Name: _____ M$5 Homework 53

1. If $4x^2 + 9 = kx$, what value of k will produce equal roots?
   (1) –3 (3) 12
   (2) 5 (4) 16

2. Paras is drawing a solar system display for his science class. If the equation representing Saturn is $(x-4)^2 + (y+3)^2 = 36$, which of the following equations could be used to represent Saturn's rings, which have an elliptical orbit?

   (1) $\frac{(x-4)^2}{9} + \frac{(y+3)^2}{4} = 1$

   (2) $\frac{(x-4)^2}{64} + \frac{(y+3)^2}{49} = 1$

   (3) $\frac{(x+4)^2}{36} - \frac{(y-3)^2}{25} = 1$

   (4) $\frac{(x+4)^2}{144} + (y-3)^2 = 1$

3. Which composition would produce an image triangle whose area is not equal to the area of the original triangle?
   (1) $r_{y-\text{axis}} \circ r_{x-\text{axis}}$ (3) $r_{y=-x} \circ D_3$
   (2) $T_{2,-3} \circ r_{y=x}$ (4) $R_{180^\circ} \circ R_{270^\circ}$

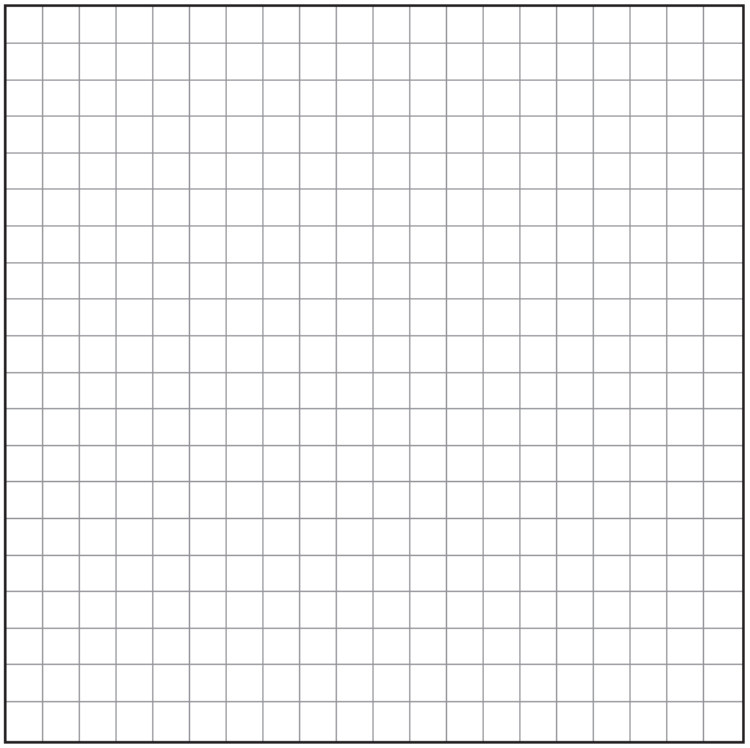
4. Which of the following is not an isometry?
   (1) $(x, y) \longrightarrow (-y, x)$
   (2) $(x, y) \longrightarrow (-4 + x, y + 3)$
   (3) $(x, y) \longrightarrow (x, 2y)$
   (4) $(x, y) \longrightarrow (-x, y)$

5. The number of minutes a student watches television over a 3-day period varies inversely as the score on a student's mid-year exam. If Jake watches 10 hours of television over the three days and scores a 98% on his mid-year exam, what will Cindy's score be (to the *nearest whole number)* if she watches 12 hours of television over the three days?

6. a) Draw the graph of $xy = -10$ using at least eight values of x in the interval $-10 \le x \le 10$ $(x \neq 0)$.

   b) On the same set of axes, draw and label the graph of the image of $xy = -10$ after a rotation of 90º.

   c) What is the equation of the graph drawn in part (b).



