Chapters 1 + 2

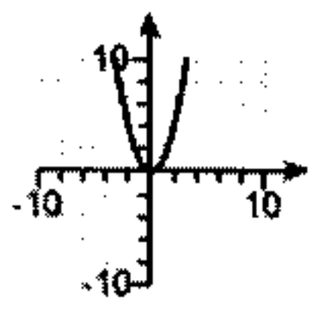
Student: _____	**Instructor:** SIU INSTRUCTOR	**Assignment:** Rev for Final-Chapters 1&2
Date: _____	**Course:** Math 108 Final Review	
Time: _____	**Book:** Beecher: Algebra & Trigonometry, 3e ENHANCED	

1. Graph the equation.

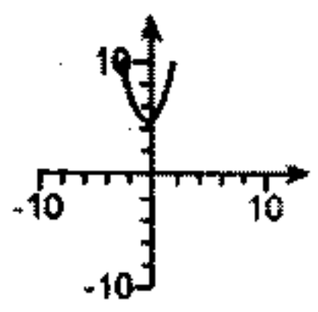
$y = x^2 - x - 5$

Choose the correct graph.

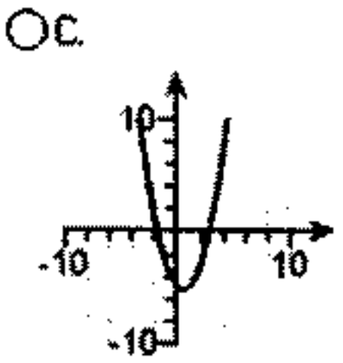
○A.



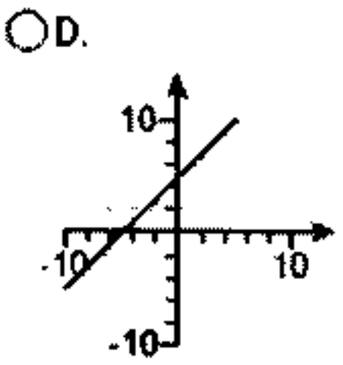
○B.



○C.



○D.



Answer: C

2. Find the equation for the circle with a diameter whose endpoints are $(1,2)$ and $(-3,-5)$.

Choose the correct equation.

○A. $(x+2)^2 + (y+3)^2 = 65$

○B. $(x-1)^2 + (y-2)^2 = \frac{65}{4}$

○C. $(x+1)^2 + \left(y+\frac{3}{2}\right)^2 = \frac{65}{4}$

○D. $(x+1)^2 + \left(y+\frac{3}{2}\right)^2 = 65$

Answer: C

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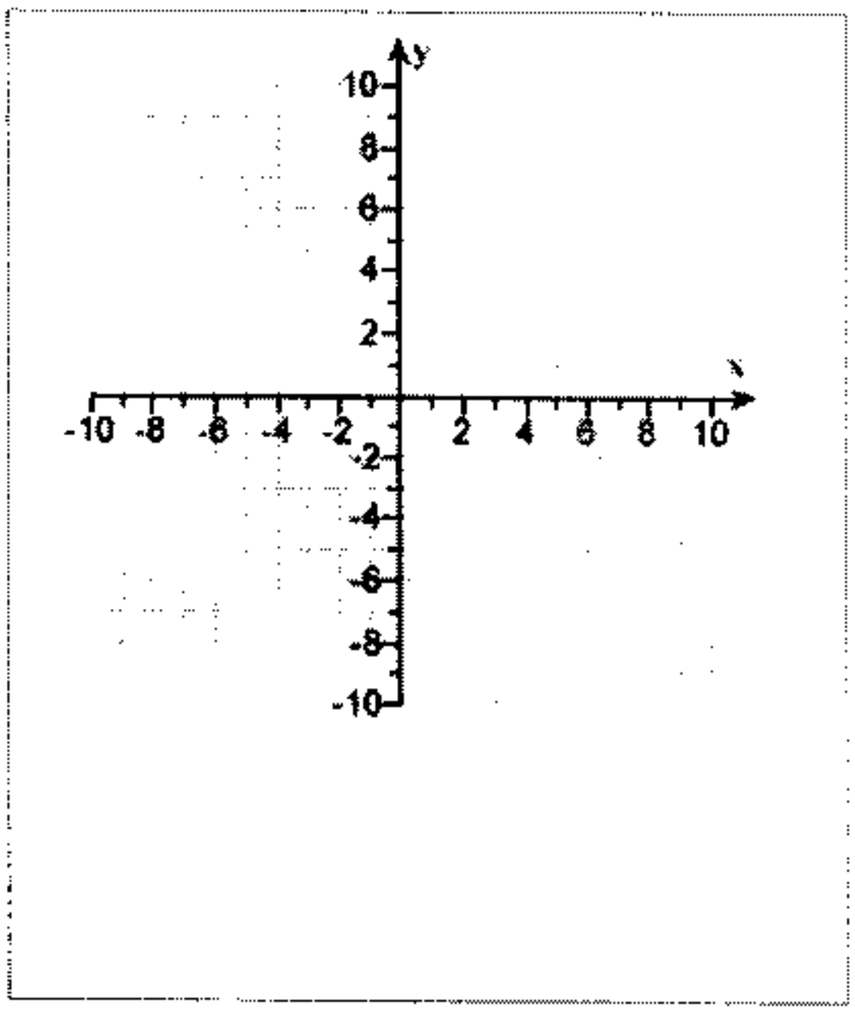
3.

