

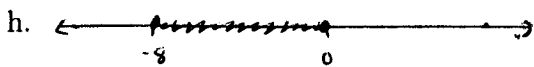
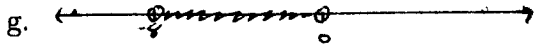
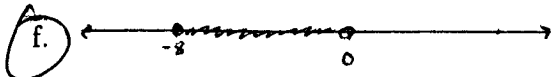
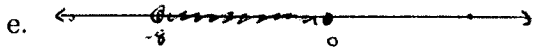
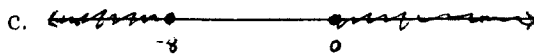
Name Solutions.

1. There are no notes or calculators allowed on this test.
2. All students will be expected to adhere to the academic code of conduct. It is always a violation of the university honor code to, in any way, assist another person in the completion of this exam or to copy answers from another student. Please keep your eyes on your own work and keep your own work covered up as much as possible during the exam so that others will not be tempted or distracted. Thank you for your cooperation.
3. Please mute/turn off all cell phones or pagers
4. Show all work for full credit. Box your final answers.
5. You do not need to do the problems in the order that they appear.
6. There are 100 possible points on the exam.

Good Luck!

2

1. (4 points) Circle the letter of the number line that represents  $[-8, 0)$



2. (5 points) Rewrite the expression without using absolute value notation.

$$|1 - x|$$

for  $x > 2$

Since for values of  $x$  larger than two  $1 - x$  is a negative number,

$$|1 - x| = -(1 - x) = -1 + x \text{ or } x - 1$$

3. (6 points) Solve for  $x$ .

$$(x + 1)(x - 6) = 4$$

$$x^2 + x - 6x - 6 = 4$$

$$x^2 - 5x - 10 = 0$$

$$x = \frac{5 \pm \sqrt{25 - 4(1)(-10)}}{2} = \frac{5 \pm \sqrt{65}}{2}$$

4. ( 7 points) Write the equation of the line through the points (1, 2) and (2, 6). Write your answer in the form  $y=mx+b$ .

$$m = \frac{6-2}{2-1} = \frac{4}{1} = \underline{4} \quad \text{OR} \quad m = \frac{2-6}{1-2} = \frac{-4}{-1} = \underline{4}$$

$$y-2 = 4(x-1)$$

OR

$$y-\cancel{6} = 4(x-\cancel{2})$$

$$\boxed{y = 4x - 2}$$

$$\boxed{y = 4x - 2}$$

5. ( 6 points) Solve the inequality and write your answer in interval notation.

$$5t + 8 \leq 7 + 7t$$

$$8 \leq 7 + 2t$$

$$1 \leq 2t$$

$$\boxed{\frac{1}{2} \leq t}$$

$$\boxed{[\frac{1}{2}, \infty)}$$

6. ( 6 points) Solve the inequality and write your answer in interval notation.

$$-17 < 3x - 5 < 17$$

$$-12 < 3x < 22$$

$$-4 < x < \frac{22}{3}$$

$$|3x - 5| < 17$$

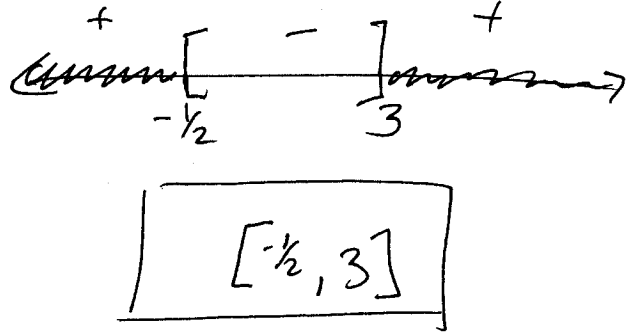
$$\boxed{(-4, \frac{22}{3})}$$

4

7. (6 points) Solve the inequality and write your answer in interval notation.

$$(2x + 1)(x - 3) \leq 0$$

$$\begin{cases} (2x+1)(x-3) = 0 \\ x=3 \text{ or } x=-\frac{1}{2} \end{cases}$$



8. (12 points) Find the domain of the functions. Express your answer in interval notation.

a.

$$f(x) = \sqrt{2x - 6} + 3$$

$$2x - 6 \geq 0 \Rightarrow 2x \geq 6 \Rightarrow x \geq 3$$

$$\text{Domain: } [3, \infty)$$

b.