7. Which letter has rotational symmetry?
   (1) **E** (3) **G**
   (2) **T** (4) **H**

9. Which geometric figure has 72° rotational symmetry?
   (1) rhombus (3) regular pentagon
   (2) square (4) equilateral triangle

8. The graphs of $y = 2x^2 - 5x + 2$ and $y - 4x = 13$ intersect in how many points?
   (1) 1 (3) 3
   (2) 2 (4) 0

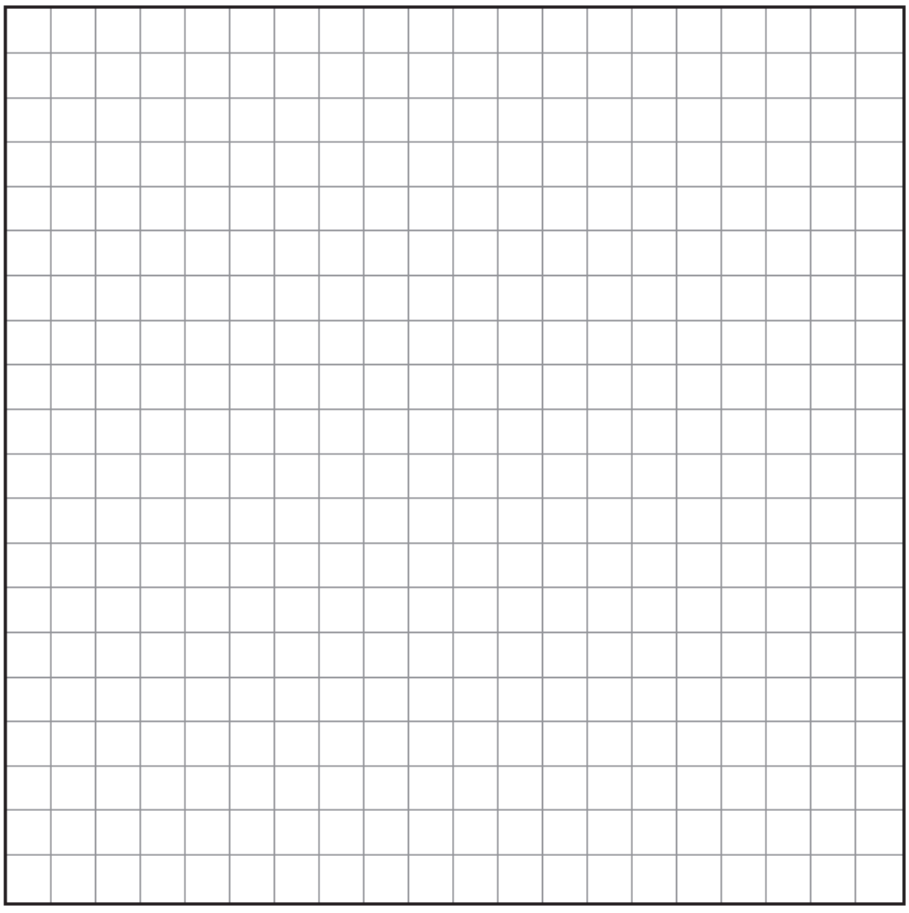
10. Find the domain of $g(x) = \dfrac{2x-7}{\sqrt{x^2-1}}$.

11. The profits of an Internet auction company can be represented by $P = -t^2 + 8t + 12$, where P represents profits in hundreds of thousands of dollars and t represents the years since the company started (let 2000 be $t = 0$). According to the model, in what year will the company have maximum profits? What will the maximum profits be? (*Justify your answer.*)

12. The vertices of $\triangle CAT$ are $C(-2,3)$, $A(3,3)$, and $T(0,-2)$. Given the transformations B, D, and F defined as follows

$B(x,y) \longrightarrow (y,x)$

$D(x,y) \longrightarrow (-x,-y)$

$F(x,y) \longrightarrow (x+4, y-3)$

a) Graph $\triangle CAT$ and its image $\triangle C'A'T'$, after transformation B.
b) Graph $\triangle C''A''T''$, the image of $\triangle CAT$, after transformation D.
c) Graph $\triangle C'''A'''T'''$, the image of $\triangle CAT$, after transformation F.
d) Which of the above transformations are isometries?
e) Which of the above transformations are direct isometries?
f) Which of the above transformations are opposite isometries?