

Test Form A

Name Answer key Date \_\_\_\_\_

Class \_\_\_\_\_ Section \_\_\_\_\_

~~Chapter P~~  
unit #1: Functions  
review

D

1. Find all intercepts of the graph of  $y = \frac{x+2}{x-3}$ .

(a) (-2, 0)

(b) (-2, 0), (3, 0)

(c)  $(0, \frac{2}{3}), (3, 0)$

(d)  $(-2, 0), (0, -\frac{2}{3})$

(e) None of these

y int  
let x=0  
 $y = \frac{2}{-3} = -\frac{2}{3}$   
 $(0, -\frac{2}{3})$

x-int: let y=0  
 $\frac{x+2}{x-3} = 0$   
 $x+2=0$   
 $x=-2$   
 $(-2, 0)$

C

2. Determine if the graph of  $y = \frac{x}{x^2-4}$  is symmetrical with respect to the x-axis, the y-axis, or the origin.

(a) About the x-axis

(b) About the y-axis

(c) About the origin

(d) All of these

(e) None of these

even odd neither  
 $f(-x) = \frac{-x}{(-x)^2-4} = \frac{-x}{x^2-4} = -\left(\frac{x}{x^2-4}\right) = -f(x)$

C

3. Find all points of intersection of the graphs of  $x^2 - 2x - y = 6$  and  $x - y = -4$ .

(a) (0, -6), (0, 4)

(b) (10, 14), (13, 17)

(c) (5, 9), (-2, 2)

(d) (-5, -1), (2, 6)

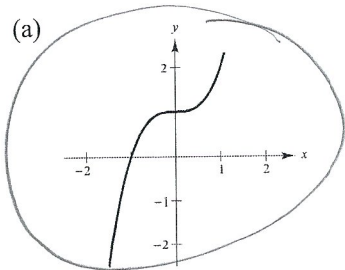
(e) None of these

$x^2 - 2x - y = 6$   
 $-(x - y = -4)$   
 $\hline x^2 - 2x - y = 6$   
 $-x + y = 4$   
 $\hline x^2 - 3x - 10 = 0$

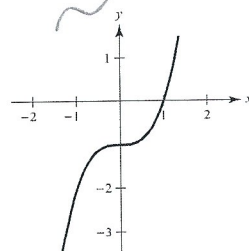
A

4. Which of the following is a sketch of the graph of the function  $y = x^3 + 1$ ?

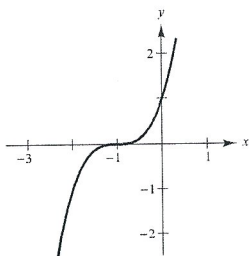
(a)



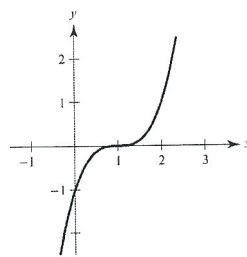
(b)



(c)



(d)



up 1

$(x-5)(x+2) = 0$   
 $x=5, x=-2$   
 $5-y=-4 \rightarrow y=-9$   
 $-2-y=-4 \rightarrow y=2$   
 $(5, 9), (-2, 2)$

D

(e) None of these

5. Find an equation for the line passing through the point (4, -1) and perpendicular to the line  $2x - 3y = 3$ .

(a)  $y = \frac{2}{3}x - 1$

(b)  $3x + 2y + 2 = 0$

(c)  $2x + 3y = 10$

(d)  $3x + 2y = 10$

(e) None of these

$y = mx + b$   
 $-1 = \frac{2}{3}(4) + b$   
 $-1 = \frac{8}{3} + b$   
 $-1 - \frac{8}{3} = b$   
 $-\frac{11}{3} = b$   
 $5 = b$

$-\frac{3y}{3} = \frac{-2x+3}{3}$   
 $y = \frac{2}{3}x - 1$   
 $\perp m = \frac{3}{2}$

**A** 6. Find the domain of  $f(x) = \frac{1}{\sqrt{3-2x}}$   $\neq 0$

$\sqrt{3-2x} > 0$   
 $3-2x > 0$   
 $-2x > -3$   
 $-\frac{1}{2}x > -\frac{3}{2}$   
 $x < \frac{3}{2}$

(a)  $(-\infty, \frac{3}{2})$  (b)  $[\frac{3}{2}, \infty)$  (c)  $(\frac{3}{2}, \infty)$  (d)  $(-\infty, \frac{3}{2}) \cup (\frac{3}{2}, \infty)$  (e) None of these

$(-\infty, \frac{3}{2})$

**B** 7. Find  $f(x + \Delta x)$  for  $f(x) = x^3 + 1$ .

(a)  $x^3 + 1 + \Delta x$  (b)  $x^3 + 3x^2(\Delta x) + 3x(\Delta x)^2 + (\Delta x)^3 + 1$   
 (c)  $x^3 + (\Delta x)^3 + 1$  (d)  $\Delta^3 x^6 + 1$   
 (e) None of these

