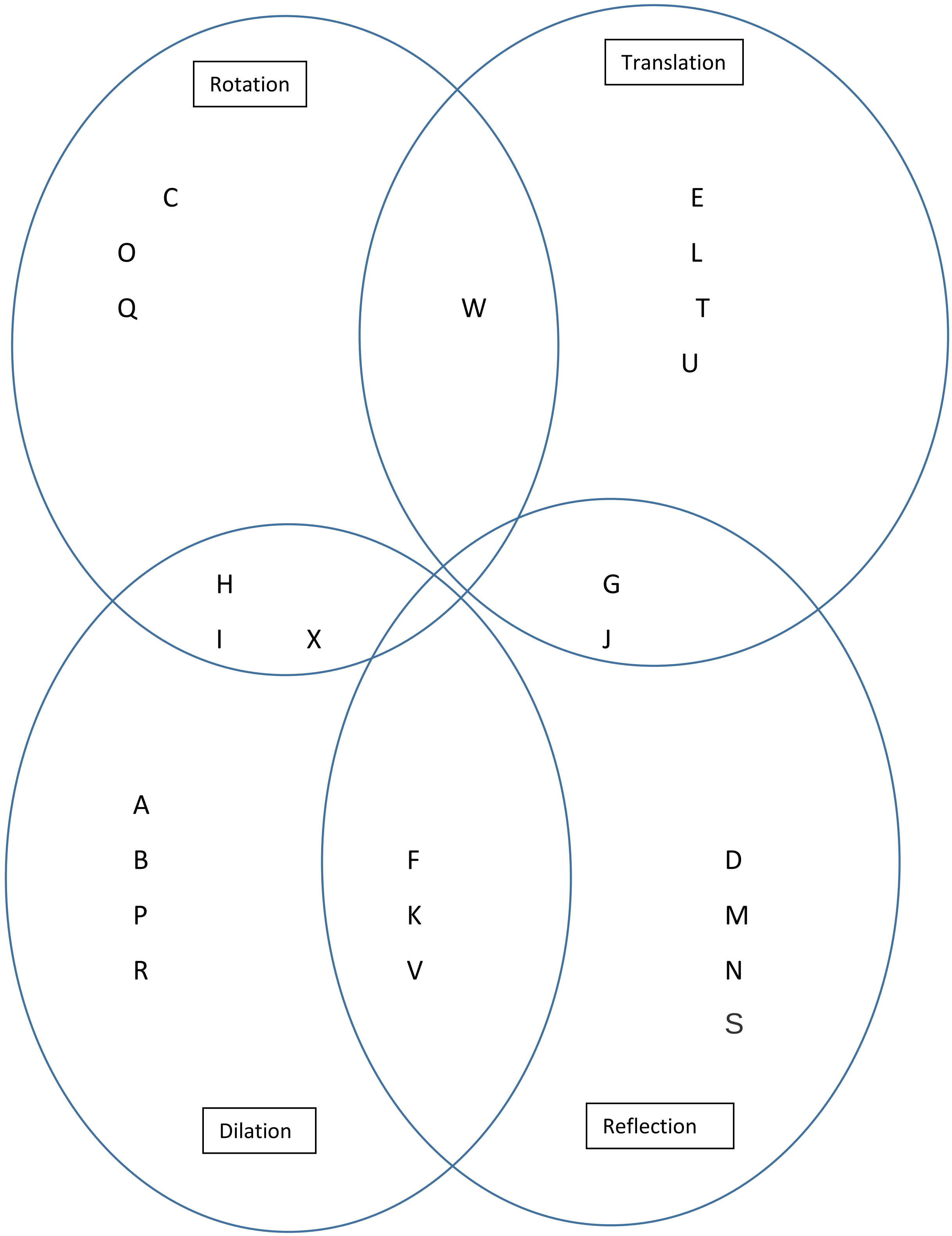
1. Write the letter of the transformation in the correct area on the Venn Diagram. (24)



a) ***(3 pts)*** *Describe the strategy you used in the card sort activity.*

Give points for any answer that makes sense.

