09-02-19
09-11-19

Student: _____ **Instructor:** Alfredo Alvarez **Assignment:** MA1314FIESTACOREQ14READY090
Date: _____ **Course:** Math 1314 Alvarez

09-15-19
09-17-19

1. Find the product.

$(x-4)(x+2)$

$(x-4)(x+2) =$ _____

$x^2+2x-4x-8=$

$x^2-2x-8=$ answer

Answer: x^2-2x-8

ID: P.4.21

2. Find the product.

$(x-3)(x+3)$

$(x-3)(x+3) =$ _____ (Simplify your answer.)

$x^2+3x-3x-9=$

$x^2-9=$ answer

Answer: x^2-9

ID: P.4.31

3. Multiply using the rule for the square of a binomial.

$(x+12)^2$

$(x+12)^2 =$ _____

$(x+12)(x+12)=$

$x^2+12x+12x+144=$

$x^2+24x+144=$ answer

Answer: $x^2+24x+144$

ID: P.4.41

4. Factor the trinomial, or state that the trinomial is prime.

$x^2-14x-32$

$(x+2)(x-16)$ answer

Check

Possible
32·1
16·2
4·8

Select the correct choice below and fill in any answer boxes within your choice.

- A. $x^2-14x-32=$ _____
- B. The polynomial is prime.

$(x+2)(x-16)=$

$x^2-16x+2x-32=$

$x^2-14x-32=$

Answer: A. $x^2-14x-32=$ $(x-16)(x+2)$

Good

ID: P.5.19

5. Factor the given polynomial.

$x^2 - 9x + 18$

Select the correct choice below and, if necessary, fill in the answer box within your choice.

- A. $x^2 - 9x + 18 =$ _____
- B. The polynomial is prime.

Answer: A. $x^2 - 9x + 18 =$ **(x − 6)(x − 3)**

ID: P.5.21

6. Factor the difference of two squares.

$144x^2 - 169y^2$

Select the correct choice below and fill in any answer boxes within your choice.

- A. $144x^2 - 169y^2 =$ _____
- B. The polynomial is prime.

Answer: A. $144x^2 - 169y^2 =$ **(12x + 13y)(12x − 13y)**

ID: P.5.43

7. Factor the expression completely or state that the polynomial is prime.

$7x^2 - 7x - 140$

Select the correct choice below and fill in any answer boxes within your choice.

- A. $7x^2 - 7x - 140 =$ _____ (Factor completely.)
- B. The polynomial is prime.

Answer: A. $7x^2 - 7x - 140 =$ **7(x + 4)(x − 5)** (Factor completely.)

ID: P.5.73

8. Use factoring to solve the quadratic equation. Check by substitution or by using a graphing utility and identifying x-intercepts.

$x^2 - x - 6 = 0$

The solution set is { }.
(Use a comma to separate answers as needed. Type repeated roots only once.)

Answer: $-2, 3$

ID: 1.5.1

$(x+2)(x-3)=0$
$x+2=0$ or $x-3=0$
$x+2-2=0-2$ or $x-3+3=0+3$
$x=-2$ or $x=3$

Possible: 6·1, 2·3

9. Solve the equation by factoring.

$x^2 = 3x + 28$

The solution set is { }.
(Use a comma to separate answers as needed.)

Answer: $7, -4$

ID: 1.5.3

$x^2-3x-28=0$
$(x+4)(x-7)=0$
$x+4=0$ or $x-7=0$
$x+4-4=0-4$ or $x-7+7=0+7$
$x=-4$ or $x=7$

Possible: 28·1, 14·2, 7·4

10. Solve the equation by factoring.

$8x^2 + 10x - 7 = 0$

The solution set is { }.
(Use a comma to separate answers as needed.)

Answer: $\frac{1}{2}, -\frac{7}{4}$

ID: 1.5.5

$(2x-1)(4x+7)=0$
$2x-1=0$ or $4x+7=0$
$2x-1+1=0+1$ or $4x+7-7=0-7$
$2x=1$ or $4x=-7$
$\frac{2x}{2}=\frac{1}{2}$ or $\frac{4x}{4}=\frac{-7}{4}$
$x=\frac{1}{2}$ or $x=-\frac{7}{4}$

Possible: 8·1, 4·2, 7·1

11. Use factoring to solve the quadratic equation. Check by substitution or by using a graphing utility and identifying x-intercepts.

$4x^2 + 12x = 0$

The solution set is { }.
(Use a comma to separate answers as needed.)

Answer: $0, -3$

ID: 1.5.9

$4x(x+3)=0$
$4x=0$ or $x+3=0$
$\frac{4x}{4}=\frac{0}{4}$ or $x+3-3=0-3$
$x=0$ or $x=-3$

12. Solve the equation by factoring.

$5 - 5x = (3x + 4)(x - 1)$

The solution set is { } (Use a comma to separate answers as needed.)

Answer: 1, − 3

ID: 1.5.13

$5-5x = 3x^2-3x+4x-4$
$5-5x = 3x^2+x-4$
$0 = 3x^2+x-4-5+5x$
$0 = 3x^2+6x-9$
$0 = 3(x^2+2x-3)$
$0 = 3(x-1)(x+3)$
$x-1=0$ or $x+3=0$
$x-1+1=0+1$ OR $x+3-3=0-3$
$x=1$ $x=-3$

Answer
$x=1$, or $x=-3$

13. Solve the equation by the square root property.

$(x-3)^2 = 36$

What is the solution set?

{ } (Use a comma to separate answers as needed.)

Answer: − 3, 9

ID: 1.5.21

$\sqrt{(x-3)^2} = \pm\sqrt{36}$
$x-3 = \pm 6$
$x-3=-6$ OR $x-3=6$
$x-3+3=-6+3$ OR $x-3+3=6+3$
$x=-3$ OR $x=9$ answer

Check
$(-3-3)^2=36$
$(-6)^2=36$
$-6(-6)=36$
$36=36$
Good

$(9-3)^2=36$
$(6)^2=36$
$(6)(6)=36$
$36=36$
Good

14. Solve the quadratic equation by completing the square.

$x^2 + 6x = 72$

What is the solution set?

{ } (Use a comma to separate answers as needed.)

Answer: 6, − 12

ID: 1.5.47

$x^2+6x+\left(\frac{1}{2}(6)\right)^2 = 72+\left(\frac{1}{2}(6)\right)^2$
$x^2+6x+(3)^2 = 72+(3)^2$
$x^2+6x+9 = 72+9$
$x^2+6x+9 = 81$
$(x+3)(x+3) = 81$
$(x+3)^2 = 81$
$\sqrt{(x+3)^2} = \pm\sqrt{81}$
$x+3 = \pm 9$

$x+3=-9$ or $x+3=9$
$x+3-3=-9-3$ $x+3-3=9-3$
$x=-12$ $x=6$
answer

15. Solve the following equation using the quadratic formula.

$x^2 + 9x + 18 = 0$

$a=1, b=9, c=18$

The solution set is { }.

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

Answer: − 3, − 6

ID: 1.5.65

$x = \frac{-9 \pm \sqrt{81-72}}{2}$
$x = \frac{-9 \pm \sqrt{9}}{2}$
$x = \frac{-9 \pm 3}{2}$

$x = \frac{-9+3}{2}$ OR $x = \frac{-9-3}{2}$
$x = \frac{-6}{2}$ OR $x = \frac{-12}{2}$
$x=-3$ OR $x=-6$
answer

formula
$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

16. Solve for x using the quadratic formula.

$x^2 - 10x + 61 = 0$

Answer: $5 + 6i, 5 - 6i$

ID: 1.5.73

The solution set is { }.
(Type an exact answer, using radicals as needed. Express complex numbers in terms of i. Use a comma to separate answers as needed.)

17. Solve the equation by the method of your choice.

$2x^2 + x = 3$

The solution set is { }.
(Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

Answer: $1, -\frac{3}{2}$

ID: 1.5.83

18. Solve the following equation.

$4x^2 - 56x + 196 = 0$

The solution set is { }.
(Use a comma to separate answers as needed.)

Answer: 7

ID: 1.5.95

19. In a round-robin chess tournament, each player is paired with every other player once. The function, shown below, models the number of chess games, N, that must be played in a round-robin tournament with t chess players. In a round-robin chess tournament, 45 games were played. How many players entered the tournament?

$N = \frac{t^2 - t}{2}$

How many players entered the tournament?

[ ] players (Simplify your answer.)

Answer: 10

ID: 1.5.131

20. Solve the given radical equation. Check all proposed solutions.

$\sqrt{3x+25} = x+7$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ A. The solution set is { }.
(Use a comma to separate answers as needed.)

○ B. There is no solution.

Answer: A. The solution set is { −3 }. (Use a comma to separate answers as needed.)

ID: 1.6.15

21. Evaluate the function $f(x) = x^2 + 9x + 6$ at the given values of the independent variable and simplify.

a. f(1) b. f(x + 8) c. f(− x)

a. f(1) = _____ (Simplify your answer.)

b. f(x + 8) = _____ (Simplify your answer.)

c. f(− x) = _____ (Simplify your answer.)

Answers 16

$x^2 + 25x + 142$

$x^2 - 9x + 6$

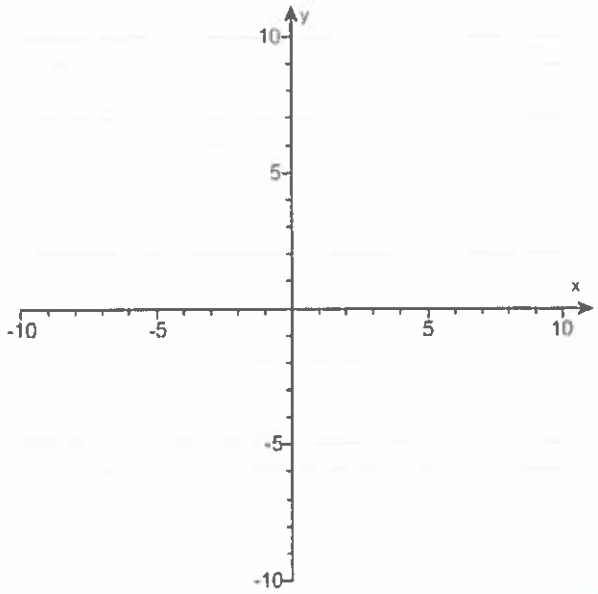
ID: 2.1.29

22.

Graph the given functions, f and g, in the same rectangular coordinate system. Then describe how the graph of g is related to the graph of f.

$f(x) = x$

$g(x) = x + 5$



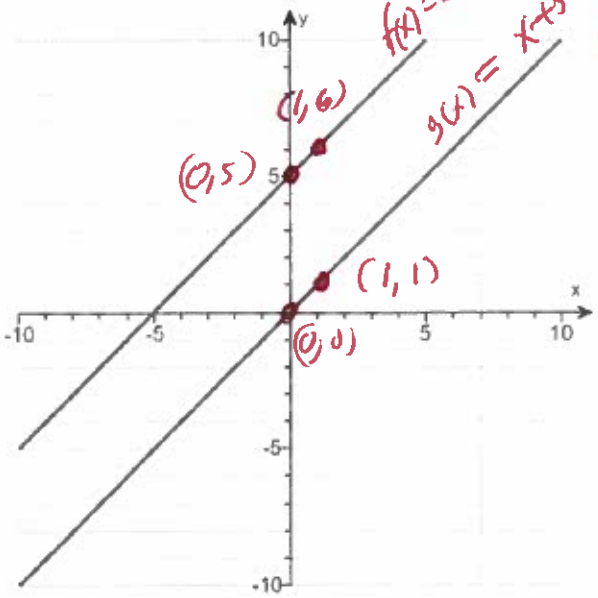
Use the graphing tool to graph the functions.

