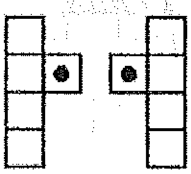
Geo REVIEW for TRANSFORMATIONS TEST – Chapter 9 Name ______________ per___ date____

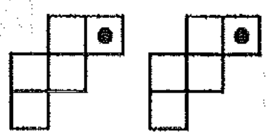
Vocabulary; define each of the following;

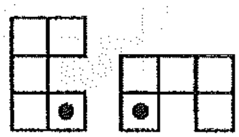
Pre-image – original figure
Image – figure after transformation
Isometry – transformation where preimage ≅ image (Refl./Rot./Transl.)
Reflection – flip across mirror line
Rotation – turn about a point
Translation – slide
Dilation – changes size
Transformation – movement of a figure
Scale factor – ratio of side lengths of preimage : image in a dilation
Reflection line – line of symmetry
Regular polygon – all sides ≅, all ∡'s ≅
Line symmetry – figure can be folded upon itself, match up
Rotational symmetry – figure can be rotated onto itself, match up.
Order of rotation – # of times a figure can rotate onto itself.
Degree of rotation – # of degrees each rotation is, $\frac{360}{\text{order}}$

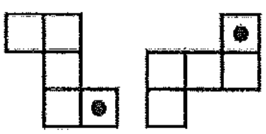
Tell what type of TRANSFORMATION is shown in each diagram;

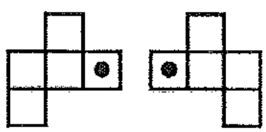
1)

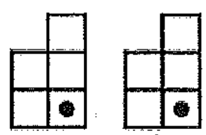
a.

Refl.

b.

transl.

c.

rotat.

d.

Rotat.

e.

Refle.

f.

transl.

True or False?

2) The pre-image is congruent to the image for any transformation. False (dilation)

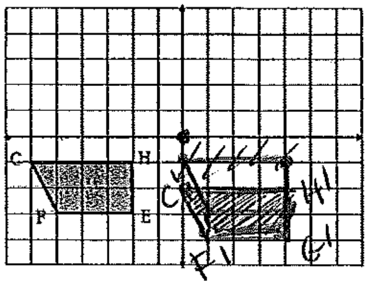
3) If triangle XYZ is reflected over the x-axis, then point Y and Y' are both the same distance from the x-axis.
True

4) If triangle XYZ is rotated about the origin, then point Y and Y' are both the same distance from the origin. true

5) In a reflection, if each image point is connected to its pre-image point, then the reflection line is the perpendicular bisector of the segment formed. true

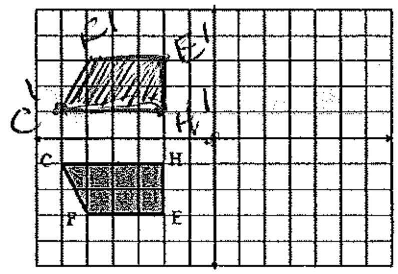
Perform each transformation. (you may use patty paper); Give the ordered pairs of the pre-image and the image; Then write the transformation RULE for #11-15.

10) (x ,y) → (x + 6, y – 1)



C(-6,-1) C'(0 , -2)
H(-2 ,-1) H'(4 , -2)
E(-2,-3) E'(4 , -4)
F(-5,-3) F'(1 ,-4)

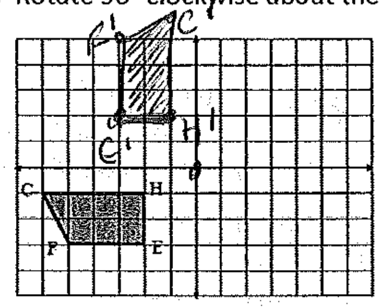
11) Reflect over the x-axis



C'(-6 , 1)
H'(-2 , 1)
E'(-2 , 3)
F'(-5 , 3)

Rule? (x,y) → (X ,-y)

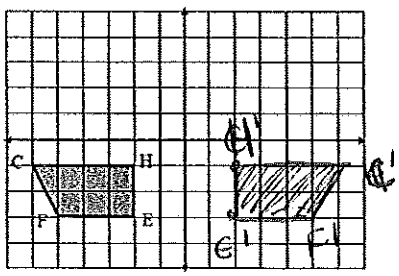
12) Rotate 90° clockwise about the origin



