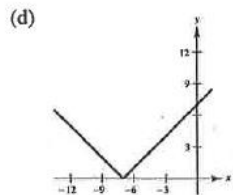
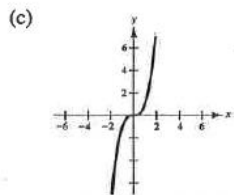
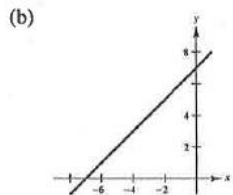
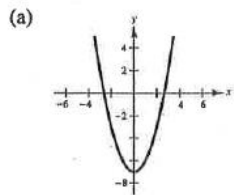


Name: Summer Assignment for Incoming AP Calculus AB Students

Due the 1<sup>st</sup> day of school! Each problem will be worth 1 point and it will be graded on accuracy! NO WORK = NO CREDIT. Show work on a separate sheet, answer in the booklet. If you need additional help you can visit my website: [vickerswihimath.weebly.com](http://vickerswihimath.weebly.com) for tutorial videos.

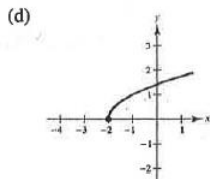
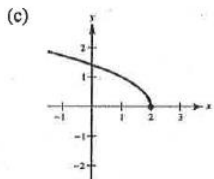
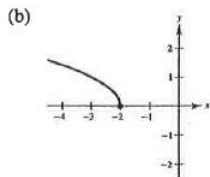
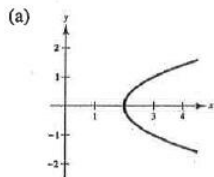
### Graphing Functions and Transformations

1. Identify the graph of the equation:  $y = |x + 7|$ .



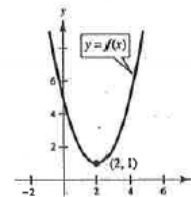
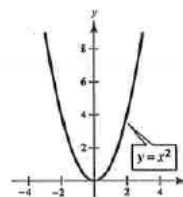
(e) None of these

2. Identify the graph of the equation:  $y = \sqrt{2 - x}$ .



(e) None of these

3. Use the graph of  $y = x^2$  to find a formula for the function  $y = f(x)$ .



(a)  $f(x) = (x - 2)^2 + 1$

(b)  $f(x) = (x - 1)^2 + 2$

(c)  $f(x) = (x + 2)^2 + 1$

(d)  $f(x) = (x + 1)^2 - 2$

(e) None of these

4. Write an equation for the graph obtained by shifting  $y = 2x - 5$  three units to the left.

(a)  $y = 2x - 8$

(b)  $y = 2x + 1$

(c)  $y = 2x - 11$

(d)  $y = 2x - 2$

(e) None of these

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

(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.

### Finding x and y-intercepts

6. Find the x-intercept(s):  $3x^2 + 2y^2 + 4xy - 12 = 0$ .

(a)  $\pm\sqrt{6}$

(b)  $\pm 2$

(c) 4

(d) 6

(e) None of these

7. Find the x-intercept(s):  $y = 2x^2 - 1$ .

(a)  $\frac{1}{2}$

(b) -1

(c)  $\pm\frac{\sqrt{2}}{2}$

(d)  $\pm\sqrt{2}$

(e) None of these

8 Find the  $x$ -intercept(s):  $y = x^2(x + 2)(3x - 1)$ .

(a)  $0, -2, \frac{1}{3}$

(b)  $0$

(c)  $0, 2, -1$

(d)  $-2, \frac{1}{3}$

(e) There are no  $x$ -intercepts.