How is the graph of f shifted to get the graph of g?

The graph of g is the graph of f shifted (1) _____ by _____ units.

(1) ○ up
○ down

Answers



f(x) = x

f(0) = 0

f(1) = 1

x	f(x)
0	0
1	1

g(x) = x+5

g(0) = 0+5

g(0) = 5

g(1) = 1+5

g(1) = 6

x	g(x)
0	5
1	6

(1) up

5

ID: 2.1.39

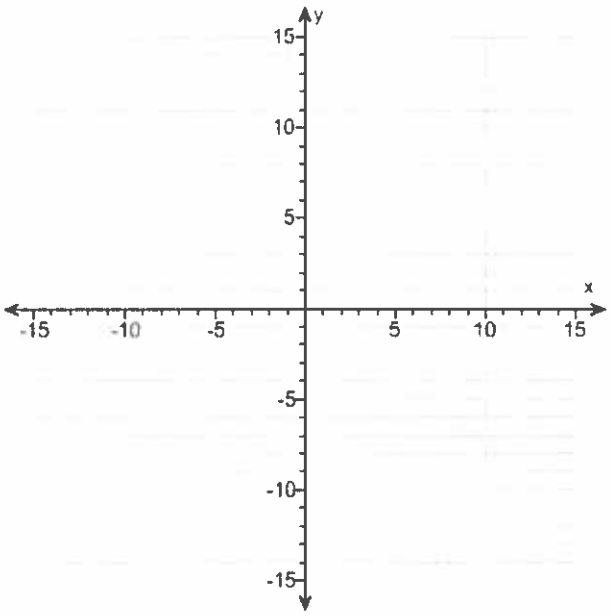
23.

Graph the given functions, f and g, in the same rectangular coordinate system. Describe how the graph of g is related to the graph of f.

$f(x) = -x^2$

$g(x) = -x^2 + 4$

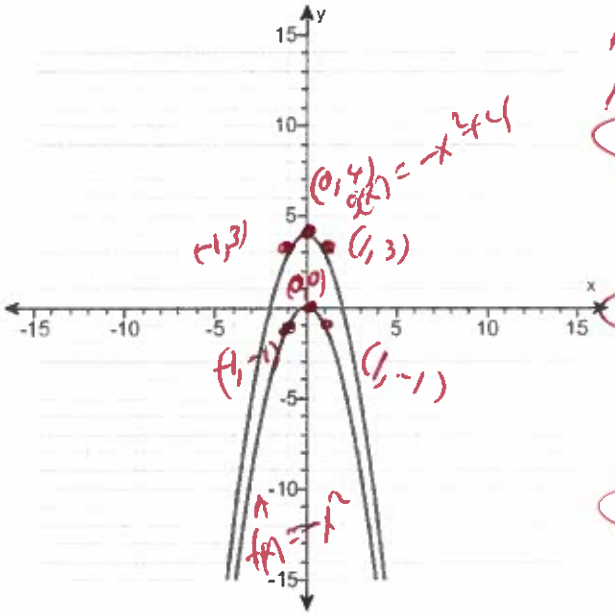
Use the graphing tool to graph the functions.



How is the graph of g related to the graph of f?

- ○ **A.** The graph of g is the graph of f shifted 4 units vertically down.
- ○ **B.** The graph of g is the graph of f shifted 4 units horizontally right.
- ○ **C.** The graph of g is the graph of f shifted 4 units vertically up.
- ○ **D.** The graph of g is the graph of f shifted 4 units horizontally left.

Answers



$f(x) = -x^2$

$f(-1) = -(-1)^2$

$f(-1) = -(-1)(-1)$

$f(-1) = -1$

$f(0) = -(0)^2$

$f(0) = -(0)(0)$

$f(0) = 0$

$f(1) = -(1)^2$

$f(1) = -(1)(1)$

$f(1) = -1$

x	f(x)
-1	-1
0	0
1	-1

C. The graph of g is the graph of f shifted 4 units vertically up.

ID: 2.1.43

$g(x) = -x^2 + 4$

$g(-1) = -(-1)^2 + 4 = -(-1)(-1) + 4 = -1 + 4 = 3$

$g(0) = -(0)^2 + 4 = -(0)(0) + 4 = 0 + 4 = 4$

$g(1) = -(1)^2 + 4 = -(1)(1) + 4 = -1 + 4 = 3$

x	g(x)
-1	3
0	4
1	3

24.

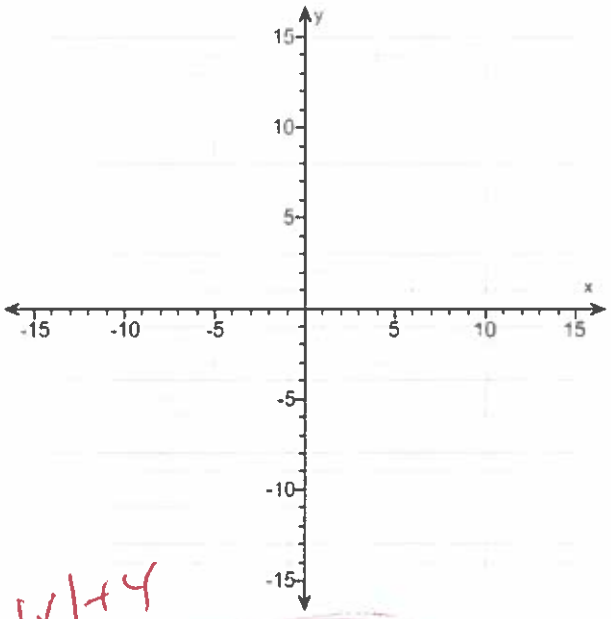
Graph the given functions, f and g, in the same rectangular coordinate system. Describe how the graph of g is related to the graph of f.

$f(x) = |x|$
$g(x) = |x| + 4$

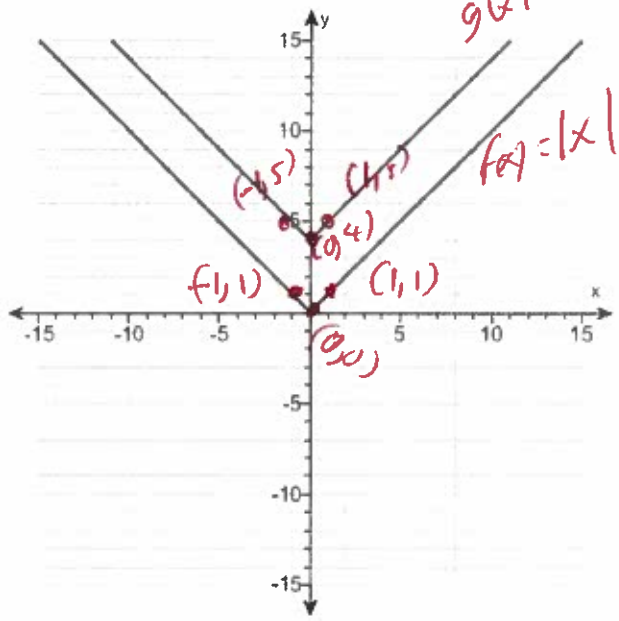
Use the graphing tool to graph the functions.

How is the graph of g related to the graph of f?

- A. The graph of g is the graph of f shifted 4 units vertically up.
- B. The graph of g is the graph of f shifted 4 units horizontally right.
- C. The graph of g is the graph of f shifted 4 units vertically down.
- D. The graph of g is the graph of f shifted 4 units horizontally left.



Answers



A. The graph of g is the graph of f shifted 4 units vertically up.

ID: 2.1.45

$g(x) = |x| + 4$

$f(x) = |x|$

$f(-1) = |-1| = 1$

$f(0) = |0| = 0$

$f(1) = |1| = 1$

x	f(x)
-1	1
0	0
1	1

$g(x) = |x| + 4$

$g(-1) = |-1| + 4$

$g(-1) = 1 + 4$

$g(-1) = 5$

$g(0) = |0| + 4$

$g(0) = 0 + 4$

$g(0) = 4$

$g(1) = |1| + 4$

$g(1) = 1 + 4$

$g(1) = 5$

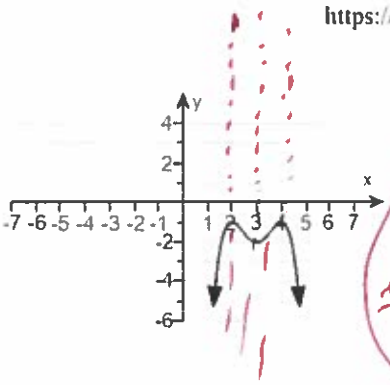
x	g(x)
-1	5
0	4
1	5

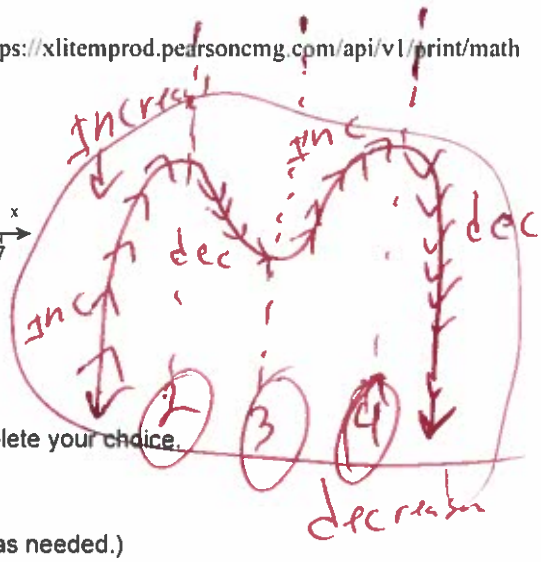
25. Use the graph to determine

(a) open intervals on which the function is increasing, if any.

(b) open intervals on which the function is decreasing, if any.

(c) open intervals on which the function is constant, if any.





(a) Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ○ **A.** The function is increasing on the interval(s) _____.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- ○ **B.** The function is never increasing.

(b) Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ○ **A.** The function is decreasing on the interval(s) _____.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- ○ **B.** The function is never decreasing.

(c) Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ○ **A.** The function is constant on the interval(s) _____.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- ○ **B.** The function is never constant.

Answers A. The function is increasing on the interval(s) $(-\infty, 2),(3, 4)$.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

A. The function is decreasing on the interval(s) $(2, 3),(4, \infty)$.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

B. The function is never constant.

ID: 2.2.9

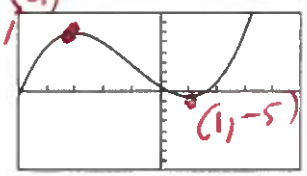
increasing $(-\infty, 2) \cup (3, 4)$

decreasing $(2, 3)$ $(4, \infty)$

26.