C'(-1 , 6)
H'(-1 , 2)
E'(-3 , 2)
F'(-3 , 5)

Rule? (x,y) → (y , -X)

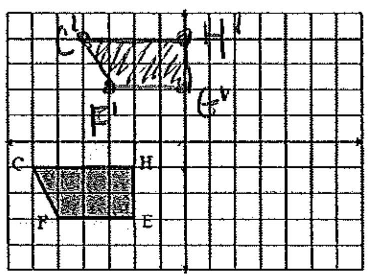
13) $R_{y\text{-axis}}$



C(-6,-1) C'(6 , -1)
H(-2 ,-1) H'(2 , -1)
E(-2 ,-3) E'(2 , -3)
F(-5, -3) F'(5 , -3)

Rule? (x,y) → (-X , y)

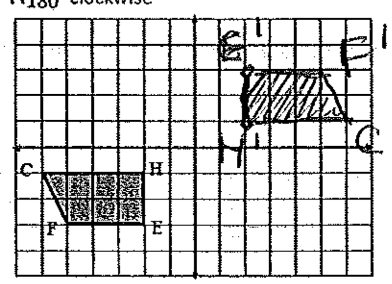
14) $T_{<2, 5>}$



C'(-4 , 4)
H'(0 , 4)
E'(0 , 2)
F'(-3 , 2)

Rule? (x,y) → (x+2, y+5)

15) $R_{180°\text{ clockwise}}$

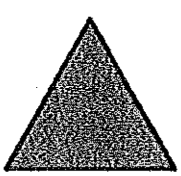


C'(6 , 1)
H'(2 , 1)
E'(2 , 3)
F'(5 , 3)

Rule? (x,y) → (-X , -y)

Decide if each figure below has rotational symmetry, then, if YES, give the order and degree of rotation.

25) equilateral triangle

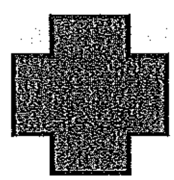


Circle YES or NO
Order 3
Degree 120°

26)

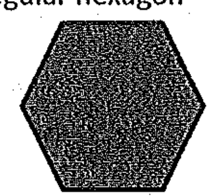
Circle YES or NO
Order ___
Degree ___

27)



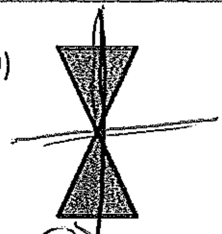
Circle YES or NO
Order 4
Degree 90°

28) regular hexagon

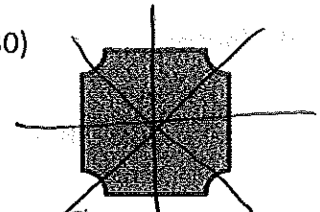


Circle YES or NO
Order 6
Degree 60°

Decide if each figure below has reflectional symmetry, then, if YES, draw all lines of symmetry.

29) 

Circle YES or NO

30) 

Circle YES or NO

31) 

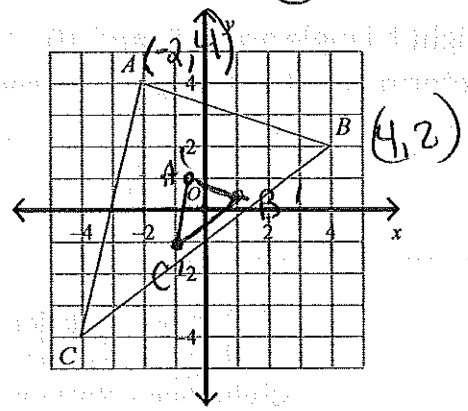
Circle YES or NO

32) 

Circle YES or NO

33) Dilate ΔABC by a scale factor of $\frac{1}{4}$.