Graph the circle.

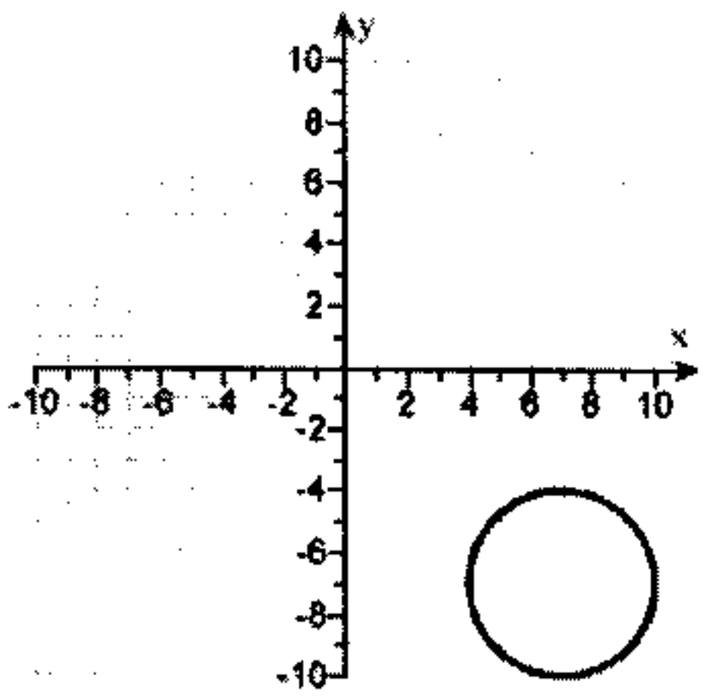
$(x-7)^2+(y+7)^2=9$

Use the graphing tool on the right to graph the circle.

Click to enlarge graph



Answer:



4. Find the domain of the function.

$$g(x) = \frac{x}{x^2 + 8x + 12}$$

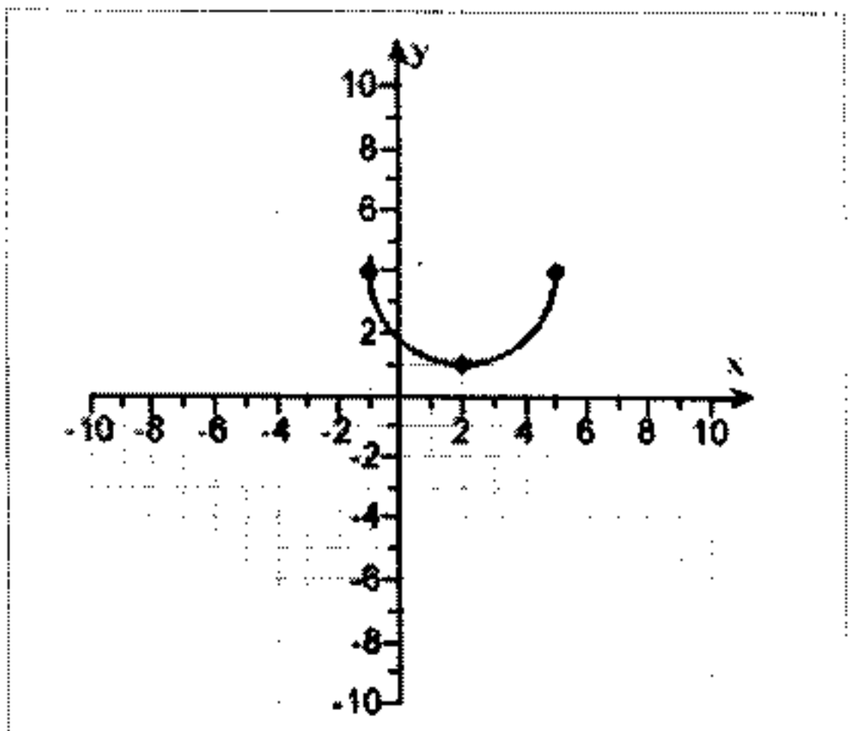
What is the domain of the function g(x)?

○A. $\{x \mid x \neq 0\}$ ○B. $\{x \mid x \neq 2\}$

○C. $\{x \mid x \neq -2 \text{ and } x \neq -6\}$ ○D. $\{x \mid x \text{ is a real number}\}$

Answer: C

5. Use the graph to determine the domain and range of the function.



What is the domain of the function?

□

(Type your answer in interval notaion.)

What is the range of the function?

□

(Type your answer in interval notaion.)

Answers: $[-1,5]$

$[1,4]$

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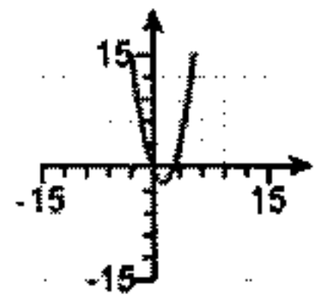
6. Graph the function. Then visually estimate the domain and range.

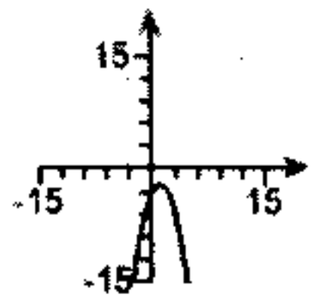
$f(x) = -x^2 + 2x - 3$

Choose the correct graph.