The graph and equation of the function f are given.
a. Use the graph to find any values at which f has a relative maximum, and use the equation to calculate the relative maximum for each value.
b. Use the graph to find any values at which f has a relative minimum, and use the equation to calculate the relative minimum for each value.

$f(x) = 2x^3 + 6x^2 - 18x + 5$



[-5,5,1] by [-80,80,10]

a. Select the correct choice below and, if necessary, fill in the answer boxes to complete your choice.

- **A.** The function f has (a) relative maxima(maximum) at _____ and the relative maxima(maximum) are(is) _____.
  (Use a comma to separate answers as needed.)
- **B.** The function f has no relative maxima.

b. Select the correct choice below and, if necessary, fill in the answer boxes to complete your choice.

- **A.** The function f has (a) relative minima(minimum) at _____ and the relative minima(minimum) are(is) _____.
  (Use a comma to separate answers as needed.)
- **B.** The function f has no relative minima.

Answers A.

The function f has (a) relative maxima(maximum) at **-3** and the relative maxima(maximum) are(is) **59**.
(Use a comma to separate answers as needed.)

A.

The function f has (a) relative minima(minimum) at **1** and the relative minima(minimum) are(is) **-5**.
(Use a comma to separate answers as needed.)

ID: 2.2.15

Window
Xmin = -5
Xmax = 5
ymin = -80
ymax = 80

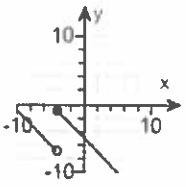
use graphing calculator
$Y_1 = 2x^3 + 6x^2 - 18x + 5$

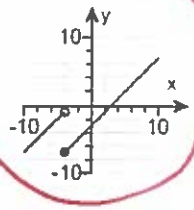
relative max (-3, 59)
relative min (1, -5)

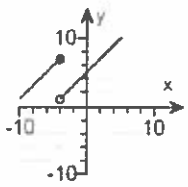
27. The domain of the piecewise function is $(-\infty,\infty)$.
a. Graph the function.
b. Use your graph to determine the function's range.

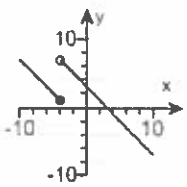
$$f(x)=\begin{cases} x+3 & \text{if } x<-4 \\ x-3 & \text{if } x\geq -4 \end{cases}$$

a. Choose the correct graph below.

○ A. 

○ B. 

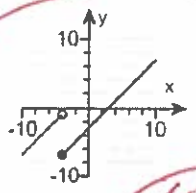
○ C. 

○ D. 

2nd MATH

b. The range of f(x) is [ ]. (Type your answer in interval notation.)

Answers



B

$(-\infty,\infty)$

$y_1 = x+3 \div (x<-4)$ OPEN circle

$y_2 = x-3 \div (x\geq -4)$ Closed circle

Use graphing calculator

Xmin = -12
Xmax = 12
Ymin = -10
Ymax = 10

ID: 2.2.47

28. Find the difference quotient of f; that is, find $\frac{f(x+h)-f(x)}{h}$, $h\neq 0$, for the following function. Be sure to simplify.

$f(x)=x^2-3x+7$

$\frac{f(x+h)-f(x)}{h}$ = [ ] (Simplify your answer.)

Answer: $2x+h-3$

ID: 2.2.61

$$\frac{((x+h)^2-3(x+h)+7)-(x^2-3x+7)}{h}=$$

$$\frac{(x+h)(x+h)-3x-3h+7-x^2+3x-7}{h}=$$

$$\frac{x^2+xh+xh+h^2-3x-3h+7-x^2+3x-7}{h}=$$

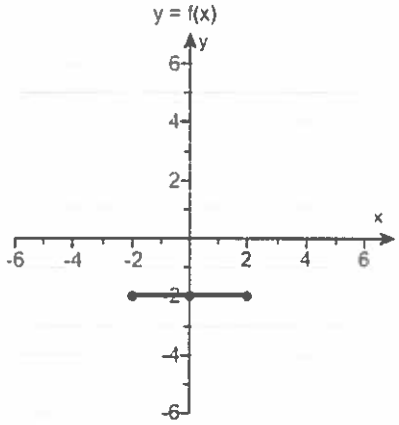
$$\frac{x^2+2xh+h^2-3x-3h+7-x^2+3x-7}{h}=$$

$$\frac{2xh+h^2-3h}{h}=$$

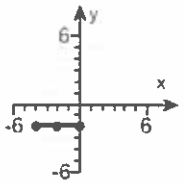
$$\frac{2xh}{h}+\frac{h^2}{h}-\frac{3h}{h}=2x+h-3$$

29.

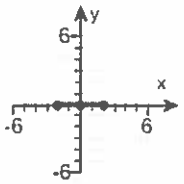
Use the graph of y = f(x) to graph the function g(x) = f(x) − 2. Choose the correct graph of g below.



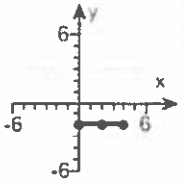
A.



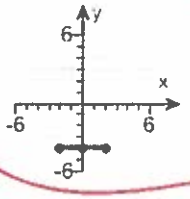
B.



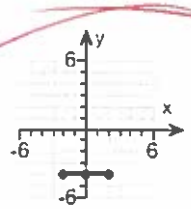
C.



D.



Answer:



D.

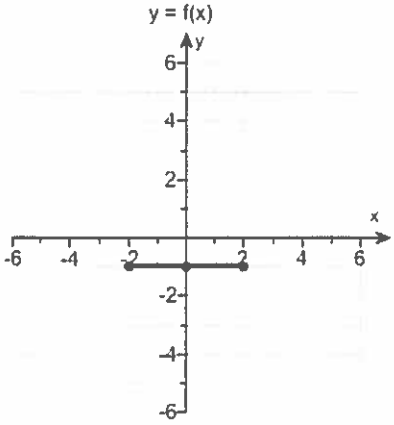
ID: 2.5.1

$g(x) = f(x) - 2$

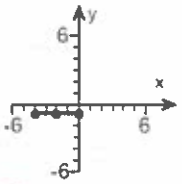
Shift down −2

30.

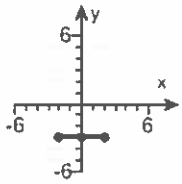
Use the graph of y = f(x) to graph the function g(x) = f(x − 2). Choose the correct graph of g below.



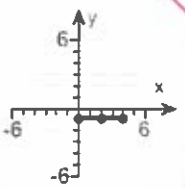
○ A.



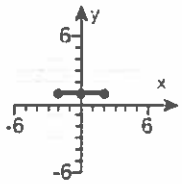
○ B.



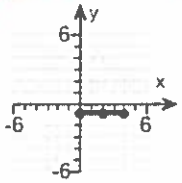
◉ C.



○ D.



Answer:



C.

ID: 2.5.3

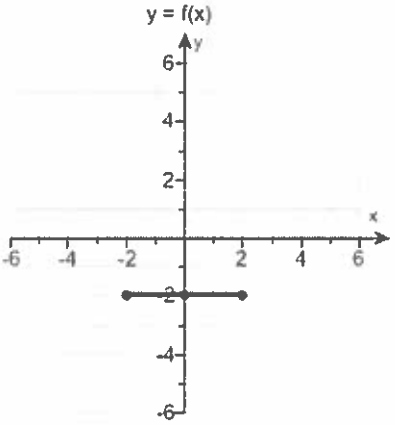
$g(x) = f(x - 2)$

Shift right 2

Opposite

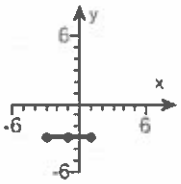
31.

Use the graph of y = f(x) to graph the function g(x) = f(x + 1) + 1.

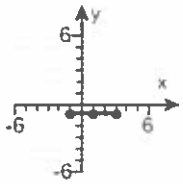


Choose the correct graph of g below.

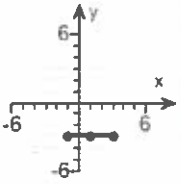
A.



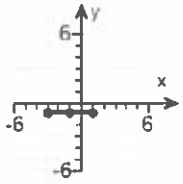
B.



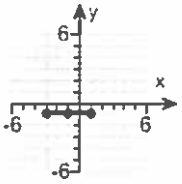
C.



D.



Answer:



D.

ID: 2.5.5

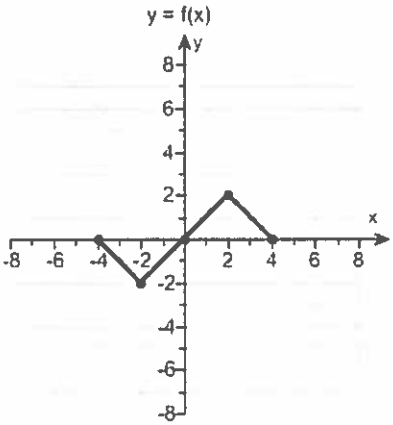
$g(x) = f(x+1) + 1$

Shift left −1 (opposite)

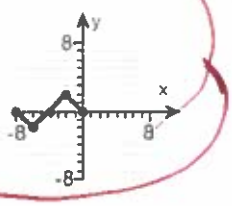
Shift up 1

32.

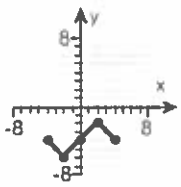
Use the graph of y = f(x) to graph the function g(x) = f(x + 4). Choose the correct graph of g below.



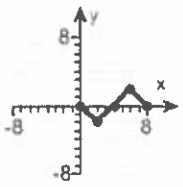
A.



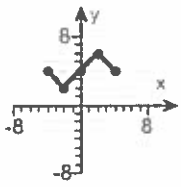
B.



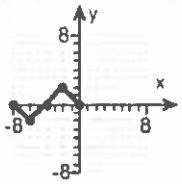
C.



D.



Answer:



A.

ID: 2.5.19

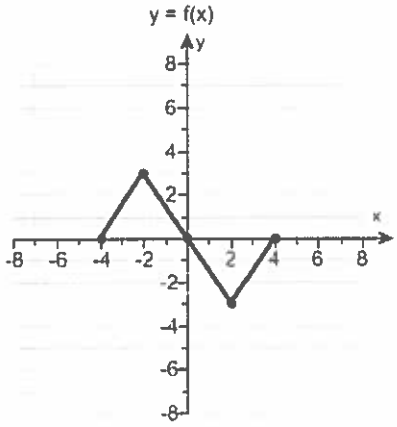
$g(x) = f(x+4)$

Shift opposite

left -4

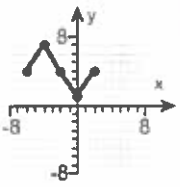
33.

Use the graph of y = f(x) to graph the function g(x) = f(x − 2) + 4.

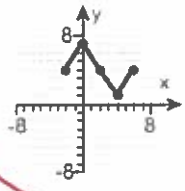


Choose the correct graph of g below.

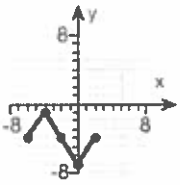
A.