$f(x + \Delta x) = (x + \Delta x)^3 + 1$   
 $= (x + \Delta x)(x^2 + 2x\Delta x + \Delta x^2) + 1$   
 $= x^3 + 2x^2\Delta x + x\Delta x^2 + x^2\Delta x + 2x\Delta x^2 + \Delta x^3 + 1$   
 $= x^3 + 3x^2\Delta x + 3x\Delta x^2 + \Delta x^3 + 1$

**B** 8. If  $f(x) = \frac{1}{\sqrt{x}}$  and  $g(x) = 1 - x^2$ , find  $f(g(x))$ .

(a)  $\frac{1-x^2}{\sqrt{x}}$  (b)  $\frac{1}{\sqrt{1-x^2}}$  (c)  $1 - \frac{1}{x}$  (d)  $\frac{1}{\sqrt{x}} + 1 - x^2$  (e) None of these

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

**D** 9. If the point  $(-3, \frac{1}{2})$  lies on the graph of the equation  $2x + ky = -11$ , find the value of  $k$ .

(a)  $-\frac{5}{2}$  (b)  $-34$  (c)  $-\frac{17}{2}$  (d)  $-10$  (e) None of these

$2(-3) + k(\frac{1}{2}) = -11$   
 $-6 + \frac{1}{2}k = -11$   
 $+\frac{1}{2}k = -5$   
 $2 \cdot \frac{1}{2}k = -10$   
 $k = -10$

**C** 10. Which of the following equations expresses  $y$  as a function of  $x$ ?

(a)  $3y + 2x - 9 = 17$  line (b)  $2x^2y + x = 4y$  parabola test (c) Both a and b (d) Neither a nor b (e)  $3y^2 - x^2 = 5$  ellipses

**B** 11. Given  $f(x) = x^2 - 3x + 4$ , find  $f(x + 2) - f(2)$ .

(a)  $x^2 - 3x + 4$  (b)  $x^2 + x$  (c)  $x^2 + x - 8$  (d)  $x^2 - 3x - 4$  (e) None of these

$f(x+2) - f(2) = (x+2)^2 - 3(x+2) + 4 - [2^2 - 3(2) + 4]$   
 $= x^2 + 4x + 4 - 3x - 6 + 4 - [4 - 6 + 4]$   
 $= x^2 + x + 2 - 2$   
 $= x^2 + x$

**B** 12. Determine which function is neither even nor odd.

(a)  $f(x) = \tan x$  (b)  $f(x) = 3x^5 + 5x^3 + 1$  (c)  $f(x) = \frac{3}{x^2}$  (d)  $f(x) = \sqrt{x^2 + 1}$  (e) Both a and b

$3(-x)^5 + 5(-x)^3 + 1 \neq -f(x)$

**D** 13. Find the point that lies on the line determined by the points  $(1, -2)$  and  $(-3, 1)$ .

(a)  $(0, 0)$  (b)  $(5, 1)$  (c)  $(4, -6)$  (d)  $(5, -5)$  (e)  $(-2, 0)$

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

plug in  $(5, -5)$   
 $15 - 20 = -5$

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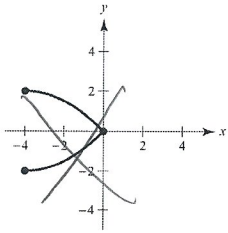
$y = x^2$

14. The domain of the function  $f$  shown in the figure is  $-4 \leq x \leq 4$ . Choose the complete graph of  $f$  if  $f$  is even.

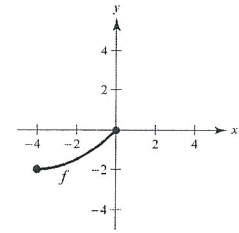
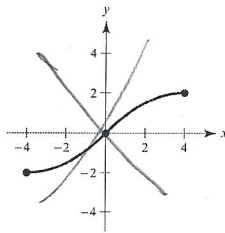
*symmetric y-axis*

D

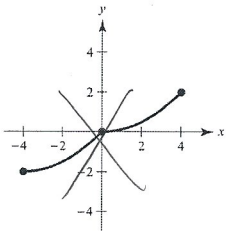
(a)



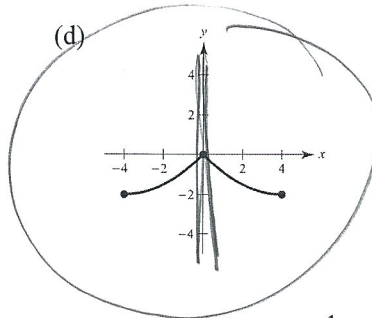
(b)



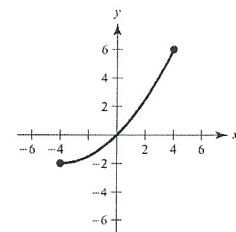
(c)