9 Find all intercepts:  $y = \frac{x + 2}{x - 3}$ .

(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

10 Find all intercepts:  $y = \frac{x - 1}{x + 3}$ .

(a)  $(1, 0), (0, -\frac{1}{3})$

(b)  $(1, 0)$

(c)  $(-3, 0), (1, 0)$

(d)  $(-3, 0), (0, -\frac{1}{3})$

(e) None of these

### Symmetry of Functions (odd/even/neither)

11 Identify the type(s) of symmetry:  $x^4y^2 + 2x^2y - 1 = 0$ .

(a) To  $x$ -axis

(b) To  $y$ -axis

(c) To origin

(d) Both a and b

(e) None of these

12 Identify the type(s) of symmetry:  $3x^4 + xy - 2 = 0$ .

(a) To  $x$ -axis

(b) To  $y$ -axis

(c) To origin

(d) Both b and c

(e) No symmetry

13 Identify the type(s) of symmetry:  $y = x^3 + 3x$ .

(a) To  $x$ -axis

(b) To  $y$ -axis

(c) To origin

(d) Both a and b

(e) No symmetry

14 Determine if  $y = \frac{x}{x^2 - 4}$  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

15 Determine if  $y = \frac{x^2}{x^2 - 4}$  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

### Linear Functions

16 Find the slope of the line passing through the points  $(6, 10)$  and  $(-1, 4)$ .

(a)  $\frac{7}{6}$

(b)  $-\frac{7}{6}$

(c)  $\frac{6}{7}$

(d)  $-\frac{6}{7}$

(e) None of these

17 Find the slope of the line passing through the points  $(-1, 16)$  and  $(4, 2)$ .

(a)  $-\frac{5}{14}$

(b)  $-\frac{14}{5}$

(c)  $\frac{5}{14}$

(d)  $\frac{14}{5}$

(e) None of these

18 Find the equation of the line that has a slope of  $-\frac{3}{4}$  and passes through the point  $(1, 2)$ .

(a)  $3x - 4y - 7 = 0$

(b)  $3x - 4y - 11 = 0$

(c)  $3x + 4y - 11 = 0$

(d)  $3x + 4y + 11 = 0$

(e) None of these

19 Find the equation of the vertical line that passes through the point  $(2, 5)$ .

(a)  $y = 2$

(b)  $y = 5$

(c)  $x = 2$

(d)  $x = 5$

(e) None of these

- 20 Find the equation of the line that passes through the point  $(0, 0)$  and has a slope that is undefined.
- (a)  $y = 0$  (b)  $x = 0$  (c)  $x + y = 0$   
 (d)  $x = y$  (e) None of these
- 21 Find an equation for the horizontal line that passes through the point  $(-3, 2)$ .
- (a)  $x = 2$  (b)  $y = 2$  (c)  $x = -3$   
 (d)  $y = -3$  (e) None of these
- 22 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)  $(-2, 0)$
- 23 Determine the slope of the line given by the equation  $9x - 5y = 11$ .
- (a)  $\frac{5}{9}$  (b)  $-\frac{5}{9}$  (c)  $\frac{9}{5}$   
 (d)  $-\frac{9}{5}$  (e)  $-9$
- 24 Find the equation of the line that passes through the point  $(1, 3)$  and is perpendicular to the line  $2x + 3y + 5 = 0$ .
- (a)  $3x - 2y + 3 = 0$  (b)  $2x + 3y - 11 = 0$  (c)  $2x + 3y - 9 = 0$   
 (d)  $3x - 2y - 7 = 0$  (e) None of these
- 25 Find the equation of the line that passes through the point  $(2, -1)$  and is parallel to the line  $2x + 7y = 5$ .
- (a)  $2x - 7y - 11 = 0$  (b)  $2x + 7y + 3 = 0$  (c)  $2x + 7y - 12 = 0$   
 (d)  $7x - 2y - 16 = 0$  (e) None of these
- 26 Find an equation for the line passing through the point  $(4, -1)$  and perpendicular to the line  $\frac{1}{2}x - 3y = 3$ .
- (a)  $y = \frac{2}{3}x - 1$  (b)  $3x + 2y + 2 = 0$  (c)  $2x + 3y = 10$   
 (d)  $3x + 2y = 10$  (e) None of these
- 27 Find an equation for the line passing through the point  $(4, -1)$  and parallel to the line  $2x - 3y = 3$ .
- (a)  $2x - 3y = 11$  (b)  $2x - 3y = -5$  (c)  $3x - 2y = -5$   
 (d)  $y = \frac{2}{3}x - 1$  (e) None of these
- 28 Find the equation of the line through the point  $(3, 1)$  and perpendicular to the line through the points  $(8, 9)$  and  $(10, 6)$ .
- (a)  $y = -\frac{3}{2}(x - 8) + 9$  (b)  $y = \frac{2}{3}(x - 3) + 1$  (c)  $y = \frac{2}{3}(x - 8) + 9$   
 (d)  $y = -\frac{3}{2}(x - 3) + 1$  (e) None of these

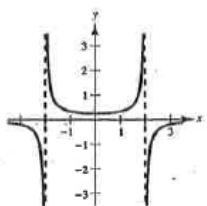
### Finding the Domain of a Function (use a graphing calculator)

- 20 Find the domain of the function:  $y = \frac{1}{x}$ .
- (a)  $(-\infty, \infty)$  (b)  $(-\infty, 0), (0, \infty)$  (c)  $(-\infty, 0)$   
 (d)  $(0, \infty)$  (e) None of these
- 30 Find the domain of the function:  $f(x) = \sqrt{2x + 3}$ .
- (a)  $[0, \infty)$  (b)  $(0, \infty)$  (c)  $[-\frac{3}{2}, \infty)$   
 (d)  $(-\frac{3}{2}, \infty)$  (e) None of these
- 31 Find the domain of the function:  $f(x) = \frac{1}{\sqrt{3 - 2x}}$ .
- (a)  $(-\infty, \frac{3}{2})$  (b)  $[\frac{3}{2}, \infty)$  (c)  $(\frac{3}{2}, \infty)$   
 (d)  $(-\infty, \frac{3}{2}), (\frac{3}{2}, \infty)$  (e) None of these
- 32 Find the domain of  $f(x) = \frac{1}{\sqrt{3 + 2x}}$ .
- (a)  $(-\infty, -\frac{3}{2})$  (b)  $[-\frac{3}{2}, \infty)$  (c)  $(-\frac{3}{2}, \infty)$   
 (d)  $(-\infty, -\frac{3}{2}), (-\frac{3}{2}, \infty)$  (e) None of these

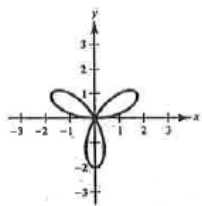
## Determine if a relationship represents a Function

33 Use the vertical line test to determine which of the following graphs does not represent  $y$  as a function of  $x$ .

