Calculus Pre-Test DO NOT WRITE ON THIS TEST!
No Calculators

1) Identify the symmetry: $f(x) = x^2 + x - 4$
   a. Symmetrical to the x-axis
   b. Symmetrical to the origin
   c. Symmetrical to the y-axis
   d. Not symmetrical

2) Identify the symmetry: $f(x) = x^3 - 6x$
   a. Symmetrical to the x-axis
   b. Symmetrical to the origin
   c. Symmetrical to the y-axis
   d. Not symmetrical

3) Identify the symmetry: $f(x) = x^4 + 8$
   a. Symmetrical to the x-axis
   b. Symmetrical to the origin
   c. Symmetrical to the y-axis
   d. Not symmetrical

True or false:

4) A function can be symmetrical to an axis AND the origin at the same time.

5) A function can be symmetrical to the x-axis.

6) A function can be symmetrical to the y-axis AND have a y-intercept.

7) If (3, -2) is a point on a graph that is symmetric with respect to the x-axis, then (-3, -2) is also a point on the graph.

---

8) Find **all** intercepts of the function $f(x) = x^2 + 8x - 20$. MORE THAN ONE ANSWER IS POSSIBLE!
   a. (0, -20)
   b. (10, 0)
   c. (2, 0)
   d. (-10, 0)
   e. (-2, 0)
   f. (-20, 0)

9) Find **all** intercepts of the function $f(x) = x\sqrt{16 - x^2}$. MORE THAN ONE ANSWER IS POSSIBLE!
   a. (16, 0)
   b. (4, 0)
   c. (0, 4)
   d. (-4, 0)
   e. (0, 0)
   f. (0, 16)

10) Find the points of intersection of the graphs of the following equations: MORE THAN ONE ANSWER IS POSSIBLE!

$$x - y = 1$$
$$x^2 + y^2 = 5$$

   a. (3, 2)
   b. (-1, -2)
   c. $(\sqrt{5}, 0)$
   d. (0, -1)
   e. (2, 1)
   f. None of these

11) Find the line that is perpendicular to $y - 2x = 4$ that passes through the point (2, 7)
   a. $y = 2x + 3$
   b. $y = -2x + 11$
   c. $y = \frac{1}{2}x + 6$
   d. $y = -\frac{1}{2}x + 8$
   e. $y = 2x + 4$
   f. None of these

12) Find the line that is parallel to $y - 2x = 4$ that passes through the point (2, 7)
   a. $y = 2x + 3$
   b. $y = -2x + 11$
   c. $y = \frac{1}{2}x + 6$
   d. $y = -\frac{1}{2}x + 8$
   e. $y = 2x + 4$
   f. None of these

Match:

13)	General Form	a. $y = mx + b$
14)	Vertical line	b. $y - b = mx$
15)	Horizontal line	c. $y = b$
16)	Point-slope form	d. $y - y_1 = m(x - x_1)$
17)	Slope-intercept form	e. $x = a$
		f. $Ax = By$
		g. $Ax + By + C = 0$

18) Find the slope of the line passing through the points (3, - 1), (-2, -6)

19) Find the y-intercept of the line that passes through the points (3, - 1), (-2, -6)

20) True or false: The following points are collinear (2, -2), (-2, 1) (-1, 0)

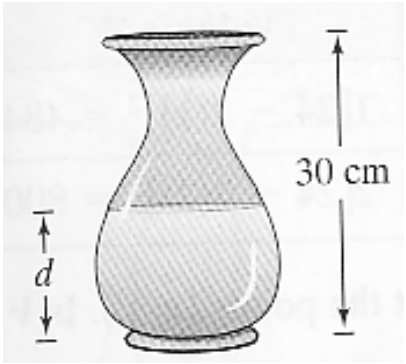
21) True or false: It is possible for two lines with negative slopes to be perpendicular.

22) Given $f(x) = x^2 - 3$, find $f(8)$

23) Given $f(x) = x^2 - 3$, find $\dfrac{f(x + \Delta x) - f(x)}{\Delta x}$

a. Δx
b. $\dfrac{x^2 + \Delta x^2 - 3}{\Delta x}$
c. $2x + \Delta x$
d. None of these

Water runs into a vase of height 30 centimeters at a constant rate. The vase is full after 5 seconds. Use this information and the shape of the vase shown to answer questions 24 – 28 if d is the depth of the water in centimeters and t is the time in seconds.



24) True or false: d is a function of t.

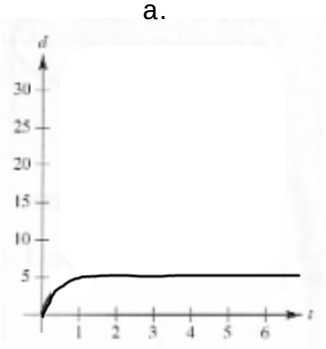
25) True or false: t is a function of d.