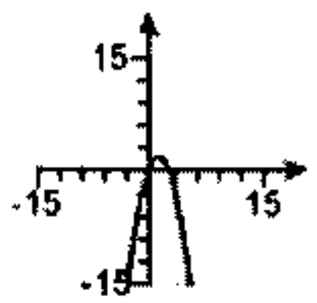
○A.



○B.



○C.



Choose the correct domain of f(x).

○A. $(-\infty, -2]$

○B. $\{x \mid x \neq 1\}$

○C. All real numbers

○D. $[-2, \infty)$

Choose the correct range of f(x).

○A. $\{y \mid y \neq 1\}$

○B. All real numbers

○C. $(-\infty, -2]$

○D. $[-2, \infty)$

Answers: B
C
C

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7. Find the slope of the following line, and sketch the graph.

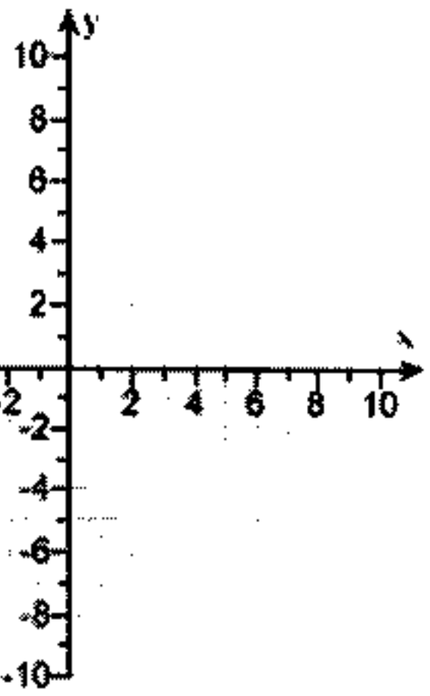
$-3x + y = 6$

The slope is $\square$.

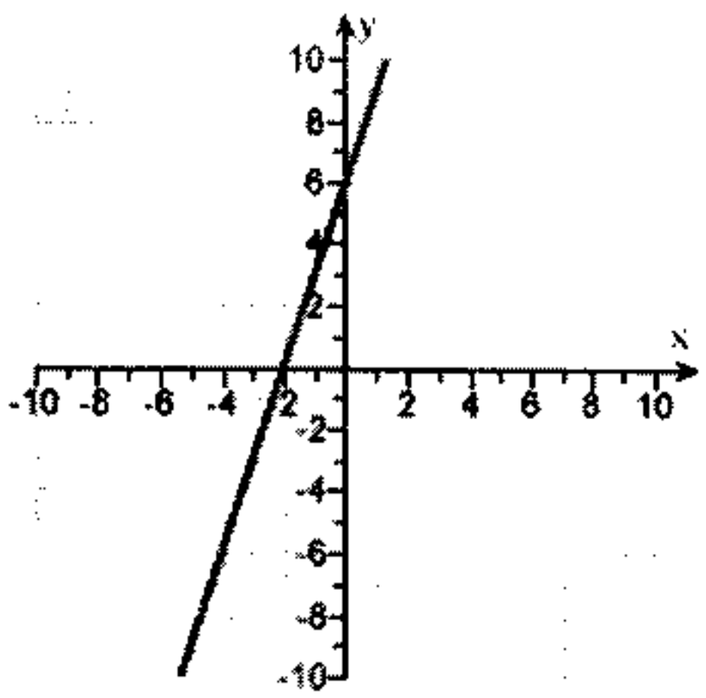
(Type a simplified fraction. Type N if the slope is undefined.)

Use the graphing tool on the right to graph the line.

Click to enlarge graph



Answers: 3



8. Let $g(x) = 3x^2 + 5x + 19$. Find $g(p + 4)$.

$g(p + 4) = \square$

(Simplify your answer.)

Answer: $3p^2 + 29p + 87$

9. Find an equation of the line containing the given pair of points.

$(-3, -1)$ and $(-8, -4)$

The equation of the line is $y =$ ☐.
(Simplify your answer. Use integers or fractions for any numbers in the expression.)

Answer: $\frac{3}{5}x + \frac{4}{5}$

10. Find a linear function h given $h(-1) = -7$ and $h(-6) = -3$.

The linear function is $h(x) =$ ☐.
(Simplify your answer. Use integers or fractions for any numbers in the expression.)

Answer: $-\frac{4}{5}x - \frac{39}{5}$

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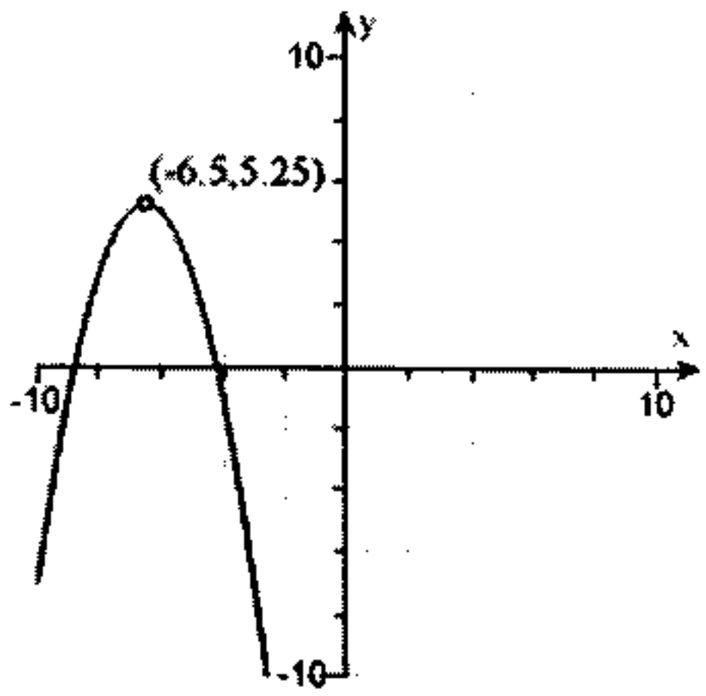
11.