(12 pts; 3 per explanation)

b) Describe the general characteristics of the coordinates of each type of transformation.

Rotation A Rotation is a transformation that turns a figure about a fixed point. The sign changes. The order of x,y can change.	Translation Add/subtract to x,y A translation "slides" an object a fixed **distance** in a given **direction**. The original object and its translation have the same **shape** and **size**, and they face in the same **direction**. A translation creates a figure that is**congruent** with the original figure and preserves **distance** (**length**) and **orientation** (lettering order).
Dilation Makes a figure larger or smaller. Coefficient of x, y changes.	Reflection The sign changes. The order of x,y can change. Each point in a shape appears at an equal distance on the opposite side of a given line - the line of reflection.

c) ***(4 pts; 1 correct answer and 3 for explanation)***

Classify the following statement as always, sometimes, or never true. Justify your choice.

"A series of reflections results in a rotation."

Sometimes. A single reflection would not result in a rotation. However, a reflection over the x axis followed by a reflection over the y axis is the same as a rotation 180°.

2. **(2 answer; 5 explanation)**

The short one has the greatest volume. To determine an answer mathematically, find the **volume** of each cylinder. The volume is the **area of the basetimes the height** . In this case, the bases are circular.

The **area of a circle** is **π × r × r** or approximately 3.14 × r × r. To find the **radius** , **r** , use a ruler to estimate the width (or diameter) of the circle. Divide the diameter by 2 to get the radius.

Another way to find the radius of a circle is to use the formula: Circumference = 2 × π × radius = 2 π r.
Radius = Circumference ÷ (2 π) .

Once you have the radius, the table below shows how to determine the volume of each cylinder. The sheet of paper is 8 1/2 inches by 11 inches.

The volume of the **shorter cylinder** is about **82 cubic inches** , and the volume of the **taller cylinder** is about **63 cubic inches.**

Cylinder	**Base Circumference (inches)**	**Radius r (inches)**	**Height h (inches)**	**Volume $\pi \times r \times r \times h$ (Cubic Inches)**
Short	11	$11 \div (2\pi)$ or about 1.75	8.5	$\pi \times 1.75 \times 1.75 \times 8.5$ about 81.8
Tall	8 1/2 = 8.5	$8.5 \div (2\pi)$ or about 1.35	11	$\pi \times 1.35 \times 1.35 \times 11$ about 63.0

3. (2 answer; 5 explanation) Ruth's ball had a higher value.

Suppose Ruth's ball had a value of $3,000 in 1927. If the price doubled in seven years, the ball would be worth $6,000 in 1934. In seven more years, its value would double again.

Year	**Value**
1927	3000
1934	$2 \times 3000 =$ **6000**
1941	$2 \times 2 \times 3000 = 2^2 \times 3000 =$ **12,000**
1948	$2 \times 2 \times 2 \times 3000 = 2^3 \times 3000 =$ **24,000**
1955	$2 \times 2 \times 2 \times 2 \times 3000 = 2^4 \times 3000 =$ **48,000**
...	...
1997	$2^{10} \times 3000 =$ **3,072,000**

The year 1997 was 70 years after 1927, so there would be 10 sets of 7 years during that time. By 1997, Ruth's ball would have a value of $3,072,000. Since it would have a greater value than McGwire's in 1997, it would have a greater value in 1999.

4. (2 pts answer; 5 pts explanation)

55 miles per hour. The first digit of 15,951 could not change in 2 hours. Therefore, 1 is the first and the last digit of the new number. The second and fourth digits changed to 6. If the middle digit is 0, 1, 2, …, then the car traveled 110, 210, 310, . . ., miles in 2 hours. Clearly the first alternative is the correct one, and the car traveled 55 miles per hour.