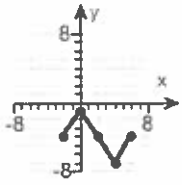
B.



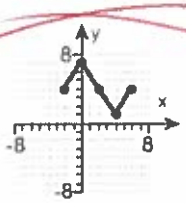
C.



D.



Answer:



B.

ID: 2.5.21

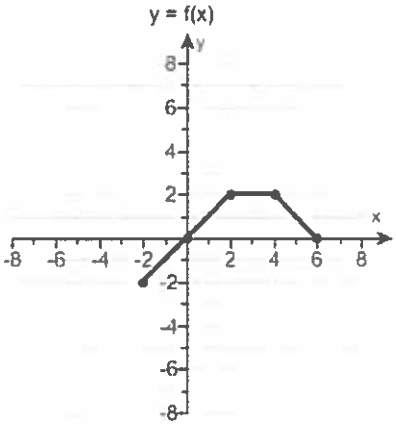
$g(x) = f(x-2) + 4$

shift right 2 opposite

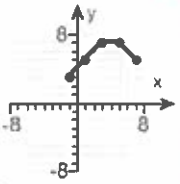
shift up 4

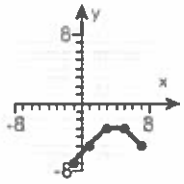
34.

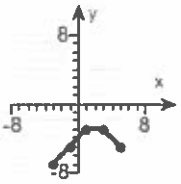
Use the graph of y = f(x) to graph the function g(x) = f(x − 1) + 5.

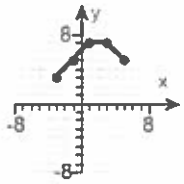


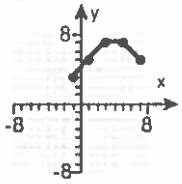
Choose the correct graph of g below.

A. 

B. 

C. 

D. 

Answer: 

A.

ID: 2.5.45

$g(x) = f(x-1) + 5$

Shift right 1 opposite

Shift up 5

35. Begin by graphing the absolute value function, $f(x) = |x|$. Then use transformations of this graph to graph the given function.

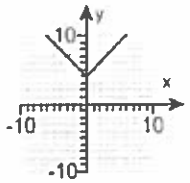
$h(x) = |x - 4|$

What transformations are needed in order to obtain the graph of h(x) from the graph of f(x)? Select all that apply.

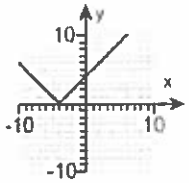
- ☐ A. Reflection about the y-axis
- ☐ B. Reflection about the x-axis
- ☐ C. Vertical stretch/shrink
- ☐ D. Horizontal stretch/shrink
- ☐ E. Horizontal translation
- ☐ F. Vertical translation

Choose the correct graph of $h(x) = |x - 4|$ below.

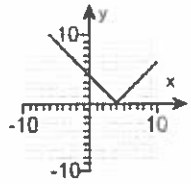
○ A.



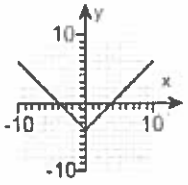
○ B.



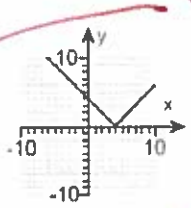
○ C.



○ D.



Answers E. Horizontal translation



C.

ID: 2.5.83

$h(x) = |x - 4|$

shift right 4

opposite

windows

x-min = -12

x-max = 12

y-min = -10

ymax = 10

use graphing calculator

$y_1 =$ math num abs

$y_1 = \text{abs}(x - 4)$

36. Begin by graphing the absolute value function, $f(x) = |x|$. Then use transformations of this graph to graph the given function.

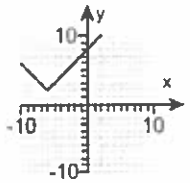
$h(x) = |x - 2| - 6$

What transformations are needed in order to obtain the graph of h(x) from the graph of f(x)? Select all that apply.

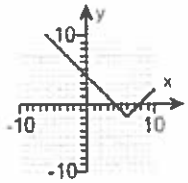
- ☐ A. Reflection about the y-axis
- ☐ B. Horizontal stretch/shrink
- ☐ C. Vertical stretch/shrink
- ☐ D. Reflection about the x-axis
- ☐ E. Vertical translation
- ☐ F. Horizontal translation

Choose the correct graph of h(x) below.

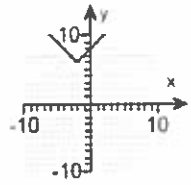
○ A.



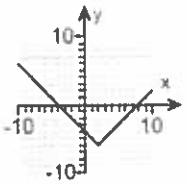
○ B.



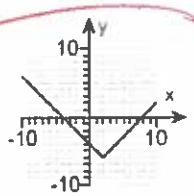
○ C.



✓ D.



Answers E. Vertical translation, F. Horizontal translation



D.

ID: 2.5.85

$h(x) = |x - 2| - 6$

shift right 2

shift down −6

Use graphing calculator

$y_1 = \text{math num abs}$

$y_1 = \text{abs}(x - 2) - 6$ (BTC)

$x_{min} = -12$
$x_{max} = 12$
$y_{min} = -10$
$y_{max} = 10$

Window

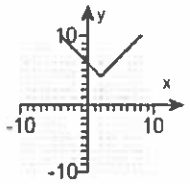
37. Begin by graphing the absolute value function, $f(x) = |x|$. Then use transformations of this graph to graph the given function.

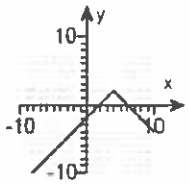
$g(x) = -|x+2| - 4$

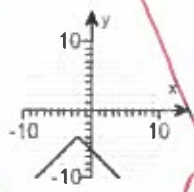
What transformations are needed in order to obtain the graph of g(x) from the graph of f(x)? Select all that apply.

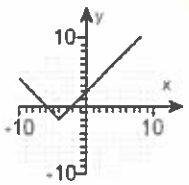
- [x] A. Vertical translation
- [ ] B. Reflection about the y-axis
- [ ] C. Vertical stretch/shrink
- [x] D. Reflection about the x-axis
- [ ] E. Horizontal stretch/shrink
- [x] F. Horizontal translation

Choose the correct graph of g(x) below.

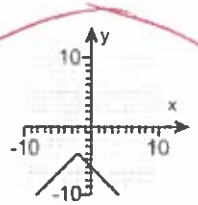
A. 

B. 

C. 

D. 

Answers A. Vertical translation, D. Reflection about the x-axis, F. Horizontal translation



C.

ID: 2.5.89

38. Find the domain of the function.

$f(x) = \sqrt{12 - 2x}$

What is the domain of f?

_____ (Type your answer in interval notation.)

Answer: $(-\infty, 6]$

ID: 2.6.23

39. First find $f+g$, $f-g$, fg and $\frac{f}{g}$. Then determine the domain for each function.

$f(x) = 2x^2 + 14x - 36$, $g(x) = x + 9$

$(f+g)(x) =$ _____ (Simplify your answer.)

$f(x) + g(x) =$

$(2x^2+14x-36) + (x+9) =$

$2x^2 + 14x - 36 + x + 9 =$

$2x^2 + 15x - 27 =$

What is the domain of $f+g$?

- ○ $\left(-\infty, \frac{9}{5}\right) \cup \left(\frac{9}{5}, \infty\right)$
- ○ $[0, \infty)$
- ○ $\left(\frac{9}{5}, \infty\right)$
- ○ $(-\infty, \infty)$

domain $(-\infty, \infty)$

$(f-g)(x) =$ _____ (Simplify your answer.)

$f(x) - g(x) =$

$(2x^2+14x-36) - (x+9) =$

$2x^2 + 14x - 36 - x - 9 =$

$2x^2 + 13x - 45 =$

What is the domain of $f-g$?

- ○ $[0, \infty)$
- ○ $\left(\frac{9}{5}, \infty\right)$
- ○ $(-\infty, \infty)$
- ○ $\left(-\infty, \frac{18}{7}\right) \cup \left(\frac{18}{7}, \infty\right)$

domain $(-\infty, \infty)$

$(fg)(x) =$ _____

$f(x) \cdot g(x) =$

$(2x^2+14x-36)(x+9) =$

$2x^3 + 18x^2 + 14x^2 + 126x - 36x - 324 =$

$2x^3 + 32x^2 + 90x - 324 =$

What is the domain of fg?

- ○ $(-\infty, \infty)$
- ○ $\left(-\infty, \frac{45}{13}\right) \cup \left(\frac{45}{13}, \infty\right)$
- ○ $\left(\frac{45}{13}, \infty\right)$
- ○ $(-\infty, -9) \cup (-9, \infty)$

domain $(-\infty, \infty)$

$\left(\frac{f}{g}\right)(x) =$ _____ (Simplify your answer.)

$\frac{f(x)}{g(x)} =$

$\frac{2x^2+14x-36}{x+9} =$

$\frac{2(x^2+7x-18)}{x+9} =$

$\frac{2(x-2)(x+9)}{(x+9)} =$

$2(x-2) =$

$2x - 4 =$

What is the domain of $\frac{f}{g}$?

- ○ $(-\infty, -9) \cup (-9, \infty)$
- ○ $(-\infty, \infty)$
- ○ $[0, \infty)$
- ○ $(-9, \infty)$

domain $(-\infty, -9) \cup (-9, \infty)$

Answers $2x^2 + 15x - 27$

$(-\infty,\infty)$

$2x^2 + 13x - 45$

$(-\infty,\infty)$

$2x^3 + 32x^2 + 90x - 324$

$(-\infty,\infty)$

$2x - 4$

$(-\infty,-9)\cup(-9,\infty)$

ID: 2.6.35

---

40. For $f(x) = 5x$ and $g(x) = x + 8$, find the following functions.

a. $(f \circ g)(x)$; **b.** $(g \circ f)(x)$; **c.** $(f \circ g)(3)$; **d.** $(g \circ f)(3)$

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

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

c. $(f \circ g)(3) =$ _____

d. $(g \circ f)(3) =$ _____

$(f \circ g)(x) =$
$f(g(x)) =$
$f(x+8) =$
$5(x+8) =$
$5x+40$ ✓

$(g \circ f)(x) =$
$g(f(x)) =$
$g(5x) =$
$f(x) + 8 =$
$5x+8$ ✓

Answers $5x + 40$

$5x + 8$

55

23

ID: 2.6.51

$(f \circ g)(x) = 5x+40$
$(f \circ g)(3) = 5(3)+40$
$(f \circ g)(3) = 15+40$
$(f \circ g)(3) = 55$ ✓

$(g \circ f)(x) = 5x+8$
$(g \circ f)(3) = 5(3)+8$
$(g \circ f)(3) = 15+8$
$(g \circ f)(3) = 23$ ✓

41. For $f(x) = x + 4$ and $g(x) = 5x + 1$, find the following functions.

a. $(f \circ g)(x)$; b. $(g \circ f)(x)$; c. $(f \circ g)(1)$; d. $(g \circ f)(1)$

