

Math 41

Exam 1 - B

February 12, 2016

#1-12:8 pts each, #9: 4 pts.

name _____

*no calculators

*show all relevant work to receive full credit

*any evidence of academic dishonesty = 0 grade

*only pencils, pens = - 5 from grade

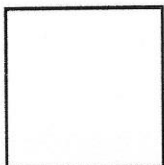
*late for exam = - 5 from grade

1. Find the slope intercept equation of the line through the point $(-2, 5)$ and

(a) parallel to the line $2x + y - 4 = 0$

(b) perpendicular to the line $x = 4$.

2. The population of a small town in central Pennsylvania was 800 in the year 2010, and had decreased to 750 by the year 2015. Find a linear model giving the population P in terms of the year t , where $t = 0$ corresponds to the year 2010.



3. Determine if the equation represents a function of y in terms of x . If it is not a function, explain your reasoning.

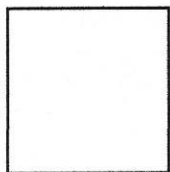
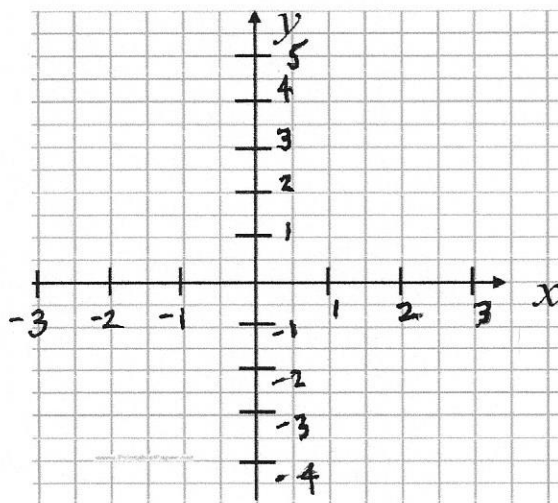
a. $y - x^2 = 16$

yes or no, if no, explain.

b. $y^2 + 4x = 12$

yes or no, if no, explain

4. Sketch a graph of the function. $f(x) = \begin{cases} x+2, & x < 0 \\ x^2 - 1, & x \geq 0 \end{cases}$



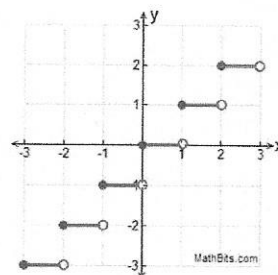
5. Determine if the statement is true **T** or false **F**. If false, explain why it is false or provide a counter-example.

a. The graph of an odd function is symmetrical to the x -axis. _____

If false, explain.

b. The graph shown is that of *the greatest integer function*, $f(x) = \llbracket x \rrbracket$ _____

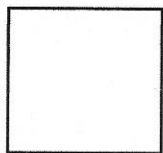
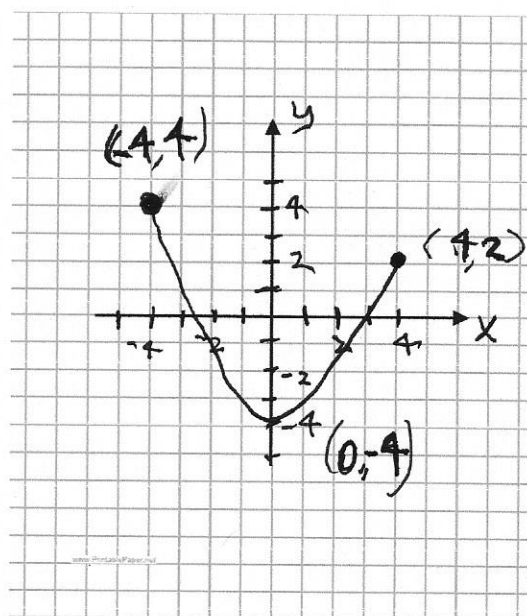
If false, explain.



6. Use the graph of $y = f(x)$ to find the following:

(a) domain of f _____

(b) range of f _____

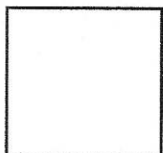
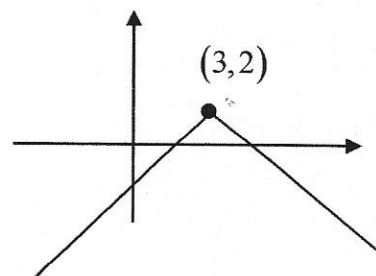


7. For the function $f(x) = x^2 - 3x + 5$, find and simplify the difference quotient.

$$\frac{f(x+h) - f(x)}{h} =$$

8. Use the graph of $f(x) = |x|$ to write the equation for the function g whose graph is shown.

Assume no vertical stretch or shrink.



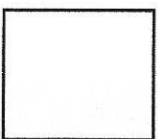
9. **Describe** the shape and the rigid transformations that gives the graph of

$g(x) = -\frac{1}{4}(x-2)^2 - 3$ using the graph of $f(x) = x^2$. Not looking for a graph, but a written description.

10. Find each of the following for the given functions, $f(x) = x^2 + 1$
 $g(x) = 2x - 3$

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

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



11. For the composite function, $f(g(x))$ find two functions f and g , if $f(g(x)) = \sqrt{4x-5}$

$$f(x) =$$

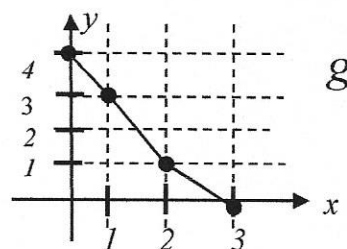
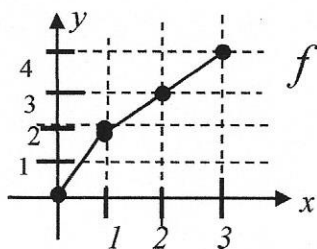
$$g(x) =$$

12. Find $f^{-1}(x)$, if it exists, for $f(x) = 27x^3 - 1$, If it does not exist, explain the reason(s).

13. (4 points): 4 points: Any plans for Valentine's Day?

☐

Extra: Use the graph of f and g to find each of the following:



a. $g(f(2)) =$

b. $(f^{-1} + g)(2) =$

c. $(g \circ f^{-1})(2) =$

d. $g^{-1}(g(2)) =$

Happy Valentine's Day