5. (9 pts; 4- one per correct answer; 5 explanation)

11, 15, 26, 41 are the four missing terms

Let x represent the second term of the sequence. The other numbers are as follows:

4, (x), (x+4), (2x + 4), (3x + 8), (5x + 12) also 67

Term 3 is term one (4) plus term two which is x giving us x + 4

Term 4 is term two (x) plus term three (x + 4) giving us 2x + 4

Term 5 is term three (2x + 4) plus term four (3x + 8) giving us 5x + 12

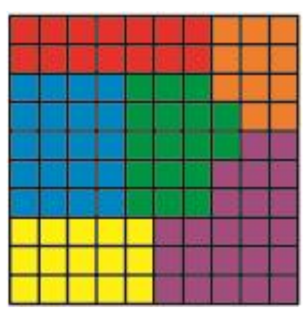
Term 5 is equal to 67 as defined by the problem giving us 5x + 12 = 67

X = 11. We can now substitute and solve for the other terms.

6. (4 pts answer; 2 purple; 2- 8 more ; 5 explanation)

Purple; 8 more purple squares than yellow.

One possible arrangement of the colors is shown below. Note that the number of purple squares exceeds the number of yellow squares by eight.



For a general solution, let *p* represent the number of purple squares. Then $\frac{p}{2}$ quarts of red paint were used to make purple. But since there were 31 quarts of red to start with and 14 squares were painted red, then it must be true that $31-14-\frac{p}{2}=17-\frac{p}{2}$ quarts of red were used to make orange paint. Consequently, an equal amount of yellow must have been used to make the orange paint, so there must be $2(17-\frac{p}{2})=34-p$ orange squares.

Similar reasoning says that $\frac{p}{2}$ quarts of blue paint must have been used for the purple, so it must also be the case that the remaining $40-20-\frac{p}{2}=20-\frac{p}{2}$ quarts of blue were used to make green. Hence, $2(20-\frac{p}{2})=40-p$ squares must be green.

So adding all of the amounts together gives:

$$\underbrace{14}_{\text{red}} + \underbrace{20}_{\text{blue}} + \underbrace{p}_{\text{purple}} + \underbrace{(34 - p)}_{\text{orange}} + \underbrace{(40 - p)}_{\text{green}} + \underbrace{y}_{\text{yellow}} = 100$$

Simplifying gives - *p* + *y* = -8, or *p* - *y* = 8. Consequently, any arrangement will have eight more purple squares than yellow squares.

In the diagram above, there are 23 purple squares and 15 yellow squares, but many other arrangements with *p* - *y*= 8 are also possible.

7. (2 pts answer; 5 pts. explanation)

42 jellybeans.

$$3 \xrightarrow[(3+1)2]{} 8 \xrightarrow[8 + 13]{} 21 \xrightarrow[2 \text{ x } 21]{} 42$$

Working backwards we had 3 left. Her sister ate one more than half. If three is one more than half then half is two which means there were 4 making it 8 when she got to the plate. She ate 13 so there were 8 + 13 or 21 when she got to the plate. She had given her bother half so the original number was 2 x 21 or 42.

8. (2 pts answer; 5 pts explanation)

\$5,400 still needs to be raised.

Let x = the amount that still needs to be raised. That means the amount raised so far is \$13,500-x.

We have $\frac{1}{2}x = \frac{1}{3}(13{,}500 - x)$

$3x = 2(13{,}500 - x)$

$3x = 27{,}000 - 2x$

$5x = 27{,}000$

$X = 5{,}400$

9. (2 pts answer; 5 pts explanation)

The nth term when n is even is $\left(\frac{1}{2}\right)^{n-1}$

The numerators are all 1 and the denominators are all powers of 2

Term number	1	2	3	4	5	6
Denominator	4	$2=2^1$	16	$8=2^3$	64	$32=2^5$

As I only care about terms where n is even I see a pattern of

Term 2 = 2^1, Term 4 = 2^3, Term 6 = 2^5 These are all the term (n) minus 1.

A numerator of 1 will stay a one no matter what the exponent as long as the exponent is positive.

10. (5 pts)

Suppose it was Barb's idea to rob the store. Then Bob lied. That would mean that Ken also lied. That would also mean that Barb lied making all three lies. We know that one of the three told the truth so it could not have been Barb'