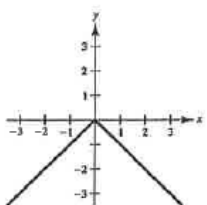
(a)



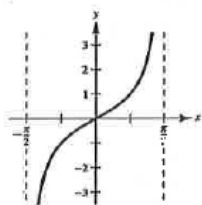
(b)



(c)



(d)



(e) Both a and d

34 In which of the following equations is  $y$  a function of  $x$ ?

(a)  $3y + 2x - 9 = 17$

(b)  $2x^2y + x = 4y$

(c) Both a and b

(d) Neither a nor b

(e) None of these

35 In which of the following equations is  $y$  a function of  $x$ ?

(a)  $2x + 3y - 1 = 0$

(b)  $x^2 + 3y^2 = 7$

(c)  $2x^2y = 7$

(d) Both a and b

(e) Both a and c

## Function Notation

36 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

37 Given  $f(x) = |x - 3| - 5$ , find  $f(1) - f(5)$ .

(a) 0

(b) -4

(c) 14

(d) -14

(e) None of these

38 Given  $f(x) = |3x + 1| - 5$ , find  $f(x + 1) - f(x)$ .

(a) 3

(b) -5

(c)  $|3x + 4| - |3x + 1| - 10$

(d)  $|3x + 4| - |3x + 1|$

(e) None of these

39 Find  $f(x + \Delta x)$  for  $f(x) = x^2 - 2x - 3$ .

(a)  $x^2 - x - 3 + \Delta x$

(b)  $x^2 + 2x(\Delta x) + (\Delta x)^2 - 2x - 2\Delta x - 3$

(c)  $x^2 - 2x - 3 + \Delta x$

(d) 5

(e) None of these

40 Let  $f(x) = \begin{cases} 1 - 2x, & x < 1 \\ -x^2, & x \geq 1 \end{cases}$ . Find  $f(5)$ .

(a) -9

(b) -25

(c) -17

(d) -34

(e) -1

41 Let  $f(x) = \begin{cases} x^2 - 5, & x < 2 \\ 3x + 1, & x \geq 2 \end{cases}$ . Find  $f(1)$ .

(a) -4

(b) -2

(c) 4

(d) 2

(e) 0

42 Given  $f(x) = 7x + 2$  and  $g(x) = x^2 - 9$ , find the product  $f(x)g(x)$ .

- (a)  $7x^3 + 2x^2 - 63x - 18$  (b)  $7x^3 - 18$   
(d)  $7x^2 - 61$  (e) None of these

43 Given  $f(x) = 6x - 12$  and  $g(x) = x^2 - 4$ , find  $\frac{f(x)}{g(x)}$ .

- (a)  $\frac{6}{x-2}$  (b)  $\frac{6(x-2)}{x+2}$   
(d)  $\frac{6}{x+2}$  (e) None of these

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

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

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

### Evaluating Composition Functions

46 Given  $f(x) = 2x^2 + 1$  and  $g(x) = x - 2$ , find  $(f \circ g)(x)$ .

- (a)  $x^2 - 7$  (b)  $2x^2 + x - 1$  (c)  $2x^2 - 1$   
(d)  $2x^2 - 8x + 9$  (e) None of these

47 Given  $f(x) = 2x^2 + 1$  and  $g(x) = x + 2$ , find  $(f \circ g)(x)$ .

- (a)  $2x^2 + 5$  (b)  $2x^2 + 3$  (c)  $2x^2 + 4x + 5$   
(d)  $2x^2 + 8x + 9$  (e) None of these

48 Given  $f(x) = x - 2$  and  $g(x) = \frac{x+5}{3}$ , find  $(g \circ f)(x)$ .

- (a)  $\frac{x-1}{3}$  (b)  $\frac{x+3}{3}$  (c)  $\frac{x^2+3x-10}{3}$   
(d)  $x+1$  (e) None of these

49 If  $f(x) = x^2$  and  $g(x) = \frac{x+1}{x}$ , find  $g(f(-2))$ .

- (a)  $\left(\frac{x+1}{x}\right)^2$  (b)  $\frac{x^2+1}{x^2}$  (c)  $\frac{5}{4}$   
(d)  $\frac{1}{4}$  (e) None of these

50 Let  $f(x) = \frac{1}{\sqrt{x}}$  and  $g(x) = 2x + 3$ . Find the domain of  $(f \circ g)(x)$ .

- (a)  $x \geq -\frac{3}{2}$  (b)  $x > 0$  (c)  $x < \frac{2}{3}$   
(d)  $x > -\frac{3}{2}$  (e) None of these