$$f(x) = \frac{x+8}{2x+5}$$

$$2x+5 \neq 0$$

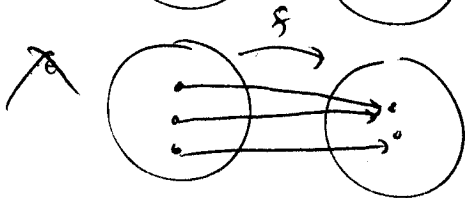
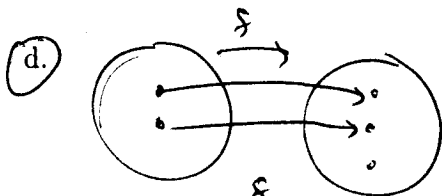
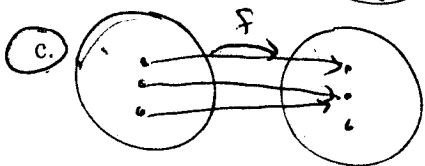
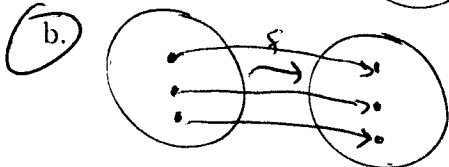
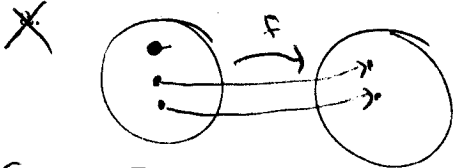
$$\text{Domain: } (-\infty, -\frac{5}{2}) \cup (-\frac{5}{2}, \infty)$$

c. Find the range of the function in part a.

$$\text{Range: } [3, \infty)$$

9. ( 5 points) Circle the letter of the rule(s) that represent(s) a function.

Note: You may need to circle more than one.



10. ( 5 points) Write an equation for the statement

For each real number, subtract eight, then multiply the result by 2.

$$y = 2(x - 8)$$

11. ( 15 points) Find the equation of the graph which results from performing each of the following operations on the graph of  $y = \sqrt{x}$ .

a Shift 5 units to the right, then reflect across the y axis.

$$y = \sqrt{-(x-5)} = \sqrt{-x+5}$$

b Shift 3 units up and 2 units left.

$$y = \sqrt{x+2} + 3$$

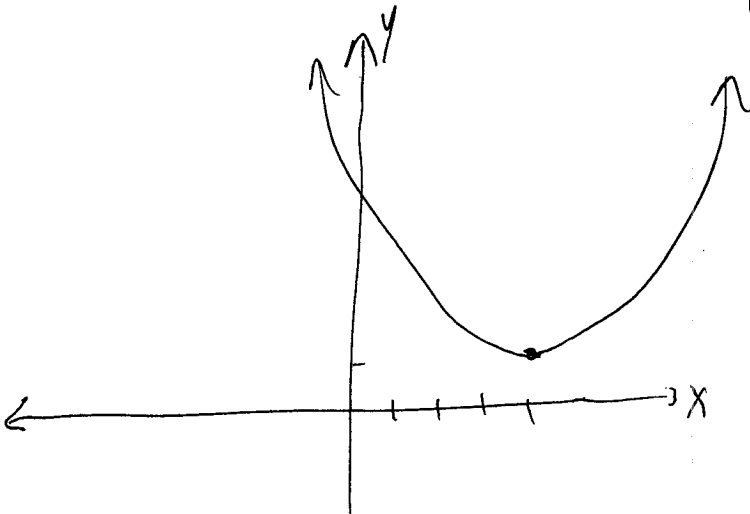
c Reflect across the x axis.

$$y = -\sqrt{x}$$

12. ( 5 points) Sketch the graph of  $f(x) = (x - 4)^2 + 1$ .

Note: You only need to label the vertex. Use what you know about translations/reflections to sketch the graph.

The graph is shifted up 1 unit  
and Right 4 units



13. ( 5 points) Given the functions  $f(x)$  and  $g(x)$  find the following

$$f(x) = 1 - x$$

$$g(x) = 1 - x$$

a.  $(f \circ g)(x)$

$$(f \circ g)(x) = f[g(x)] = f[1-x] = 1 - (1-x) = x$$

b.  $(f - g)(x)$

$$(f - g)(x) = 1 - x - (1 - x) = 0$$

14. ( 5 points) Are  $f(x)$  and  $g(x)$  from the previous problem inverses?

Show work to argue why/why not.

yes.

$$(g \circ f)(x) = g[f(x)] = g[1-x] = 1 - (1-x) = x$$

$$\& (f \circ g)(x) = x \text{ from problem 13}$$

So  $f$  and  $g$  are inverses of each other.

15. ( 8 points) From the graph determine the following:

a Write in interval notation where  $f(x) < 0$

$$(1, 7)$$

b Write the domain and the range of  $f(x)$  in interval notation.

$$\text{Domain: } (-\infty, \infty)$$

$$\text{Range: } [-3, \infty)$$