$A'\left(-\frac{1}{2}, 1\right)$
$B'\left(1, \frac{1}{2}\right)$
$C'(-1, -1)$

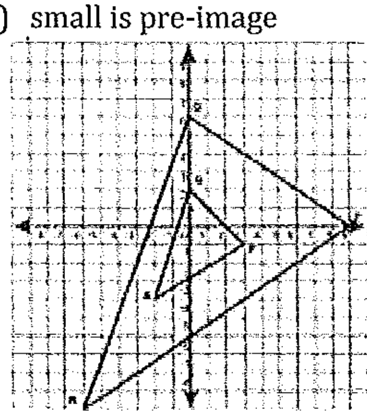


34) Given the scale factor, tell whether each dilation is an enlargement or a reduction;

a) Scale factor = 5 enlargement
b) Scale factor = $\frac{1}{2}$ reduction
c) Scale factor = -2 (neither)
d) Scale factor = $\frac{7}{2}$ enlargement
e) Scale factor = 2.3 enlargement

35) What is the scale factor of the dilations shown below?

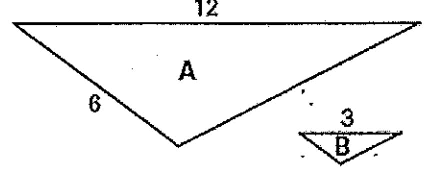
a) small is pre-image



3

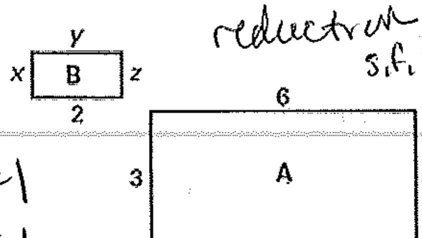
b) from A to B

$\frac{1}{4}$



Determine whether the dilation from Figure A to Figure B is a *reduction* or an *enlargement*. Then, find the values of the variables.

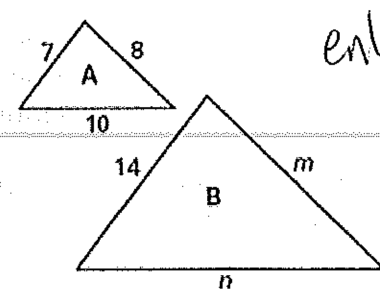
5.



reduction
s.f. = $\frac{1}{3}$

z = 1
x = 1
y = 2

6.



enlargement
s.f. = 2
m = 16
n = 20

Geometry 21 supplement

36) Given the point and its image, determine the scale factor.

a) A(3,6) A'(4.5, 9)   b) G'(3,6) G(1.5,3)   c) B(2,5) B'(1,2.5)

$\frac{9}{6} = \boxed{\frac{3}{2} \text{ or } 1.5}$ $\frac{6}{3} = 2$ $\frac{1}{2}$

37) The sides of one right triangle are 6, 8, and 10. The sides of another right triangle are 10, 24, and 26. Determine if the triangles the second one is a dilation of the first. If so, what is the scale factor? $\frac{6}{10} = \frac{3}{5}$ $\frac{8}{24} = \frac{1}{3}$ $\frac{10}{26} = \frac{5}{13}$ NOT a dilation

38) Circle the transformation that matches the rule.

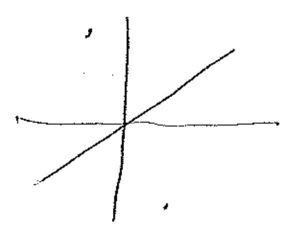
a) G (x,y) ----------- > (-y,x)	Reflection	Rotation	Translation	Dilation
b) H (x,y) ----------- > (x + 2,y + 10)	Reflection	Rotation	Translation	Dilation
c) F (x,y) ----------- > (-x, y)	Reflection	Rotation	Translation	Dilation
d) N (x,y) ----------- > (3x,3y)	Reflection	Rotation	Translation	Dilation
e) W (x,y) ----------- > (-x,-y)	Reflection	Rotation	Translation	
f) Z (x,y) ----------- > (y,x)	Reflection	Rotation	Translation	Dilation

39) Find the treasure……

-- You start at the (-3,5). The treasure map has the following instructions.

(1) Translate (x,y) ------- (x - 6, y – 3)   (2) Reflect over the x axis

(-9, 2) → (-9,-2)

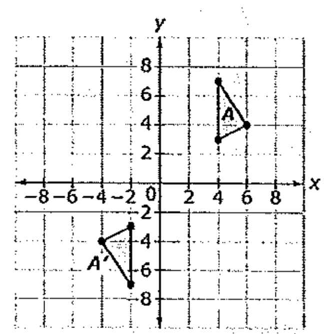


(3) Rotate it 90° about the origin clockwise (4) Reflect it over the y = x line

(-2,9)

Where is the treasure? (2,-9)

40) Mia and Brittany are studying geometric transformations.