Determine any relative maxima or minima of the function and the intervals on which the function is increasing or decreasing.

$f(x) = -x^2 - 13x - 37$



Does the function have a relative maximum or minimum?

- ○ Relative maximum
- ○ Relative minimum

The relative maximum occurs at $x =$ ☐ and has a value of ☐.

On what interval is the function increasing?

- ○A. $(-\infty, 5.25)$
- ○B. $(-6.5, \infty)$
- ○C. $(-\infty, -6.5)$
- ○D. $(5.25, \infty)$

On what interval is the function decreasing?

- ○A. $(-6.5, \infty)$
- ○B. $(-\infty, 5.25)$
- ○C. $(-\infty, -6.5)$
- ○D. $(5.25, \infty)$

Answers: the first choice

-6.5

5.25

C

A

12. Yardbird Landscaping has 56 m of fencing with which to enclose a rectangular garden. If the garden is x meters long, express the garden's area as a function of the length.

Which of the following expresses the area of the garden as a function of the length?

A. $A(x) = 28x + x^2$

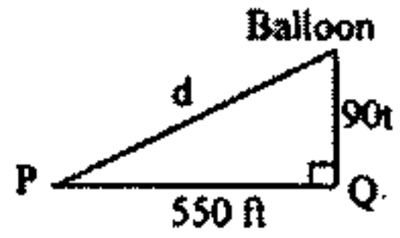
B. $A(x) = 56x - x^2$

C. $A(x) = 28x - x^2$

D. $A(x) = 56x + x^2$

Answer: C

13. A hot-air balloon rises at a rate of 90 ft/min. The balloon is tracked from point P, which is 550 ft from release point Q. Let d = distance from the balloon to point P and t = time, in minutes, since the balloon was released. Express d as a function of t.



What is d expressed as a function of t?

A. $d(t) = \sqrt{(90t) + (550)}$

B. $d(t) = \sqrt{90t^2 + 550^2}$

C. $d(t) = (90t)^2 + (550)^2$

D. $d(t) = \sqrt{(90t)^2 + (550)^2}$

Answer: D

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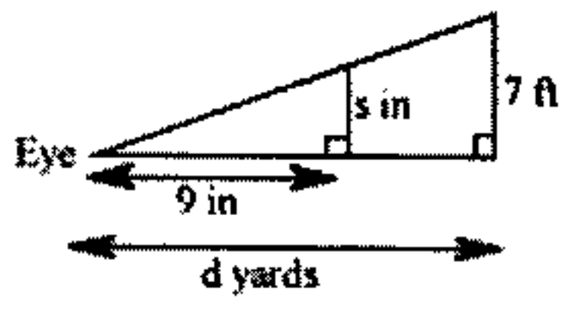
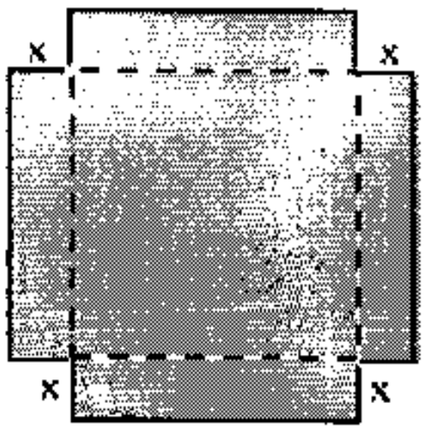
14. A device used in golf to estimate the distance d, in yards, to a hole measures the size s, in inches, that the 7-ft pin appears to be in a viewfinder. The viewfinder is held 9 inches from the viewer's eye. Express the distance d as a function of s.



d(s) = ☐

Answer: $\frac{21}{s}$

15. A piece of sheet metal is 14 cm by 14 cm. Square corners are cut out so that the sides can be folded up to make a box. Let x represent the length of a cut-out square.



Which function V represents the volume of the box in terms of x?

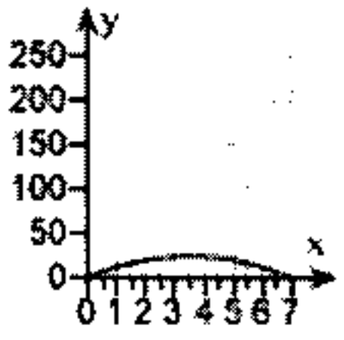
○A. $V = x(14 - 2x)$
○B. $V = (14 - 2x)^2$
○C. $V = 196x$
○D. $V = x(14 - 2x)(14 - 2x)$

What is the domain of the function?

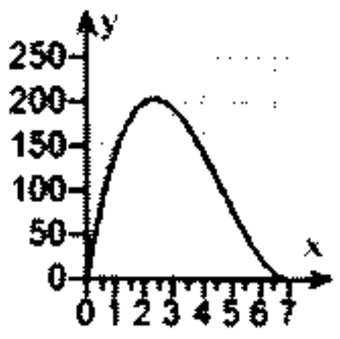
○A. $x > 0$
○B. $0 < x < 7$
○C. $0 < x < 28$
○D. $x < 7$

Graph the function with a graphing calculator. Choose the correct graph.

