad 2$

3. (a) (4 points) Convert 1 year to minutes.

$$1\ \text{yr} \cdot \frac{365\ \text{DAYS}}{1\ \text{yr}} \cdot \frac{24\ \text{HRS}}{1\ \text{DAY}} \cdot \frac{60\ \text{MIN}}{1\ \text{HR}} = \boxed{525{,}600\ \text{MIN}}$$

(b) (4 points) Convert 6 $\text{yd}^3$ (cubic yards) to $\text{ft}^3$ (cubic feet).

$$1\ \text{yd}^3 = 1\ \text{yd} \times 1\ \text{yd} \times 1\ \text{yd}$$

$$= 3\ \text{ft} \times 3\ \text{ft} \times 3\ \text{ft} = 27\ \text{ft}^3$$

$$6\ \text{yd}^3 \cdot \frac{27\ \text{ft}^3}{1\ \text{yd}^3} = \boxed{162\ \text{ft}^3}$$

4. (4 points) You decide to take a 1,264-mile cross-country trip to Cooper City, Florida. Suppose your car averages 30 miles per gallon during the trip and that the cost of gasoline is \$3.89 per gallon. How much will you spend on gasoline during the trip? Round your answer to the nearest dollar.

$$1264 \text{ mi} \cdot \frac{1 \text{ g}}{30 \text{ mi}} \cdot \frac{\$3.89}{1 \text{ g}} = \$163.90$$

$$\approx \boxed{\$164}$$

5. (4 points) Your sound system uses a total of 180 watts of power. Suppose you use your sound system for 22 hours a week. How many kilowatt-hours of energy does your sound system use in one year? (*Hint: a 1 watt lightbulb turned on for 1 hour uses*

$$1 \text{ watt} \times 1 \text{ hour} = 1 \text{ watt-hour}$$

*of electricity. Now, how many kilowatt-hours is this?*)

$$180 \text{ W} \cdot \frac{22 \text{ HRS}}{1 \text{ WK}} \cdot \frac{52 \text{ WKS}}{1 \text{ YR}} = 205{,}920 \text{ W-HRS} \Big/ \text{YR}$$

$$= \boxed{205.920 \text{ KW-HRS}} \Big/ \text{YR}$$