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

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

c. $(f \circ g)(1) =$ _____

d. $(g \circ f)(1) =$ _____

Answers $5x + 5$

$5x + 21$

10

26

ID: 2.6.53

$(fog)(x) =$
$f(g(x)) =$
$f(5x+1) =$
$(5x+1) + 4 =$
$5x + 1 + 4 =$
$5x + 5$ ✓

$(gof)(x) =$
$g(f(x)) =$
$g(x+4) =$
$5(x+4)+1 =$
$5x + 20 + 1 =$
$5x + 21$ ✓

$(fog)(x) = 5x + 5$
$(fog)(1) = 5(1) + 5$
$(fog)(1) = 5 + 5$
$(fog)(1) = 10$ ✓

$(gof)(x) = 5x + 21$
$(gof)(1) = 5(1) + 21$
$(gof)(1) = 5 + 21$
$(gof)(1) = 26$ ✓

42. For $f(x) = 2 - x$ and $g(x) = 2x^2 + x + 3$, find the following functions.

a. $(f \circ g)(x)$; b. $(g \circ f)(x)$; c. $(f \circ g)(3)$; d. $(g \circ f)(3)$

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

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

c. $(f \circ g)(3) =$ _____

d. $(g \circ f)(3) =$ _____

Answers $-2x^2 - x - 1$

$2x^2 - 9x + 13$

-22

4

ID: 2.6.59

$(fog)(x) =$
$f(g(x)) =$
$f(2x^2+x+3) =$
$2 - (2x^2+x+3) =$
$2 - 2x^2 - x - 3 =$
$-2x^2 - x - 1$ ✓

$(gof)(x) =$
$g(f(x)) =$
$g(2-x) =$
$2(2-x)^2 + (2-x) + 3 =$
$2(2-x)(2-x) + (2-x) + 3 =$
$2(4 - 2x - 2x + x^2) + (2-x) + 3 =$
$2(4 - 4x + x^2) + (2-x) + 3 =$
$8 - 8x + 2x^2 + 2 - 1x + 3 =$
$2x^2 - 9x + 13 =$ ✓

$(fog)(x) = -2x^2 - x - 1$
$(fog)(3) = -2(3)^2 - (3) - 1$
$(fog)(3) = -2(3)(3) - (3) - 1$
$(fog)(3) = -18 - 3 - 1$
$(fog)(3) = -22$ ✓

$(gof)(x) = 2x^2 - 9x + 13$
$(gof)(3) = 2(3)^2 - 9(3) + 13$
$(gof)(3) = 2(3)(3) - 9(3) + 13$
$(gof)(3) = 18 - 27 + 13$
$(gof)(3) = 4$ ✓

43. Find the distance between the pair of points.

(2,4) and (14,13)

The distance between the points is _____ units.
(Round to two decimal places as needed.)

Answer: 15

ID: 2.8.1

$(2,4)$ and $(14,13)$
$x_1\ y_1$ $x_2\ y_2$

$distance = \sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$

$distance = \sqrt{((2)-(14))^2+((4)-(13))^2}$

$distance = \sqrt{(2-14)^2+(4-13)^2}$

$distan = \sqrt{(-12)^2+(-9)^2}$

$distan = \sqrt{144+81}$

$distan = \sqrt{225}$

$d = 15$

44. Find the midpoint of the line segment with the given endpoints.

(2,8) and (6,10)

The midpoint of the segment is _____.
(Type an ordered pair.)

Answer: (4,9)

ID: 2.8.19

$(2,8)$ and $(6,10)$
$x_1\ y_1$ $x_2\ y_2$

$Midpoint = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

$Midpoint = \left(\frac{(2)+(6)}{2}, \frac{(8)+(10)}{2}\right)$

$Midpoint = \left(\frac{2+6}{2}, \frac{8+10}{2}\right)$

$Midpoint = \left(\frac{8}{2}, \frac{18}{2}\right)$

$Midpoint = (4, 9)$

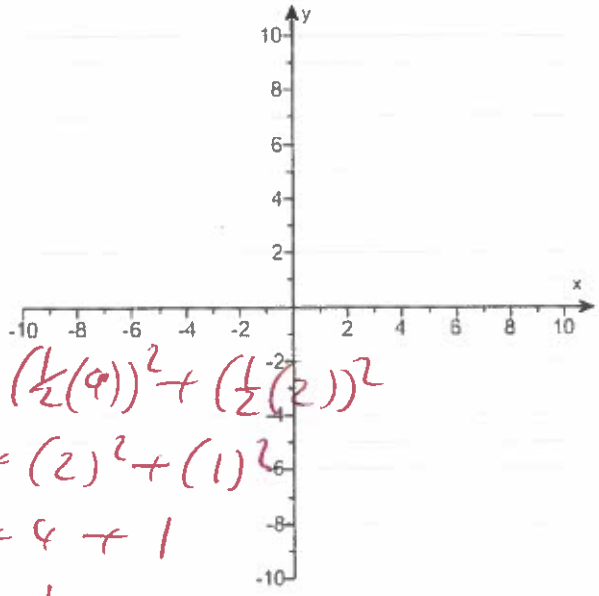
45. Complete the square and write the equation of the circle in standard form. Then determine the center and radius of the circle to graph the equation.

$x^2 + y^2 + 4x + 2y + 4 = 0$

$x^2+4x+y^2+2y=-4$

The equation in standard form is _____.
(Simplify your answer.)

Use the graphing tool to graph the circle.



$x^2+4x+\left(\frac{1}{2}(4)\right)^2+y^2+2y+\left(\frac{1}{2}(2)\right)^2=-4+\left(\frac{1}{2}(4)\right)^2+\left(\frac{1}{2}(2)\right)^2$

$x^2+4x+(2)^2+y^2+2y+(1)^2=-4+(2)^2+(1)^2$

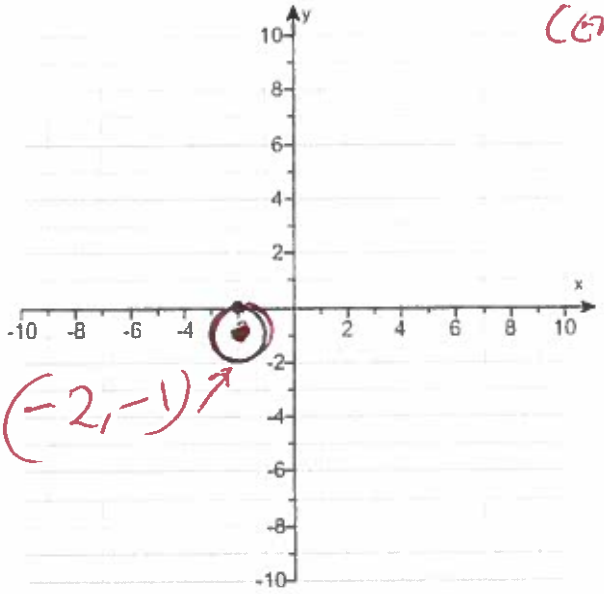
$x^2+4x+4+y^2+2y+1=-4+4+1$

$(x+2)(x+2)+(y+1)(y+1)=1$

$(x+2)^2+(y+1)^2=1$

Answers $(x+2)^2+(y+1)^2=1$

Center $=(-2,-1)$ Radius $=\sqrt{1}=1$



ID: 2.8.53

$Vertex_x = \left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

46. In the following exercise, find the coordinates of the vertex for the parabola defined by the given quadratic function.

$f(x) = 2x^2 + 8x + 2$

$a=2 \quad b=8 \quad c=2$

$Vertex_x = \left(\frac{-(8)}{2(2)}, f\left(\frac{-(8)}{2(2)}\right)\right)$

The vertex is _____. (Type an ordered pair.)

$Vertex_x = \left(\frac{-8}{4}, f\left(\frac{-8}{4}\right)\right)$ $Vertex_x = (-2, 8-16+2)$

Answer: (−2, −6) $Vertex_x = (-2, f(-2))$ $Vertex_x = (-2, -6)$

$Vertex_x = (-2, 2(-2)^2 + 8(-2) + 2)$

ID: 3.1.13 $Vertex_x = (-2, 2(-2)(-2) + 8(-2) + 2)$

47. Find the coordinates of the vertex for the parabola defined by the given quadratic function.

$f(x) = -x^2 + 10x + 4$

The vertex is _____. (Type an ordered pair.)

Answer: (5,29) $a=-1, \quad b=10, \quad c=4$

$Vertex_x = \left(\frac{-b}{2a}, f\left(\frac{b}{2a}\right)\right)$

ID: 3.1.15

$Vertex_x = \left(\frac{-(10)}{2(-1)}, f\left(\frac{-(10)}{2(-1)}\right)\right)$

$Vertex_x = \left(\frac{-10}{-2}, f\left(\frac{-10}{-2}\right)\right)$

$Vertex_x = (5, f(5))$

$Vertex_x = (5, -(5)^2 + 10(5) + 4)$

$Vertex_x = (5, -(5)(5) + 10(5) + 4)$

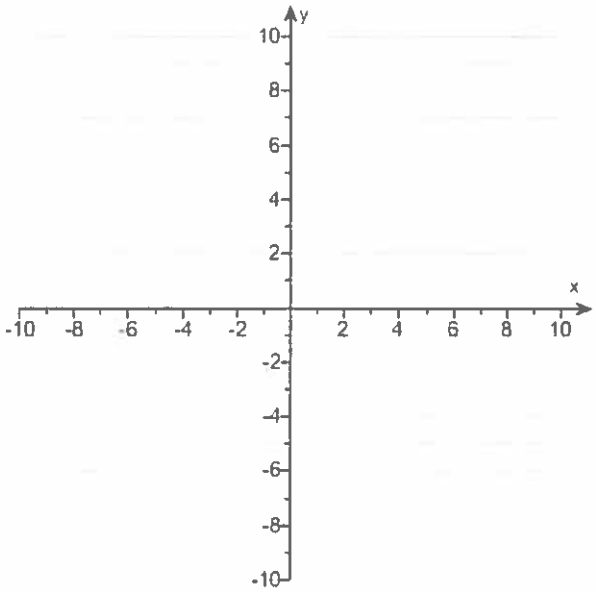
$Vertex_x = (5, -25 + 50 + 4)$

$Vertex_x = (5, 29)$

48.

Use the vertex and intercepts to sketch the graph of the quadratic function. Give the equation of the parabola's axis of symmetry. Use the graph to determine the domain and range of the function.

$f(x) = (x-4)^2 - 9$

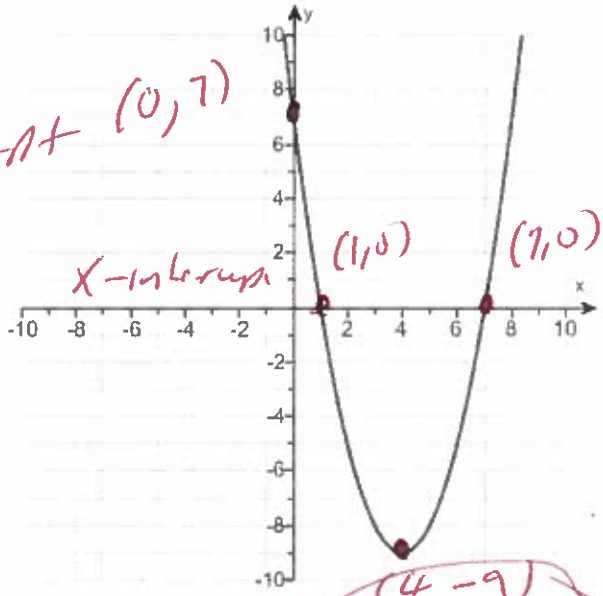


Use the graphing tool to graph the function. Use the vertex and one of the intercepts when drawing the graph.