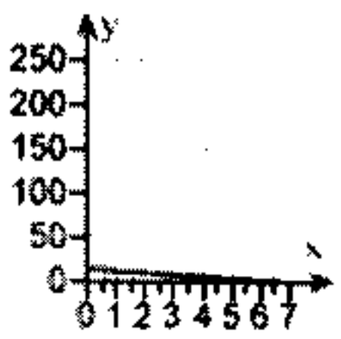
○A.



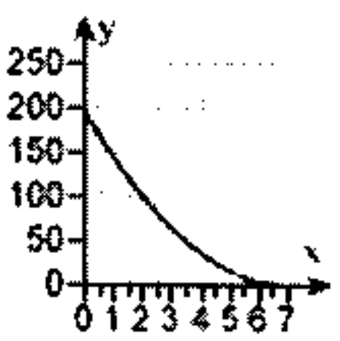
○B.



○C.



○D.



What dimensions approximately yield the maximum volume?

○A. 2.3cm by 2.3cm by 2.3cm
○B. 9.4cm by 9.4cm by 2.3cm
○C. 7cm by 7cm by 7cm
○D. 7cm by 7cm by 3.5cm

Answers: D
B
B
B

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16. For the piecewise function, find the values $h(-8)$, $h(-6)$, $h(1)$, and $h(8)$.

$$h(x) = \begin{cases} -3x - 14, & \text{for } x < -7 \\ 1, & \text{for } -7 \le x < 1 \\ x + 4, & \text{for } x \ge 1 \end{cases}$$

$h(-8) =$ ☐

$h(-6) =$ ☐

$h(1) =$ ☐

$h(8) =$ ☐

Answers: 10
1
5
12

17. For the given functions, find the domain of f, g, and f/g, and find (f/g)(x).

$f(x) = \frac{8}{x+2}$, $g(x) = \frac{1}{3-x}$

What is the domain of f?

○A. $(-\infty,\infty)$ ○B. $(-\infty,2) \cup (2,\infty)$

○C. $(-2,\infty)$ ○D. $(-\infty,-2) \cup (-2,\infty)$

What is the domain of g?

○A. $(-\infty,3) \cup (3,\infty)$ ○B. $(3,\infty)$

○C. $(-\infty,-3) \cup (-3,\infty)$ ○D. $(-\infty,\infty)$

What is the domain of f/g?

○A. $(-\infty,-3) \cup (-3,2) \cup (2,\infty)$ ○B. $(-\infty,3) \cup (3,\infty)$

○C. $(-\infty,-2) \cup (-2,\infty)$ ○D. $(-\infty,-2) \cup (-2,3) \cup (3,\infty)$

$(f/g)(x) =$ □

Answers: D
A
D
$\frac{8(3-x)}{x+2}$

18. The expression $\frac{f(x+h)-f(x)}{h}$ for $h \neq 0$ is called the difference quotient.

Find and simplify the difference quotient for the function

$f(x) = 3x^2 + 6x + 3$.

The difference quotient is □.
(Simplify your answer.)

Answer: $6x + 3h + 6$

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19. For $f(x) = 5x^3$, construct and simplify the difference quotient $\frac{f(x+h) - f(x)}{h}$.

$\frac{f(x+h) - f(x)}{h} =$ ☐

(Type in descending powers of x.)

Answer: $15x^2 + 15xh + 5h^2$

20. Let $f(x) = -4x - 1$ and $g(x) = x^2 - 2$.

Find $(f \circ g)(3)$.

Then $(f \circ g)(3) =$ ☐.

Answer: -29

21. Find $(f \circ g)(x)$ and $(g \circ f)(x)$ for the indicated functions.

$f(x) = 8x - 9$, $g(x) = \frac{x+9}{8}$

$(f \circ g)(x) =$ ☐ (Simplify your answer.)

$(g \circ f)(x) =$ ☐ (Simplify your answer.)

Answers: x

x

22. Determine the symmetries (if any) of the graph of the given relation.

$y = |x| - 6$

Choose the correct symmetry of the graph.

- ○ A. It is symmetric to the origin.
- ○ B. It is symmetric to the y-axis.
- ○ C. It is symmetric to the x-axis.
- ○ D. It has no symmetries.

Answer: B

23. Determine whether the function is even, odd, or neither even nor odd.

$$f(x) = \frac{1}{x^{12}}$$

Is the function even, odd, or neither?

- ○ A. Odd
- ○ B. Even
- ○ C. Neither even nor odd

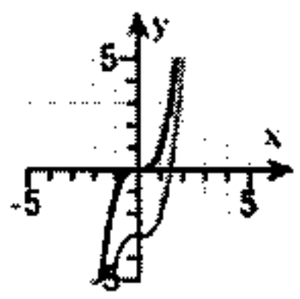
Answer: B

24. Graph the function.

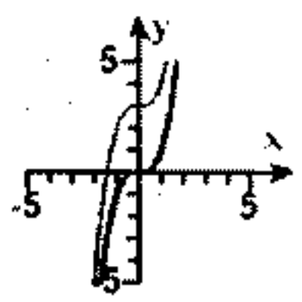
$g(x) = (x + 3)^3$

Each grid shows $f(x) = x^3$ in blue. Which grid also shows $g(x) = (x + 3)^3$?