(d)



(e)

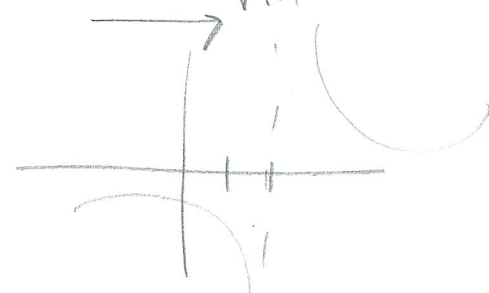


15. Describe the transformation needed to sketch the graph of  $y = \frac{1}{x-2}$  using the graph of  $f(x) = \frac{1}{x}$ .

*shift 2*  
 $x \neq 2$

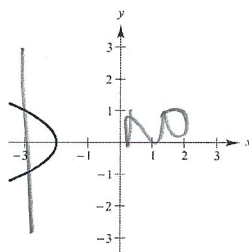
A

- (a) Shift  $f(x)$  two units to the right.
- (b) Shift  $f(x)$  two units to the left.
- (c) Shift  $f(x)$  two units upward.
- (d) Shift  $f(x)$  two units downward.
- (e) Reflect  $f(x)$  about the  $x$ -axis.

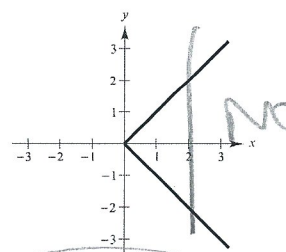


16. Use the vertical line test to determine which of the following graphs represent  $y$  as a function of  $x$ .

(a)

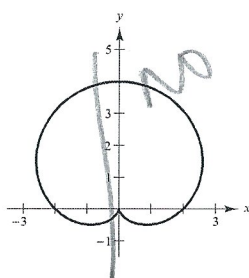


(b)

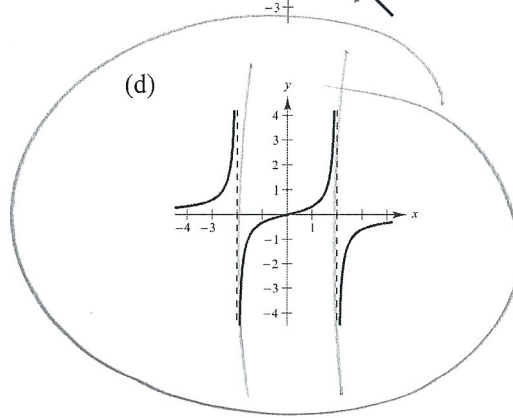


D

(c)



(d)



(e) None of these

17. Let  $f(x) = \begin{cases} \frac{1}{x} & x < 0 \\ 2x + 1, & x \geq 0 \end{cases}$ . Find  $f(3)$ .

$f(3) = 2(3) + 1$   
 $= 6 + 1 = 7$   
 (c) 7

- C (a)  $\frac{1}{3}$  (b) 1  
 (d) Undefined (e)  $\frac{22}{3}$

18. The dollar value of a product in 1998 is \$1430. The value of the product is expected to increase \$83 per year for the next 5 years. Write a linear equation that gives the dollar value  $V$  of the product in terms of the year  $t$ . (Let  $t = 8$  represent 1998.)

- A (a)  $V = 1430 + 83(t - 8)$  (b)  ~~$V = 83 + 1430t$~~  (c)  $V = 1430 + 83t$   
 (d)  ~~$V = 83 + 1430(t + 8)$~~  (e)  $V = 1430 + 83(t + 8)$   
 $t = 9$  1999  $(t - 8) = (9 - 8) = 1$  yr of increase  
 $1430 + 83$

19. During the first and second quarters of the year, a business had sales of \$150,000 and \$185,000, respectively. If the growth of sales follows a linear pattern, what will sales be during the fourth quarter?

- D (a) \$220,000 (b) \$235,000 (c) \$335,000  
 (d) \$255,000 (e) None of these  
 $+ 35,000$   
 $220,000, 255,000$   
 add 35,000 per Quarter

20. In order for a company to realize a profit in the manufacture and sale of a certain item, the revenue,  $R$ , for selling  $x$  items must be greater than the cost,  $C$ , of producing  $x$  items. If  $R = 79.99x$  and  $C = 61x + 1050$ , for what values of  $x$  will this product return a profit?

- D (a)  $x \geq 55$  (b)  $x \geq 8$  (c)  $x \geq 18$   
 (d)  $x \geq 56$  (e) None of these

$R > C$   
 $79.99x > 61x + 1050$   
 $-61x \quad -61x$

$\frac{18.99x}{18.99} > \frac{1050}{18.99}$

$x > 55.29$

$x \geq 56$

55 not included  
 ~~$x \geq 55$~~