The axis of symmetry is _____.
(Type an equation. Simplify your answer.)
The domain of the function is _____.
(Type your answer in interval notation.)
The range of the function is _____.
(Type your answer in interval notation.)

$f(x) = (x-4)^2 - 9$

Answers



y-intercept (0,7)

x-intercept (1,0)

(7,0) x-intercept

x	f(x)
0	7
1	0
4	-9
7	0

(4,-9) vertex min

x = 4

$(-\infty, \infty)$

$[-9, \infty)$

ID: 3.1.17

Window
X-min = -2
X-max = 12
y-min = -10
y-max = 10

$y_1 = (x-4)^2 - 9$

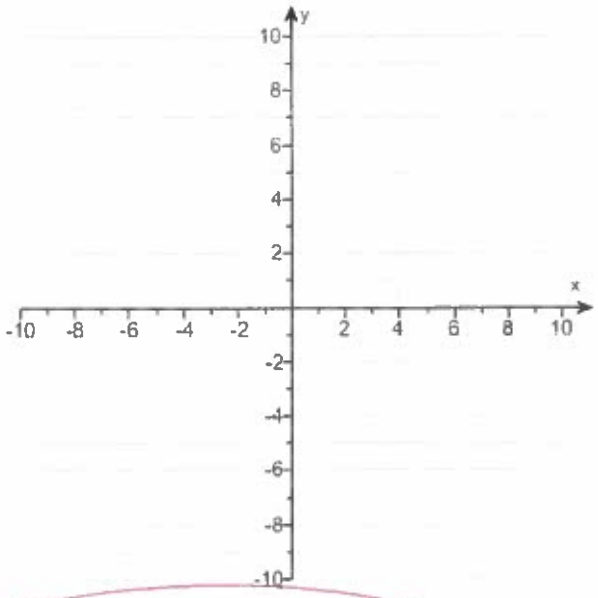
use Graphing Calculator

49.

Use the vertex and intercepts to sketch the graph of the quadratic function. Give the equation of the parabola's axis of symmetry. Use the graph to determine the function's domain and range.

$f(x) = x^2 - 6x + 5$

Use the graphing tool to graph the equation. Use the vertex and one of the intercepts when drawing the graph.

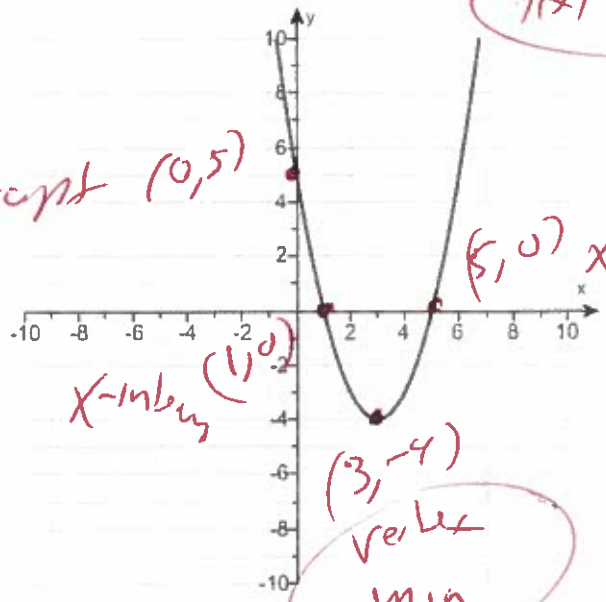


The axis of symmetry is _____.
(Type an equation.)

The domain of f is _____.
(Type your answer in interval notation.)

The range of f is _____.
(Type your answer in interval notation.)

Answers



$x = 3$

$(-\infty, \infty)$

$[-4, \infty)$

ID: 3.1.27

$f(x) = x^2 - 6x + 5$

x	f(x)
0	5
1	0
3	-4
5	0

y-intercept (0,5)

(5,0) x intercept

x-intercept (1,0)

(3,-4) vertex min

Windows
x-min = -12
x-max = 12
y-min = -10
y-max = 10

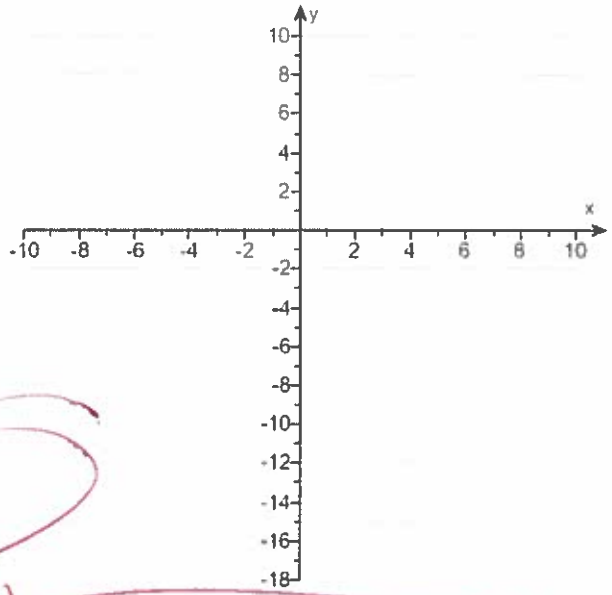
use graphing calculator

$y_1 = x^2 - 6x + 5$

50.

Use the vertex and intercepts to sketch the graph of the quadratic function. Give the equation of the parabola's axis of symmetry. Use the graph to determine the domain and range of the function.

$f(x) = 10x - x^2 - 16$



Use the graphing tool to graph the equation. Use the vertex and one of the intercepts to draw the graph.

The axis of symmetry is _____.
(Type an equation.)

The domain of the function is _____.
(Type your answer in interval notation.)

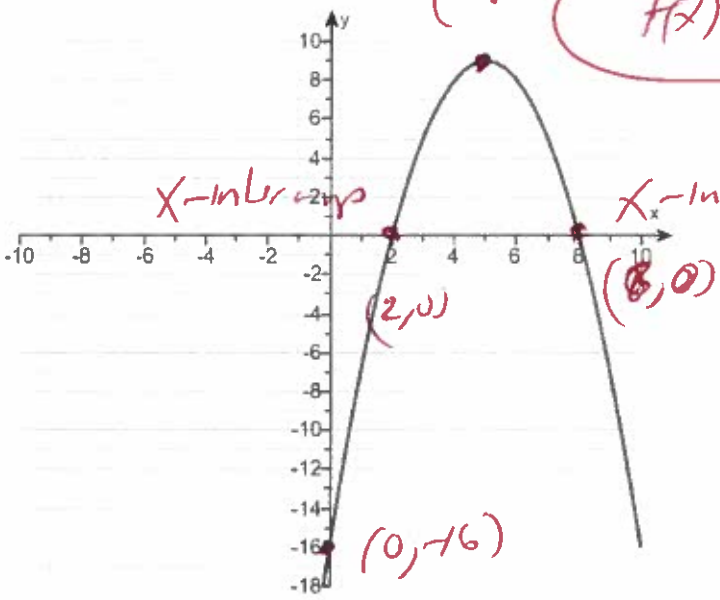
The range of the function is _____.
(Type your answer in interval notation.)

Vertex max (5, 9)

$f(x) = 10x - x^2 - 16$

x	f(x)
0	-16
2	0
5	9
8	0

Answers



x = 5

$(-\infty, \infty)$

$(-\infty, 9]$

Use graphing Calculator

Window
x-min = -12
x-max = 12
y-min = -10
y-max = 10

$Y_1 = 10x - x^2 - 16$

ID: 3.1.31

51. Consider the function $f(x) = -2x^2 + 20x - 4$.

a. Determine, without graphing, whether the function has a minimum value or a maximum value.
b. Find the minimum or maximum value and determine where it occurs.
c. Identify the function's domain and its range.

a. The function has a (1) _____ value.

b. The minimum/maximum value is _____. It occurs at x = _____.

c. The domain of f is _____. (Type your answer in interval notation.)

The range of f is _____. (Type your answer in interval notation.)

(1) ○ maximum
○ minimum

Answers (1) maximum

46

5

$(-\infty, \infty)$

$(-\infty, 46]$

ID: 3.1.41

52. Divide using synthetic division.

$(2x^3 + 6x^2 - x + 5) \div (x - 3)$

$(2x^3 + 6x^2 - x + 5) \div (x - 3) =$ _____ + $\frac{\text{_____}}{x-3}$

(Simplify your answers. Do not factor. Use integers or fractions for any numbers in the expressions.)

Answers $2x^2 + 12x + 35$

110

ID: 3.3.21

53. Solve the equation $x^3 - 5x^2 + 2x + 8 = 0$ given that -1 is a zero of $f(x) = x^3 - 5x^2 + 2x + 8$.

The solution set is { _____ }. (Use a comma to separate answers as needed.)

Answer: $-1, 4, 2$

ID: 3.3.43

54. The following function is given.

$f(x) = 5x^3 - 7x^2 - 45x + 63$

a. List all rational zeros that are possible according to the Rational Zero Theorem. Choose the correct answer below.

Last / first = $\pm 63 / \pm 5$

$\pm 63, \pm 21, \pm 7, \pm 6, \pm 3, \pm 1, \pm 5, \pm 1$

- A. $\pm 1, \pm 5, \pm \frac{1}{3}, \pm \frac{5}{3}, \pm \frac{1}{6}, \pm \frac{5}{6}, \pm \frac{1}{7}, \pm \frac{5}{7}, \pm \frac{1}{21}, \pm \frac{5}{21}, \pm \frac{1}{63}, \pm \frac{5}{63}$
- B. $\pm 1, \pm 3, \pm 9, \pm 7, \pm 21, \pm 63, \pm \frac{1}{5}, \pm \frac{3}{5}, \pm \frac{9}{5}, \pm \frac{7}{5}, \pm \frac{21}{5}, \pm \frac{63}{5}$
- C. $\pm 1, \pm 5, \pm \frac{1}{3}, \pm \frac{5}{3}, \pm \frac{1}{9}, \pm \frac{5}{9}, \pm \frac{1}{7}, \pm \frac{5}{7}, \pm \frac{1}{21}, \pm \frac{5}{21}, \pm \frac{1}{63}, \pm \frac{5}{63}$
- D. $\pm 1, \pm 3, \pm 6, \pm 7, \pm 21, \pm 63, \pm \frac{1}{5}, \pm \frac{3}{5}, \pm \frac{6}{5}, \pm \frac{7}{5}, \pm \frac{21}{5}, \pm \frac{63}{5}$

b. Use synthetic division to test several possible rational zeros in order to identify one actual zero.

One rational zero of the given function is [ ].
(Simplify your answer.)

c. Use the zero from part **(b)** to find all the zeros of the polynomial function.

The zeros of the function $f(x) = 5x^3 - 7x^2 - 45x + 63$ are [ ].
(Simplify your answer. Type an integer or a fraction. Use a comma to separate answers as needed.)