26) Determine the domain of the function.
a. (0, 5)
b. [0, 5)
c. [5, 30)
d. [0, 5]
e. None of these

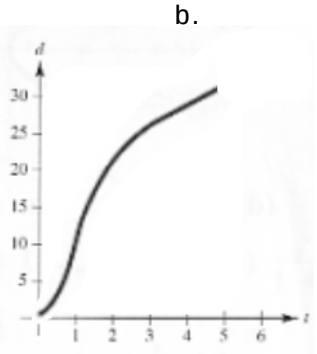
27) Determine the range of the function.
a. (0, 30)
b. [0, 30)
c. [5, 30)
d. [0, 30]
e. None of these

28) Which of the following graphs could be a model of the function?

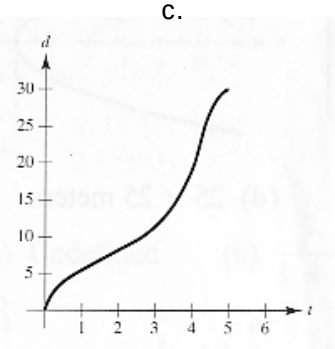
a.



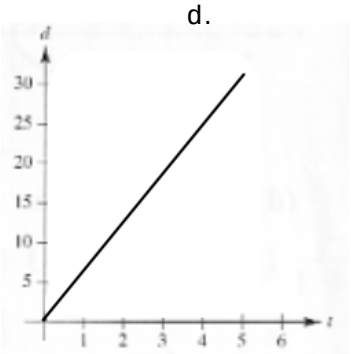
b.



c.



d.



Determine whether the function is even, odd or neither

29) $f(x) = x^2 + 2x + 2$

a. Even b. Odd c. Neither

30) $g(x) = 1 + \sin x$

a. Even b. Odd c. Neither

31) $h(x) = x^4 - x^2$

a. Even b. Odd c. Neither

32) $m(x) = x\cos x$

a. Even b. Odd c. Neither

33) An open box is to be made from a rectangular piece of material 9 inches by 12 inches by cutting equal squares from each corner and turning up the sides. Let x be the length of each side of the square cut out of each corner. Write the volume V of the box as a function of x.

a) $V = x^3$ b) $V = 108x$
c) $V = x(9 - x)(12 - x)$ d) $V = x(9 - 2x)(12 - 2x)$
e) None of these

Use the graphs to the right to answer questions 34 – 39. MORE THAN ONE ANSWER IS POSSIBLE FOR EACH QUESTION. GRAPHS MAY BE USED MORE THAN ONCE.

34) Which of the graphs represent a cubic function?

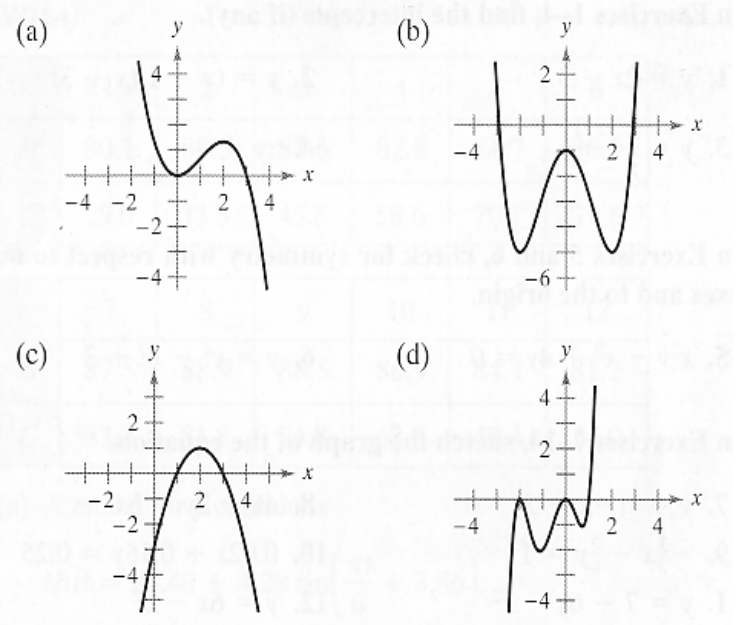
35) Which graphs have a positive leading coefficient?

36) What is the minimum degree of (d)?

37) Which of the graphs represent a quadratic function?

38) How many zeros does (b) have?

39) True or false: all graphs represent polynomial functions.