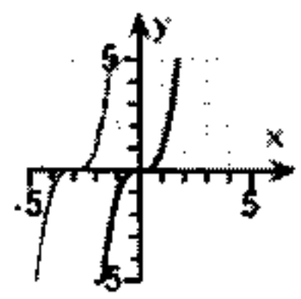
○A.



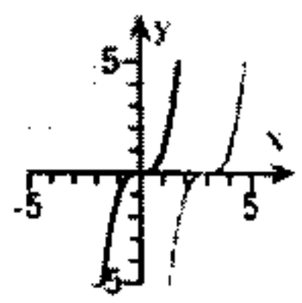
○B.



○C.



○D.



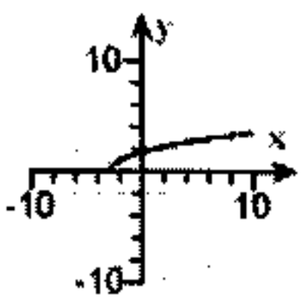
Answer: C

25. Graph the following function.

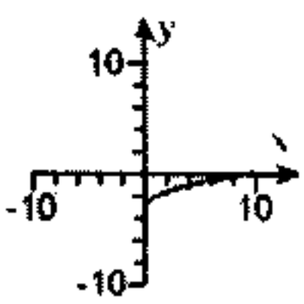
$y = \sqrt{x+3}$

Choose the best graph.

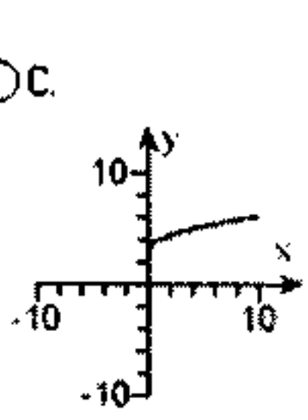
○A.



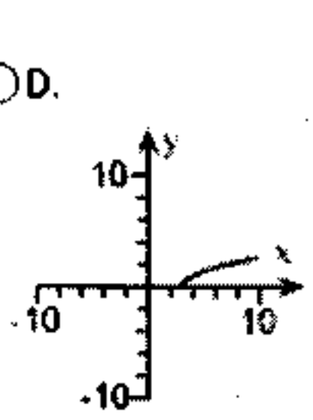
○B.



○C.



○D.



Answer: A

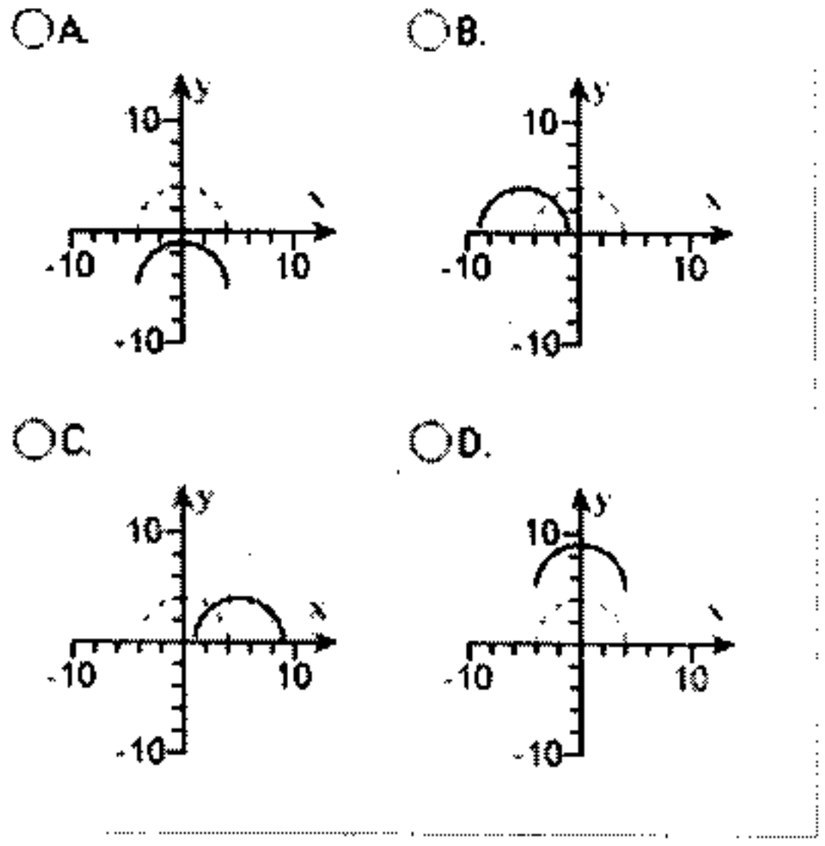
26. The point $(-15, 2)$ is on the graph of $y = f(x)$. Find a point on the graph of $y = g(x)$, where $g(x) = 2f(x)$.

A point on the graph of $y = g(x)$ is $\square$.
(Type an ordered pair.)

Answer: $(-15,4)$

27. The graph of $y = f(x)$ is shown in green. Graph $y = f(x) + 5$.

Choose the correct graph (in blue).



Answer: D

28. Solve $P = \frac{1}{4}k(e_1 + e_2)$ for k.

Choose the correct answer below.

A. $k = 4P - (e_1 + e_2)$

B. $k = 4P(e_1 + e_2)$

C. $k = \frac{P}{4(e_1 + e_2)}$

D. $k = \frac{4P}{(e_1 + e_2)}$

Answer: D

29. Solve for u.

$k = u + uns$

The solution is u = ☐.