Answers B. $\pm 1, \pm 3, \pm 9, \pm 7, \pm 21, \pm 63, \pm \frac{1}{5}, \pm \frac{3}{5}, \pm \frac{9}{5}, \pm \frac{7}{5}, \pm \frac{21}{5}, \pm \frac{63}{5}$

use synthetic division

$\frac{7}{5}$

$\frac{7}{5}, 3, -3$

3	5	−7	−45	63
		15	24	−63
	5	8	−21	0 rem

ID: 3.4.11

$5x^2 + 8x - 21 = 0$

$(5x - 7)(x + 3) = 0$

$5x - 7 = 0$ OR $x + 3 = 0$

$5x - 7 + 7 = 0 + 7$ OR $x + 3 - 3 = 0 - 3$

$5x = 7$ OR $x = -3$

$\frac{5x}{5} = \frac{7}{5}$

$x = \frac{7}{5}$

answer

$3, \frac{7}{5}, -3$

55. The following equation is given.

$x^3 - 5x^2 - 9x + 45 = 0$

a. List all rational roots that are possible according to the Rational Zero Theorem.

(Use a comma to separate answers as needed.)

b. Use synthetic division to test several possible rational roots in order to identify one actual root.

One rational root of the given equation is ____.
(Simplify your answer.)

c. Use the root from part (b.) and solve the equation.

The solution set of $x^3 - 5x^2 - 9x + 45 = 0$ is { }.
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

Answers 1, − 1,3, − 3,45, − 45,5, − 5,15, − 15,9, − 9

5

5,3, − 3

ID: 3.4.17

Possibl Last first

±45, ±15, ±9, ±5, ±3, ±1

±1

use synthetic division

3 | 1 −5 −9 45

3 −6 −45

1 −2 −15 0 rem

$x^2 - 2x - 15 = 0$

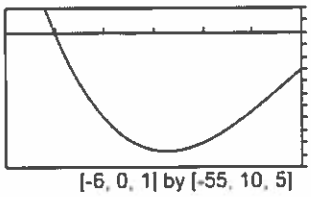
$(x+3)(x-5) = 0$

$x+3=0$ or $x-5=0$

$x+3-3=0-3$ or $x-5+5=0+5$

$x=-3$ or $x=5$

56. An incomplete graph of the polynomial function $f(x) = -x^3 - x^2 + 17x - 15$ is shown on the right.



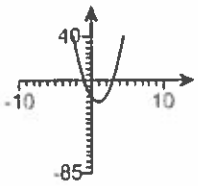
a. Find all zeros of the function.

b. Without using a graphing utility, draw a complete graph of the function.

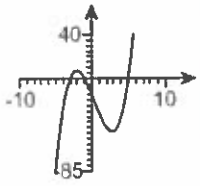
a. The zeros are _____.
(Use a comma to separate answers as needed.)

b. Choose the correct graph of the function below. The scale for each graph is [-10, 10, 1] by [-85, 40, 5].

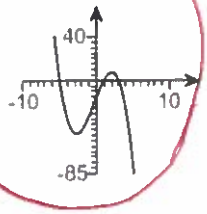
○ A.



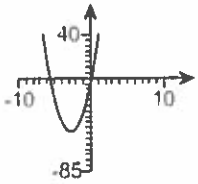
○ B.



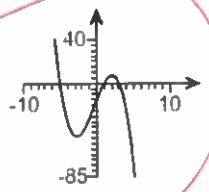
○ C.



○ D.



Answers -5,3,1



C.

Windows
Xmin = -10
Xmax = 10
Ymin = -85
Ymax = 40

Use a graphing Calculator

$Y_1 = -X^3 - X^2 + 17X - 15$

ID: 3.4.53

57. Find the vertical asymptotes, if any, and the values of x corresponding to holes, if any, of the graph of the rational function.

$$h(x) = \frac{x+3}{x(x+5)}$$

but $X(X+5) = 0$
$X = 0$ OR $X+5 = 0$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice. (Type an equation. Use a comma to separate answers as needed.)

$X = 0$ OR $X+5-5 = 0-5$

○ A. There are no vertical asymptotes but there is(are) hole(s) corresponding to _____

○ B. The vertical asymptote(s) is(are) _____ and hole(s) corresponding to _____.

$X = -5$

○ C. The vertical asymptote(s) is(are) _____. There are no holes.

○ D. There are no discontinuities.

Answer: C. The vertical asymptote(s) is(are) $x = -5, x = 0$. There are no holes.

ID: 3.5.23

Vertical asymptotes: $X = 0$ OR $X = -5$

58. Find the vertical asymptotes, if any, and the values of x corresponding to holes, if any, of the graph of the rational function.

$$f(x) = \frac{x-4}{x^2-5x+4}$$

$f(x) = \frac{(x-4)}{(x-1)(x-4)} \Rightarrow f(x) = \frac{1(x-4)}{(x-1)(x-4)}$

Select the correct choice below and, if necessary, fill in the answer box(es) to complete your choice. (Type an integer or a fraction. Use a comma to separate answers as needed.)

$f(x) = \frac{1}{x-1}$ Simplify function

set $x-1=0$

$x-1+1=0+1$

$x=1$

- A. Vertical asymptote(s) at x = _____
- B. Hole(s) at x = _____
- C. Vertical asymptote(s) at x = _____ and hole(s) at x = _____
- D. There are no discontinuities.

Answer: C. Vertical asymptote(s) at x = 1 and hole(s) at x = 4

ID: 3.5.33

Vertical asymptote $x=1$

hole at $x=4$ undefined

59. Find the horizontal asymptote, if any, of the graph of the rational function.

$$f(x) = \frac{13x}{5x^2+6}$$

$\lim_{x\to\infty}\left(\frac{13x}{5x^2+6}\right)\frac{\frac{1}{x^2}}{\frac{1}{x^2}} = \lim_{x\to\infty}\frac{\frac{13x}{x^2}}{\frac{5x^2}{x^2}+\frac{6}{x^2}} =$

formula $\lim_{x\to\infty}\frac{1}{x^n}=0$

$\lim_{x\to\infty}\frac{\frac{13}{x}}{5+\frac{6}{x^2}} =$

$\frac{0}{5+0} =$

$\frac{0}{5} =$

$0 =$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The horizontal asymptote is _____. (Type an equation.)
- B. There is no horizontal asymptote.

Answer: A. The horizontal asymptote is y = 0. (Type an equation.)

ID: 3.5.37

horizontal asymptote $y=0$

60. Find the horizontal asymptote, if any, of the graph of the rational function.

$$g(x) = \frac{27x^2}{9x^2+7}$$

$\lim_{x\to\infty}\left(\frac{27x^2}{9x^2+7}\right)\frac{\frac{1}{x^2}}{\frac{1}{x^2}} = \lim_{x\to\infty}\frac{\frac{27x^2}{x^2}}{\frac{9x^2}{x^2}+\frac{7}{x^2}} =$

$= \lim_{x\to\infty}\frac{27}{9+\frac{7}{x^2}}$

$= \frac{27}{9+0}$

$= \frac{27}{9}$

$= 3$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The horizontal asymptote is _____. (Type an equation.)
- B. There is no horizontal asymptote.

Answer: A. The horizontal asymptote is y = 3. (Type an equation.)

ID: 3.5.39

formula $\lim_{x\to\infty}\frac{1}{x^n}=0$

horizontal asymptote $y=3$

61. **a.** Find the slant asymptote of the graph of the rational function and **b.** Use the slant asymptote to graph the rational function.

$$f(x) = \frac{x^2 + x - 2}{x - 7}$$

opp: 7 | 1 1 −2 / 7 56 / 1 8 54

$y = x + 8$ ✓ SLANT asymptote

use Synthetic division

a. Find the slant asymptote of the graph of f. Select the correct choice below and fill in any answer boxes within your choice.

find y-intercept let $x = 0$

$f(0) = \frac{(0)^2 + (0) - 2}{0 - 7} = \frac{-2}{-7} = \frac{2}{7}$

- A. y = _____
- B. There is no slant asymptote.

b. Use the slant asymptote to graph the rational function.

y-intercept $= (0, \frac{2}{7})$ ✓

First determine the symmetry of the graph of f.

- A. The graph has y-axis symmetry: $f(-x) = f(x)$.
- B. The graph has origin symmetry: $f(-x) = -f(x)$.
- C. The graph has both y-axis and origin symmetry.
- D. The graph has neither y-axis nor origin symmetry.

find x-intercept let $y = 0$

$0 = \frac{x^2 + x - 2}{x - 7}$

Find the y-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

$0(x-7) = 1(x^2 + x - 2)$

$0 = x^2 + x - 2$

- A. The y-intercept is _____.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- B. There is no y-intercept.

Find the x-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

$0 = (x - 1)(x + 2)$

$x - 1 = 0$ or $x + 2 = 0$

- A. The x-intercept is _____.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- B. There is no x-intercept.

Find the vertical asymptote(s). Select the correct choice below and fill in any answer boxes within your choice.

$x - 1 + 1 = 0 + 1$ OR $x + 1 - 2 = 0 - 2$

$x = -2$

$x = 1$

- A. x = _____
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- B. There is no vertical asymptote.

Find the horizontal asymptote(s). Select the correct choice below and fill in any answer boxes within your choice.

x-intercept $(1, 0)$ OR $(-2, 0)$

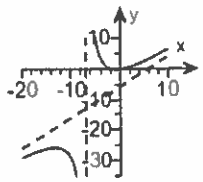
$y_1 = (x^2 + x - 2) \frac{m}{n} (x - 7)$

- A. y = _____
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- B. There is no horizontal asymptote.

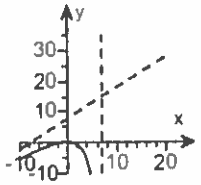
Plot points between and beyond each x-intercept and vertical asymptote, then use the information above to graph the rational function. Choose the correct graph below.

use graphing calculator

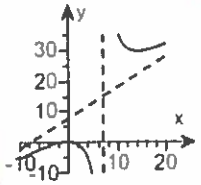
- A.



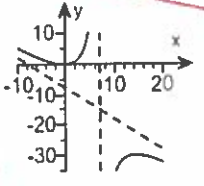
- B.



- C. ✓



- D.



Answers A. y = x + 8

D. The graph has neither y-axis nor origin symmetry.

A. The y-intercept is $\frac{2}{7}$.

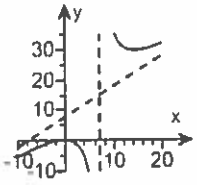
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

A. The x-intercept is −2,1.

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

A. x = 7 (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

B. There is no horizontal asymptote.



C.

ID: 3.5.85

62. Graph the given function by making a table of coordinates.

$f(x) = 2^x$

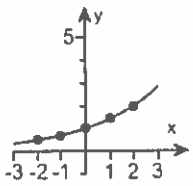
Complete the table of coordinates.

x	−2	−1	0	1	2
y					

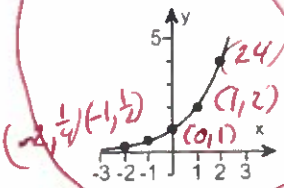
(Type integers or fractions. Simplify your answers.)