40) Find the equation of the vertical line that passes through the point (-1, 4)

a. $x = -1$ b. $x = 4$ c. $y = 4$ d. $y = -1$ e. None of these

Calculus Pre-Test
No Calculators

DO NOT WRITE ON THIS TEST!

1) Identify the symmetry: $f(x) = x^2 + x - 4$ **d. Not symmetrical**

2) Identify the symmetry: $f(x) = x^3 - 6x$ **b. Symmetrical to the origin**

3) Identify the symmetry: $f(x) = x^4 + 8$ **c. Symmetrical to the y-axis**

True or false:

4) A function can be symmetrical to an axis AND the origin at the same time. **False**

5) A function can be symmetrical to the x-axis. **False**

6) A function can be symmetrical to the y-axis AND have a y-intercept. **True**

7) If (3, -2) is a point on a graph that is symmetric with respect to the x-axis, then (-3, -2) is also a point on the graph. **False**

---

8) Find **all** intercepts of the function $f(x) = x^2 + 8x - 20$. MORE THAN ONE ANSWER IS POSSIBLE!

a. (0, -20)
b. (10, 0)
c. (2, 0)
d. (-10, 0)
e. (-2, 0)
f. (-20, 0)

9) Find **all** intercepts of the function $f(x) = x\sqrt{16 - x^2}$. MORE THAN ONE ANSWER IS POSSIBLE!

a. (16, 0)
b. (4, 0)
c. (0, 4)
d. (-4, 0)
e. (0, 0)
f. (0, 16)

10) Find the points of intersection of the graphs of the following equations: MORE THAN ONE ANSWER IS POSSIBLE!

$$x - y = 1$$
$$x^2 + y^2 = 5$$

a. (3, 2)
b. (-1, -2)
c. $(\sqrt{5}, 0)$
d. (0, -1)
e. (2, 1)
f. None of these

11) Find the line that is perpendicular to $y - 2x = 4$ that passes through the point (2, 7)

a. $y = 2x + 3$
b. $y = -2x + 11$
c. $y = \frac{1}{2}x + 6$
d. $y = -\frac{1}{2}x + 8$
e. $y = 2x + 4$
f. None of these

12) Find the line that is parallel to $y - 2x = 4$ that passes through the point (2, 7)

a. $y = 2x + 3$
b. $y = -2x + 11$
c. $y = \frac{1}{2}x + 6$
d. $y = -\frac{1}{2}x + 8$
e. $y = 2x + 4$
f. None of these

13) General Form **G**
14) Vertical line **E**
15) Horizontal line **C**
16) Point-slope form **D**
17) Slope-intercept form **A**

a. $y = mx + b$
b. $y - b = mx$
c. $y = b$
d. $y - y_1 = m(x - x_1)$
e. $x = a$
f. $Ax = By$
g. $Ax + By + C = 0$

18) Find the slope of the line passing through the points (3, - 1), (-2, -6) **1**

19) Find the y-intercept of the line that passes through the points (3, - 1), (-2, -6) **-4**

20) True or false: The following points are collinear (2, -2), (-2, 1) (-1, 0) **False**

21) True or false: It is possible for two lines with negative slopes to be perpendicular. **False**

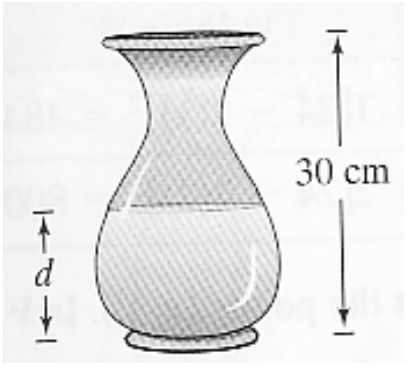
22) Given $f(x) = x^2 - 3$, find $f(8)$ **61**

23) Given $f(x) = x^2 - 3$, find $\dfrac{f(x + \Delta x) - f(x)}{\Delta x}$

a. Δx c. **$2x + \Delta x$**

b. $\dfrac{x^2 + \Delta x^2 - 3}{\Delta x}$ d. None of these

Water runs into a vase of height 30 centimeters at a constant rate. The vase is full after 5 seconds. Use this information and the shape of the vase shown to answer questions 24 – 28 if d is the depth of the water in centimeters and t is the time in seconds.



24) True or false: d is a function of t. **True**

25) True or false: t is a function of d. **False**

26) Determine the domain of the function.

a. (0, 5) d. **[0, 5]**

b. [0, 5) e. None of these

c. [5, 30)

27) Determine the range of the function.

