**Homework Day 14:  Cumulative Review (After Test)**

1. Given triangle ABC, with coordinate points A(1, 3) B(1, 6) C(-3, 1) find the coordinate points of the image and write the correct algebraic rule for each:

$(x,y) \to (2x, 2y)$  a. Dilation by 2   $A'(2,6), B'(2,12), C'(-6,2)$

$(x,y) \to (-y, x)$  b. Rotation 90   $A'(-3,1), B'(-6,1), C'(-1,-3)$

$(x,y) \to (-x, -y)$  c. Rotation 180   $A'(-1,-3), B'(-1,-6), C'(3,-1)$

$(x,y) \to (-x, y)$  d. Reflection over the y-axis   $A'(-1,3), B'(-1,6), C'(3,1)$

$(x,y) \to (-y, -x)$  e. Reflections over y = -x   $A'(-3,-1), B'(-6,-1), C'(-1,3)$

2. Given $\triangle ABC \sim \triangle FED$ find all angle measures and side measures.
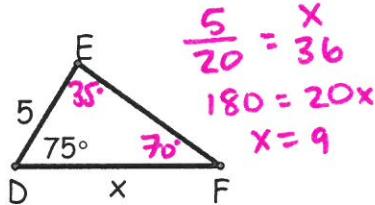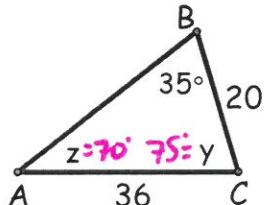
~△'s have congruent corresponding angles and proportional sides

$\frac{5}{20} = \frac{x}{36}$

$180 = 20x$

$x = 9$

$\boxed{X = 9, y = 75°, z = 70°}$

B, 35°, 20, z=70° 75°= y, A, 36, C

E, 35°, 5, 75°, 70°, D, x, F

3. Given $\triangle PJG \sim \triangle PRQ$ find the values of x and y.

PJ = 6
JG = 5
PG = 4
GQ = x
RQ = x + 6
JR = y

$\frac{5}{x+6} = \frac{4}{4+x}$

$5(4+x) = 4(x+6)$

$20 + 5x = 4x + 24$

$\boxed{x = 4}$

P  4  G  X  Q
6  5
J
y
R

$x + 6 = 10$
$4 + 6 = 10$
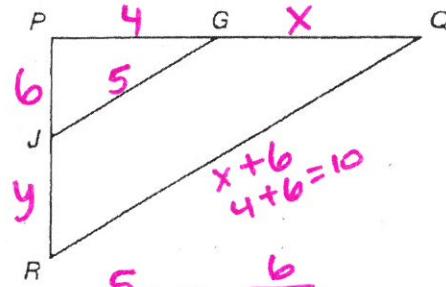
$\frac{5}{10} = \frac{6}{6+y}$

$60 = 5(6+y)$

$60 = 30 + 5y$

$30 = 5y$

$\boxed{y = 6}$

4. If GJ=27, what is the value of x?
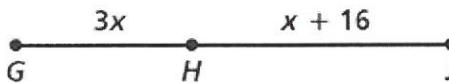
3x          x + 16
G      H          J

$3x + x + 16 = 27$

$4x = 11$

$\boxed{x = \tfrac{11}{4}}$

6. Describe a single transformation that has the same image as the composition of <6, 2> followed by <-2, -4>.

<4, -2>  Translation right 4 and down 2.

7. Can the following triangles be proven congruent? If so, write the congruency statement and which postulate proves them congruent.

a.

ASA
AAS
$\triangle LMN \cong \triangle OPN$

L, M, N, P, O

b.

R, S, T, V

ASA
$\triangle TSR \cong \triangle VTR$

c.

L, M, N, P, O

SAS
$\triangle LNM \cong \triangle ONP$

d.

