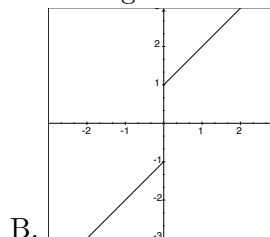
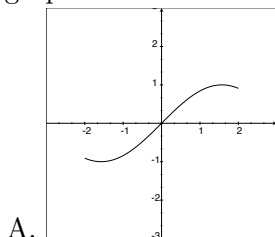


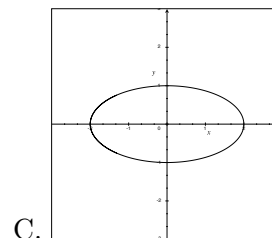
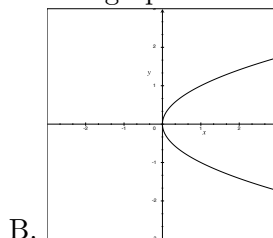
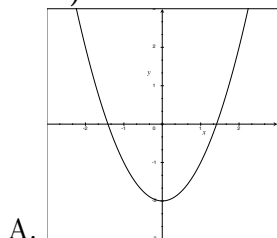
MATH 140. TEST 1 v1 (FALL 2003. HARVEY).

Name (1 point): _____

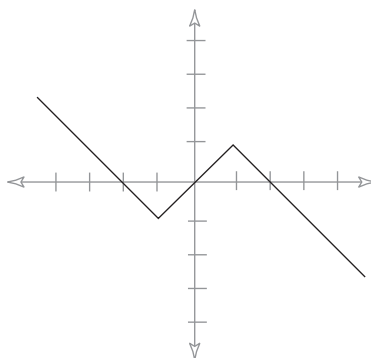
- (9 points)** Find the equation of the line through the points $(2, 0)$ and $(3, 3)$.
- (9 points)** Find the equation of the line through the point $(2, 6)$ and perpendicular to $y = 2x + 3$.
- (9 points)** Use the graphs to estimate the domain and range of the functions below:



- (9 points)** Which of the following are the graphs of functions?



- 5-7.** The graph of $f(x)$ is shown below. Use this to graph the following transformations.



- (9 points)** $f(2x)$
- (9 points)** $f(x + 1)$
- (9 points)** $f(x - 1) + 2$

8. (9 points) Graph the piecewise function:

$$f(x) = \begin{cases} -x & x \leq -2 \\ x^2 & -2 < x < 3 \\ x & x \geq 3 \end{cases}$$

9. (9 points)

$$f(x) = x^2 \qquad g(x) = \frac{1}{x-2}$$

Find $f \circ g(x)$ and $g \circ f(x)$. What are the domains of these compositions?

10. (9 points) Find the inverse function of

$$f(x) = \sqrt[3]{x+4}.$$

11. (9 points) Find the inverse function of

$$f(x) = \frac{2x+1}{4x+5}.$$

SOLUTIONS.

1. (9 points)

$$m = \frac{3-0}{3-2} = 3 \implies y-0 = 3(x-2) \implies y = 3x-6$$

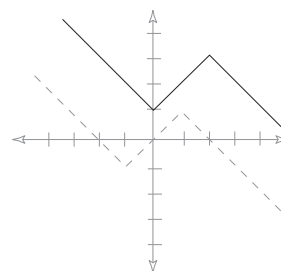
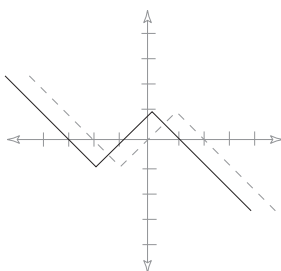
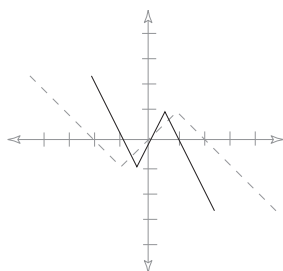
2. (9 points)

$$m = -\frac{1}{2} \implies y-6 = -\frac{1}{2}(x-2) \implies y-6 = -\frac{1}{2}x+1 \implies y = -\frac{1}{2}x+7$$

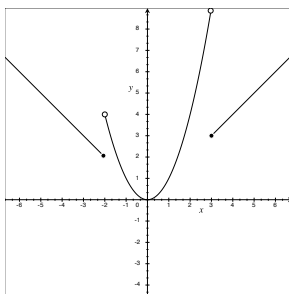
3. (9 points) A. Domain: $[-2, 2]$, Range: $[-1, 1]$. B. Domain: all reals, Range: $(-\infty, -1] \cup [1, \infty)$

4. (9 points) Only A is a function. B and C are not.

5-7.



8. (9 points)



9. (9 points)

$$f \circ g(x) = f\left(\frac{1}{x-2}\right) = \frac{1}{(x-2)^2} \quad \text{Domain: all reals except 2: } (-\infty, 2) \cup (2, \infty)$$

$$g \circ f(x) = g(x^2) = \frac{1}{x^2 - 2} \quad \text{Domain: all reals except } \pm\sqrt{2}: (-\infty, -\sqrt{2}) \cup (-\sqrt{2}, \sqrt{2}) \cup (\sqrt{2}, \infty)$$

10. (9 points) Switch x and y :

$$x = \sqrt[3]{y+4} \implies x^3 = y+4 \implies y = x^3 - 4$$

11. (9 points) Switch x and y :

$$x = \frac{2y+1}{4y+5} \implies (4y+5)x = 2y+1 \implies 4xy-2y = 1-5x \implies y(4x-2) = 1-5x \implies y = \frac{1-5x}{4x-2}$$