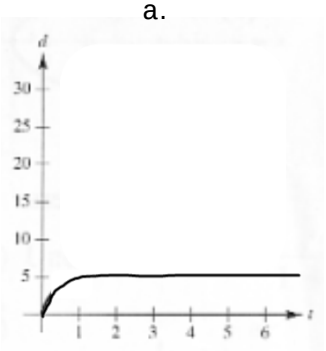
a. (0, 30) d. **[0, 30]**

b. [0, 30) e. None of these

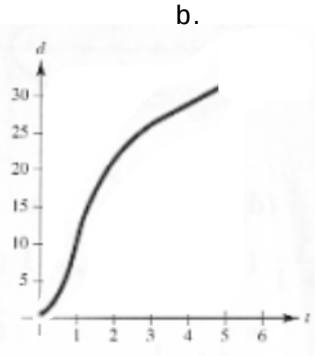
c. [5, 30)

28) Which of the following graphs could be a model of the function?

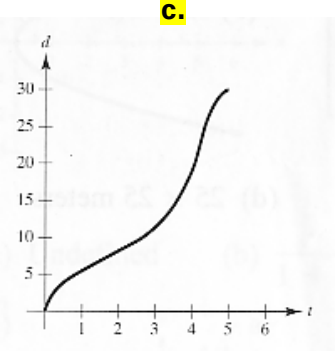
a.



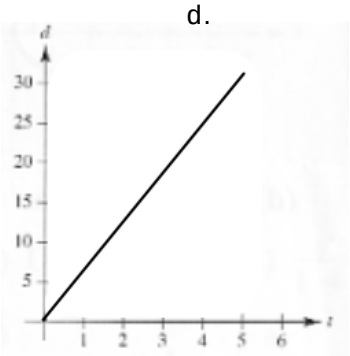
b.



c.



d.



Determine whether the function is even, odd or neither

29) $f(x) = x^2 + 2x + 2$

a. Even b. Odd **c. Neither**

30) $g(x) = 1 + \sin x$

a. Even b. Odd c. **Neither**

31) $h(x) = x^4 - x^2$

a. **Even** b. Odd c. Neither

32) $m(x) = x\cos x$

a. Even b. **Odd** c. Neither

33) An open box is to be made from a rectangular piece of material 9 inches by 12 inches by cutting equal squares from each corner and turning up the sides. Let x be the length of each side of the square cut out of each corner. Write the volume V of the box as a function of x.

a) $V = x^3$ b) $V = 108x$
c) $V = x(9 - x)(12 - x)$ d) **$V = x(9 - 2x)(12 - 2x)$**
e) None of these

Use the graphs to the right to answer questions 34 – 39. MORE THAN ONE ANSWER IS POSSIBLE FOR EACH QUESTION. GRAPHS MAY BE USED MORE THAN ONCE.

34) Which of the graphs represent a cubic function? **A**

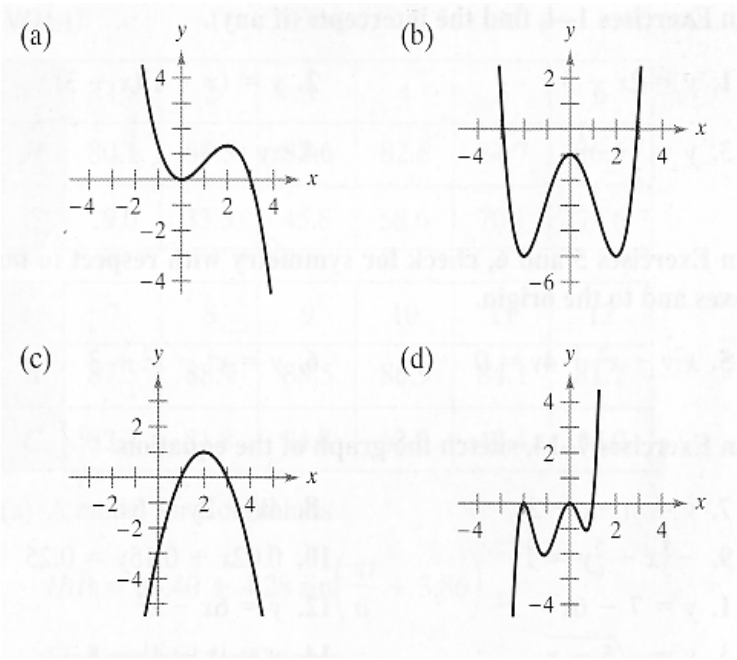
35) Which graphs have a positive leading coefficient? **C, D**

36) What is the minimum degree of (d)? **5**

37) Which of the graphs represent a quadratic function? **C**

38) How many zeros does (b) have? **2**

39) True or false: all graphs represent polynomial functions. **TRUE**



40) Find the equation of the vertical line that passes through the point (-1, 4)

a. **x = -1** b. x = 4 c. y = 4 d. y = -1 e. None of these