H, K, M, L
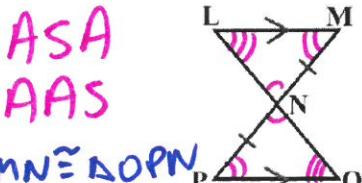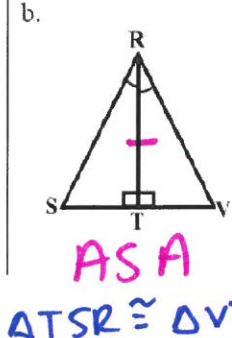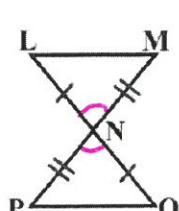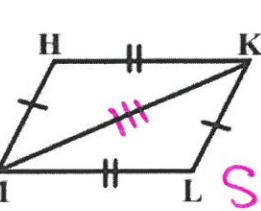
SSS
$\triangle MHK \cong \triangle KLM$

8. Factor: $y = 3x^2 + 8x + 5$

$3 \cdot 5 = 15$
$3 + 5 = 8$

$(3x^2 + 3x) + (5x + 5)$
$3x(x+1) + 5(x+1)$
$\boxed{(3x+5)(x+1)}$

9. Solve: $x^2 + 5x = -24$    $x = \dfrac{-5 \pm \sqrt{25 - 4(5)(24)}}{2(1)}$

$x^2 + 5x + 24 = 0$

$\to x = \dfrac{-5 \pm \sqrt{-455}}{2} = \boxed{\dfrac{-5 \pm \sqrt{455}\,i}{2}}$

10. Find the exact value of: $3x^2 + 7x - 23 = y$

$x = \dfrac{-7 \pm \sqrt{49 - 4(3)(-23)}}{2(3)} = \dfrac{-7 \pm \sqrt{325}}{6} = \boxed{\dfrac{-7 \pm 5\sqrt{13}}{6}}$

11. Explain how you know if a quadratic will have 0, 1, or 2 solutions.
Use the discriminant $b^2 - 4ac$
• If it is positive, then 2 real solutions
• If negative, the 2 imaginary sol.
• If 0, then 1 real solution

12. Explain how you know if a quadratic has real or imaginary solutions.
$b^2 - 4ac$, use the discriminant
• If +, then real solutions
• If −, then imaginary solutions

13. Explain the difference between rational and irrational.
Rational numbers can be written as a ratio like 8/1 or 3/4
Irrational can be written as a decimal but not a fraction like $\pi$ or $\sqrt{2}$

14. What is the max height and the amount of time till the acorn hits the ground of the following:
$y = -16x^2 + 19x + 48$    53.64

15. Given the x-intercepts (0, 3) and (0, 7) ~~(3,0) (7,0)~~ and the vertex (5, -3), write the equation of the parabola.

$y = k(x-3)(x-7) \to -3 = -4k$
$-3 = k(5-3)(5-7)$    $3/4 = k$
$-3 = k(2)(-2)$

$y = 3/4 (x-3)(x-7)$
$y = 3/4 (x^2 - 10x + 21)$
$\boxed{y = 3/4\,x^2 - 15/2\,x + 63/4}$

16. Simplify the following expressions:

a. $(\sqrt[5]{25x^4})(\sqrt[5]{125x^3})$   $\sqrt[5]{3125x^7} = \boxed{5x\sqrt[5]{x^2}}$

b. $\sqrt[3]{64x^5 y^{10} z^{21}} = \boxed{4xy^3 z^7 \sqrt[3]{x^2 y}}$

17. Solve the following for the value of x:   $\sqrt{x-5} - 12 = -8$
$\phantom{xxxxx}+12 \quad +12$

$(\sqrt{x-5})^2 = (4)^2$   $\sqrt{21-5}$   $-12 = -8$ ✓
$x - 5 = 16$
$\boxed{x = 21}$

18. Find the inverse of $y = 3x + 6$
$x = 3y + 6$
$x - 6 = 3y$
$\boxed{\dfrac{x-6}{3} = y}$ or $\boxed{y = \dfrac{1}{3}x - 2}$

19. The value, V, of a tractor can be modeled by the function $V(t) = 20{,}000(0.84)^t$, where t is the number of years since the tractor was purchased. To the nearest hundredth of a percent, what is the monthly rate of depreciation?

$(0, 20000)$
$(12, 16800)$

$20000 = 16800\, b^{0-12}$
$\dfrac{20000}{16800} = 16800\, b^{-12}$
$\left(\dfrac{20000}{16800}\right)^{-1/12} = b^{-12 \cdot -1/12}$

$1 - .9856 = .0144$

$\boxed{1.44\%}$

$.9856 \approx b$