Answer: $\dfrac{k}{1+ns}$

30. Multiply.

$(2+8i)^2$

$(2+8i)^2 =$ ☐
(Simplify your answer. Type your answer in the form $a + bi$.)

Answer: $-60+32i$

31. Divide and simplify to the form $a + bi$.

$\dfrac{2+9i}{9-i}$

$\dfrac{2+9i}{9-i} =$ ☐
(Type a and b as fractions.)

Answer: $\dfrac{9}{82}+\dfrac{83}{82}i$

32. Solve.

$4x^3 + x^2 - 36x - 9 = 0$
(Hint: factor by grouping.)

The solutions are ☐.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

Answer: $-\dfrac{1}{4}, -3, 3$

33. Find the zeros of the function algebraically.

$f(x) = x^2 - 18x - 4$

The zeros are ☐.
(Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

Answer: $9 + \sqrt{85}, 9 - \sqrt{85}$

34. Solve.

$x^4 - 19x^2 + 48 = 0$

The solution is x = ☐.
(Type exact answers, using radicals as needed. Use a comma to separate answers. Type N if there is no solution.)

Answer: $\sqrt{3}, -\sqrt{3}, 4, -4$

35. Solve.

$x - 7\sqrt{x} + 12 = 0$

The solution is x = ☐.
(Use a comma to separate answers. Type N if there is no solution.)

Answer: 16,9

36. Solve.

$x^{2/3} - 2x^{1/3} - 3 = 0$

The solution is x = ☐.
(Use a comma to separate answers. Type N if there is no solution.)

Answer: $27, -1$

37. The diagonal of a TV set is 13 inches long. Its length is 7 inches more than the height. Find the dimensions of the TV set.

The height of the TV set is [ ] inches.

The length of the TV set is [ ] inches.

Answers: 5
12

38. A picture frame measures 18 cm by 20 cm, and 120 cm^2 of picture shows. Find the width of the frame.

The width of the frame is [ ] cm.

Answer: 4

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39. For the function below, find the vertex, the axis of symmetry, the maximum or minimum value, and the graph of the function.

$f(x) = 2x^2 - 7x + 1$

The vertex is ☐.
(Type an ordered pair. Type fractions for the coordinates.)

Choose the correct axis of symmetry.

○A. $x = \frac{7}{4}$ ○B. $y = -\frac{41}{8}$

○C. $y = \frac{41}{8}$ ○D. $x = -\frac{7}{4}$

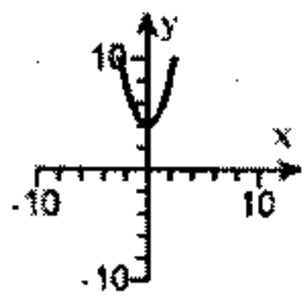
Does f(x) have a maximum or a minimum value?

○ Minimum
○ Maximum

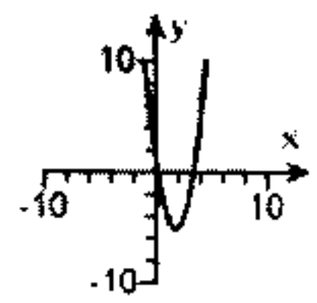
minimum/maximum value = ☐
(Type a fraction.)

Choose the correct graph of f(x).

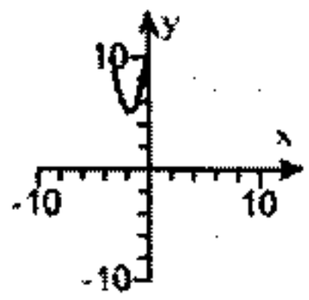
○A.



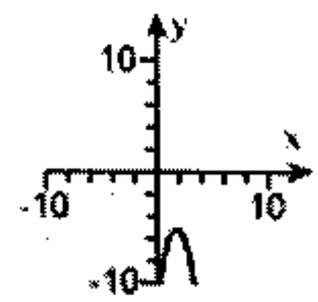
○B.



○C.



○D.



Answers: $\left(\frac{7}{4}, -\frac{41}{8}\right)$
A
the first choice
$-\frac{41}{8}$
B

40.

For the function below, find the vertex, the axis of symmetry, the maximum or minimum value, and the graph of the function.

$f(x) = -x^2 + 3x - 5$

The vertex is ☐.
(Type an ordered pair. Type fractions for the coordinates.)

Choose the correct axis of symmetry.