Mia is able to move triangle A to triangle A' using the flowing sequence of basic transformations:

1. Reflection across the x-axis
2. Reflection across the y-axis
3. Translation two units to the right

Brittany claims that the same three transformations, done in any order, will always produce the same result. Explain why Brittany's claim is incorrect. if translate first, then the reflections will end up in diff. place

Geometry **PRACTICE with TRANSFORMATION Notation** Name ________________ date_____

Please apply the given rules to each set of pre-image ordered pairs and write the new coordinates for each image. Then tell what type of transformation it is.

Rule	Pre-image coordinates	New image coordinates	Describe this transformation;
$(x, y) \rightarrow (-x, y)$	(3, -7)	(-3, -7)	Reflect over y-axis
	(10, 8)	(-10, 8)	
	(-2, -5)	(2, -5)	
$(x, y) \rightarrow (-x, -y)$	(6, -4)	(-6, 4)	Rotates 180°
	(1, 28)	(-1, -28)	
	(-12, -3)	(12, 3)	
$(x, y) \rightarrow (y, -x)$	(5, -2)	(-2, -5)	Rotates 90° clockwise
	(8, 1)	(1, -8)	
	(-9, -2)	(-2, 9)	
$(x, y) \rightarrow (x+2, y-4)$	(3, -7)	(5, -11)	Translates right 2 down 4
	(10, 8)	(12, 4)	
	(-2, -5)	(0, -9)	
$(x, y) \rightarrow (x, y+6)$	(6, -4)	(6, 2)	Translates up 6
	(1, 28)	(1, 34)	
	(-12, -3)	(-12, 3)	
$(x, y) \rightarrow (x-3, y)$	(5, -2)	(2, -2)	translates left 3
	(8, 1)	(5, 1)	
	(-9, -2)	(-12, -2)	
$(x, y) \rightarrow (3x, 3y)$	(3, -7)	(9, -21)	Dilation, Enlarges w/ scale factor 3
	(10, 8)	(30, 24)	
	(-2, -5)	(-6, -15)	
$(x, y) \rightarrow (.5x, .5y)$	(6, -4)	(3, -2)	Dilation Reduction w/ scale factor ½ or .5
	(2, 28)	(1, 14)	
	(-12, -10)	(-6, -5)	
$(x, y) \rightarrow (-(x+1), (y-4))$	(5, -2)	(-6, -6)	Transformation Sequence: • right 1, down 4 translation • Reflected over y-axis
	(8, 1)	(-9, -3)	
	(-9, -2)	(8, -6)	
$(x, y) \rightarrow (-(x-6), -(y+3))$	(3, -7)	(3, 4)	Transformation Sequence: • translated left 6, up 3 • Rotated 180°
	(10, 8)	(-4, -11)	
	(-2, -5)	(8, 2)	

Transformations Cheat Sheet

Transformation	Preserves Size	Preserves Angle Measure	Rigid Motion
Reflection	Yes	Yes	Yes
Translation	Yes	Yes	Yes
Rotation	Yes	Yes	Yes
Dilation	No	Yes	No

A rigid motion must preserve both size and angle measures

Reflections

A reflection is a flip. The size and the angle measure stay the same.

Reflection over the x-axis	When you reflect a point across the x –axis the x-coordinate remains the same, but the y- coordinate is transformed into its opposite. $P(x, y) \rightarrow P'(x, -y)$ or $r_{x-axis}(x, y) = (x, -y)$
Reflection in the y-axis	When you reflect a point across the y-axis, the y-coordinate remains the same, but the x – coordinate is transformed into its opposite. $P(x, y) \rightarrow P'(-x, y)$ or $r_{y-axis}(x, y) = (-x, y)$

Rotations

A rotation turns a figure through an angle about a fixed point called the center. The figure will rotate counterclockwise when we are given an angle that is positive.

Rotation of 90° counter cw	$R_{90°}(x, y) = (-y, x)$
Rotation of 90° clockwise	$R_{-90°}(x, y) = (y, -x)$
Rotation of 180°	$R_{180°}(x, y) = (-x, -y)$