○A. $y = -\frac{11}{4}$ ○B. $x = -\frac{3}{2}$

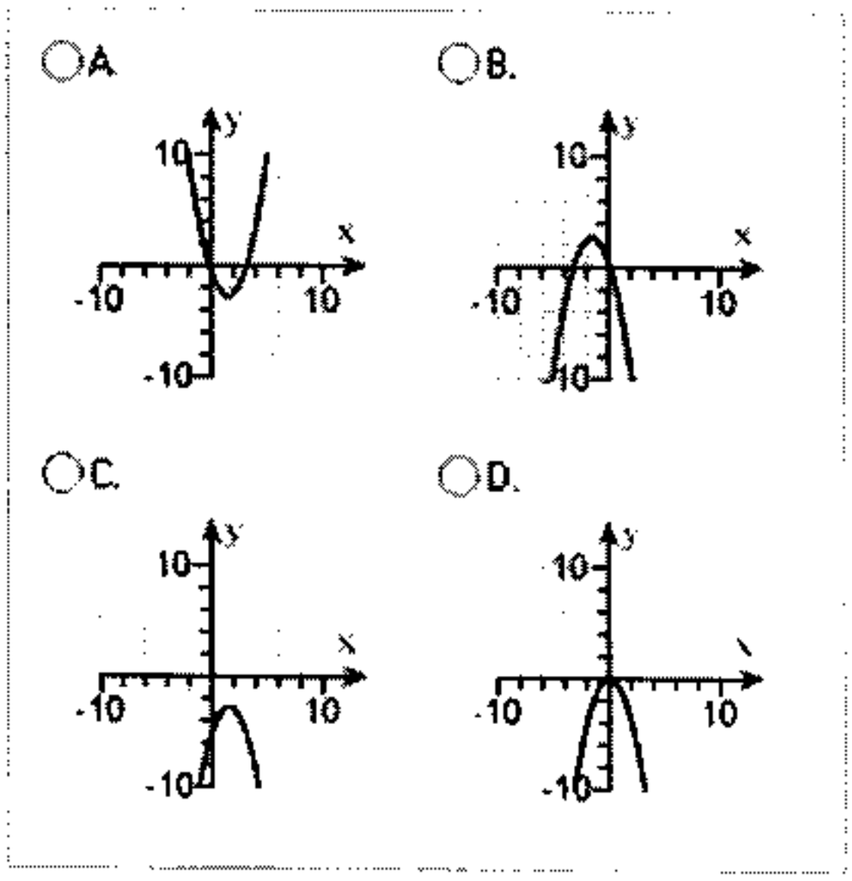
○C. $y = \frac{11}{4}$ ○D. $x = \frac{3}{2}$

Does f(x) have a maximum or a minimum value?

○ Maximum
○ Minimum

minimum/maximum value = ☐
(Type a fraction.)

Choose the correct graph of f(x).



Answers: $\left(\frac{3}{2}, -\frac{11}{4}\right)$
D
the first choice
$-\frac{11}{4}$
C

41. If a baseball is projected upward from ground level with an initial velocity of 64 feet per second, then its height is a function of time, given by $s = -16t^2 + 64t$.

What is the maximum height reached by the ball?

The maximum height reached by the ball is ☐ feet.

Answer: 64

42. A one compartment vertical file is to be constructed by bending the long side of an 8 in by 14 in sheet of plastic along two lines to form a U shape. How tall should the file be to maximize the volume that it can hold?

The file should be ☐ in high.
(Type an integer or an improper fraction.)

Answer: $\frac{7}{2}$

43. Solve.

$$\frac{-4a}{a+10} = \frac{4}{a-8}$$

The solution(s) is/are a = ☐.
(Use a comma to separate answers. Type N if there is no solution.)

Answer: 2,5

44. Solve.

$$\sqrt{x+9} + 3 = x$$

x = ☐
(Type N if there is no solution.)

Answer: 7

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45. Solve $\frac{S_1V_1}{Z_1} = \frac{S_2V_2}{Z_2}$ for Z_2 .

Choose the correct answer below.

○A. $Z_2 = \frac{S_1V_1Z_1}{S_2V_2}$

○B. $Z_2 = \frac{S_1V_1}{S_2V_2Z_1}$

○C. $Z_2 = \frac{S_2V_2Z_1}{S_1V_1}$

○D. $Z_2 = \frac{S_2V_2}{S_1V_1Z_1}$

Answer: C

46. Solve $\frac{1}{t} + \frac{1}{r} = \frac{1}{e}$ for t.

The solution is t = ☐.

Answer: $\frac{re}{r-e}$

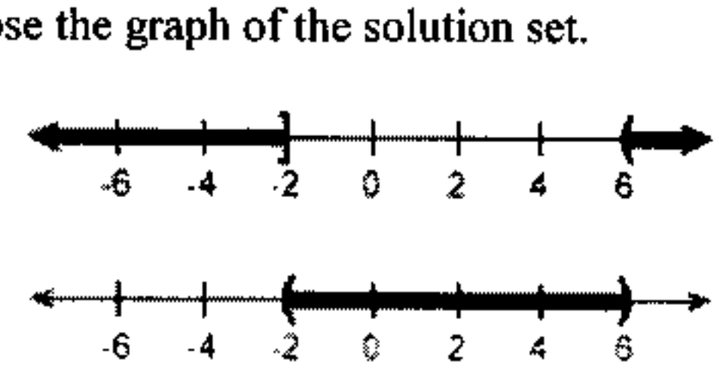
47. Solve and graph.

$-6 < 6 - 2x \leq 10$

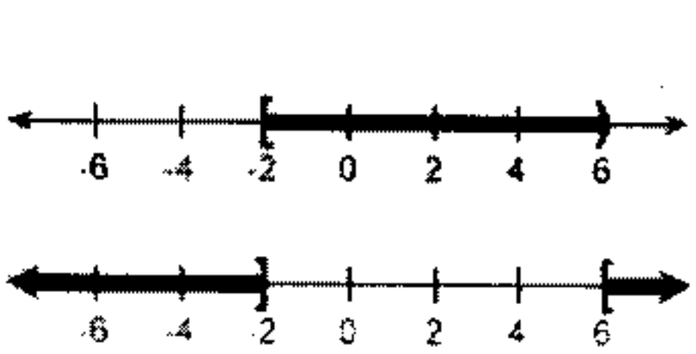
The solution set in interval notation is ☐.
(Type N if there is no solution.)

Choose the graph of the solution set.

○A.



○B.



○C.

○D.

Answers: $[-2,6)$
B

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