Choose the correct graph below.

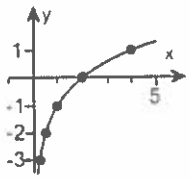
○ A.



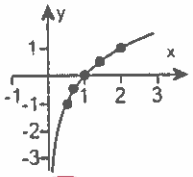
● B.



○ C.



○ D.



x	f(x)
−2	¼
−1	½
0	1
1	2
2	4

Answers

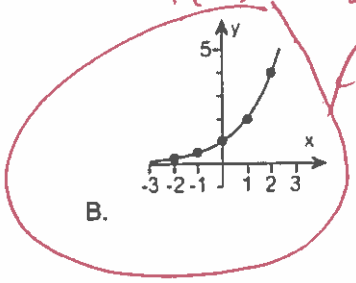
$\frac{1}{4}$ $f(-2) = 2^{-2} = \frac{1}{2^2} = \frac{1}{2 \cdot 2} = \frac{1}{4}$

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

1 $f(0) = 2^0 = 1$

2 $f(1) = 2^1 = 2$

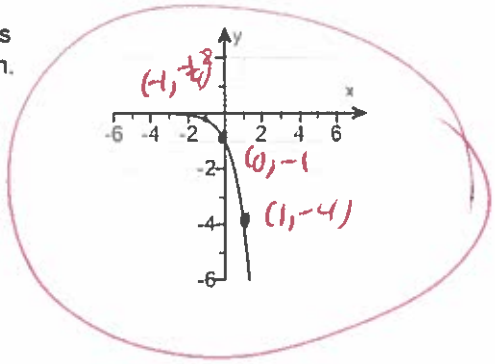
4 $f(2) = 2^2 = 2 \cdot 2 = 4$



B.

ID: 4.1.11

63. The graph of an exponential function is given. Select the function for the graph.



$f(x) = -4^x$

$f(x) = -1 \cdot 4^x$

x	f(x)
-1	-4
0	-1
1	-4

Identify the function.

○ A. $f(x) = 4^x - 1$ ○ B. $f(x) = -4^{-x}$ ● C. $f(x) = -4^x$ ○ D. $f(x) = 4^{x-1}$

Answer: C. $f(x) = -4^x$

$f(-1) = -1 \cdot 4^{-1} = -1 \cdot \frac{1}{4} = -\frac{1}{4}$

$f(0) = -1 \cdot 4^0 = -1 \cdot 1 = -1$

$f(1) = -1 \cdot 4^1 = -1 \cdot 4 = -4$

ID: 4.1.23

64. Find the domain of the logarithmic function.

$f(x) = \log(7 - x)$

The domain of $f(x) = \log(7 - x)$ is _____.
(Type your answer in interval notation.)

Answer: $(-\infty, 7)$

let $7 - x > 0$

$7 - x - 7 > 0 - 7$

$-x > -7$

$\frac{-x}{-1} < \frac{-7}{-1}$

$x < 7$ or

or $(-\infty, 7)$

Formula

$f(x) = \log(Ax + B)$

let $Ax + B > 0$

ID: 4.2.77

65. Use properties of logarithms to expand the logarithmic expression as much as possible. Evaluate logarithmic expressions without using a calculator if possible.

$\log_b\left(\frac{x^3y}{z^5}\right) =$

$\log_b\left(\frac{x^3y}{z^5}\right) =$ _____

$\log_b(x^3y) - \log_b(z^5) =$

$\log_b(x^3) + \log_b(y) - \log_b(z^5) =$

$3\log_b(x) + \log_b(y) - 5\log_b(z) =$

Answer: $3\log_b x + \log_b y - 5\log_b z$

Formula

$\log_b\left(\frac{A}{B}\right) = \log_b(A) - \log_b(B)$

$\log_b(AB) = \log_b(A) + \log_b(B)$

$\log_b(A^N) = N\log_b(A)$

ID: 4.3.27

66. Use properties of logarithms to expand the logarithmic expression as much as possible. Evaluate logarithmic expressions without using a calculator if possible.

$$\ln\left[\frac{x^7\sqrt{x^2+9}}{(x+9)^7}\right] = \ln(x^7\sqrt{x^2+9}) - \ln(x+9)^7 =$$

$$\ln(x^7) + \ln\sqrt{x^2+9} - \ln(x+9)^7 =$$

$$\ln\left[\frac{x^7\sqrt{x^2+9}}{(x+9)^7}\right] = \ln(x^7) + \ln(x^2+9)^{\frac{1}{2}} - \ln(x+9)^7 =$$

$$7\ln(x) + \frac{1}{2}\ln(x^2+9) - 7\ln(x+9) =$$

Answer: $7\ln x + \frac{1}{2}\ln(x^2+9) - 7\ln(x+9)$

Formula

$\ln\left(\frac{A}{B}\right) = \ln(A) - \ln(B)$ $\quad \ln(A^N) = N\ln(A)$

$\ln(AB) = \ln(A) + \ln(B)$

ID: 4.3.37

67. Solve the following exponential equation by expressing each side as a power of the same base and then equating exponents.

$9^{x+1} = 81^{x-9}$

$(3^2)^{x+1} = (3^4)^{x-9}$

$2x = 4x - 38$

$2x - 4x = 4x - 38 - 4x$

$-2x = -38$

$\frac{-2x}{-2} = \frac{-38}{-2}$

$x = 19$

The solution set is { }. $4x - 36$

Answer: 19

$3^{2x+2} = 3$

$2x+2 = 4x-36$

$2x+2-2 = 4x-36-2$

ID: 4.4.19

68. Solve the following exponential equation by taking the natural logarithm on both sides. Express the solution in terms of natural logarithms. Then, use a calculator to obtain a decimal approximation for the solution.

$2e^{5x} = 504$

$\frac{2e^{5x}}{2} = \frac{504}{2}$

$e^{5x} = 252$

What is the solution in terms of natural logarithms?

The solution set is { }.

(Use a comma to separate answers as needed. Simplify your answer. Use integers or fractions for any numbers in the expression.)

$\ln(e^{5x}) = \ln(252)$

What is the decimal approximation for the solution?

$5x\ln(e) = \ln(252)$

The solution set is { }.

(Use a comma to separate answers as needed. Round to two decimal places as needed.)

$5x(1) = \ln(252)$

$5x = \ln(252)$

$\frac{5x}{5} = \frac{\ln(252)}{5}$

Answers $\frac{\ln 252}{5}$

1.11

$x = \frac{\ln(252)}{5}$ or $x = 1.11$

$x = 1.10588858$ or Round

ID: 4.4.31

69. Solve the exponential equation. Express the solution in terms of natural logarithms. Then use a calculator to obtain a decimal approximation for the solution.

$2^{(x-3)} = 223$

What is the solution in terms of natural logarithms?

The solution set is { }.
(Use a comma to separate answers as needed. Simplify your answer. Use integers or fractions for any numbers in the expression.)

What is the decimal approximation for the solution?

The solution set is { }.
(Use a comma to separate answers as needed. Round to two decimal places as needed.)

Answers $\frac{\ln 223}{\ln 2} + 3$

10.80

ID: 4.4.37

70. Solve the following logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expression. Give the exact answer.

$\log_2(x+13) = 2$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is { }. (Type an integer or a simplified fraction.)
B. There is no solution.

Answer: A. The solution set is { −9 }. (Type an integer or a simplified fraction.)

ID: 4.4.55

71. Solve the logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give an exact answer.

$\log_{13} x + \log_{13}(12x-1) = 1$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is { }. (Type an exact answer in simplified form.)
B. There is no solution.

Answer: A. The solution set is { $\frac{13}{12}$ }. (Type an exact answer in simplified form.)

ID: 4.4.67

72. Solve the logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log_5(x+122) + \log_5(x-2) = 3$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is { } (Simplify your answer. Use a comma to separate answers as needed.)

B. There is no solution.

Answer: A. The solution set is { 3 }.

(Simplify your answer. Use a comma to separate answers as needed.)

ID: 4.4.69

73. Solve the logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log_4(x+12) - \log_4(x-3) = 2$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is { }. (Simplify your answer. Use a comma to separate answers as needed.)

B. There is no solution.

Answer: A. The solution set is { 4 }.

(Simplify your answer. Use a comma to separate answers as needed.)

ID: 4.4.71

74. Solve the logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log(x+6) = \log x + \log 6$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is { }. (Simplify your answer. Use a comma to separate answers as needed.)

B. There is no solution.

Answer: A. The solution set is { $\frac{6}{5}$ }.

(Simplify your answer. Use a comma to separate answers as needed.)

ID: 4.4.77

75. Solve the logarithmic equation. Be sure to reject as a solution any value that is not in the domain of the original logarithmic expressions.

$2\log x = \log 36$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is { }.
(Type an exact answer in simplified form. Use a comma to separate answers as needed.)

B. There is no solution.

Answer: A. The solution set is { 6 }
(Type an exact answer in simplified form. Use a comma to separate answers as needed.)

ID: 4.4.81

76. Solve the logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log x + \log(x-3) = \log 28$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The solution set is { }.
(Simplify your answer. Use a comma to separate answers as needed.)

B. There is no solution.

Answer: A. The solution set is { 7 }.
(Simplify your answer. Use a comma to separate answers as needed.)

ID: 4.4.87

77. Complete the table for a savings account subject to 4 compoundings yearly.

$\left[A = P\left(1 + \frac{r}{n}\right)^{nt}\right]$

Amounted Invested	Number of Compounding Periods	Annual Interest Rate	Accumulated Amount	Time t in Years
$12,000	4	4.5%	$15,000	?

Let A represent the accumulated amount, P the amount invested, n the number of compounding periods, r the annual interest rate, and t the time. Find the time, t.

t = _____ years
(Do not round until the final answer. Then round to one decimal place as needed.)

Answer: 5.0

ID: 4.4.107

78. Complete the table for a savings account subject to continuous compounding.

$(A = Pe^{rt})$ $19000 = 9500\,e^{.11t}$

Amount Invested	Annual Interest Rate	Accumulated Amount	Time t in years
$9500	11%	$19,000	?

Let A represent the accumulated amount, P the amount invested, r the annual interest rate, and t the time. Find the time, t.

$t \approx$ [ ] years (Round to one decimal place as needed.)

$\frac{19000}{9500} = \frac{9500\,e^{.11t}}{9500}$ $2 = e^{.11t}$ $\ln(2) = \ln(e^{.11t})$ $\ln(2) = .11t\ln(e)$ $\ln(2) = .11t(1)$

$\frac{\ln(2)}{.11} = \frac{.11t}{.11}$ $6.301338005 = t$ or $6.3 = t$ Round

Answer: 6.3

ID: 4.4.111

79. The exponential model $A = 46.4\,e^{0.02t}$ describes the population, A, of a country in millions, t years after 2003. Use the model to determine when the population of the country will be 74 million.

2003 + t

The population of the country will be 74 million in [ ] (Round to the nearest year as needed.)

2026 ↑ YEAR

$74 = 46.4\,e^{0.02t}$ $\frac{74}{46.4} = \frac{46.4\,e^{0.02t}}{46.4}$ $1.594827 = e^{0.02t}$ $\ln(1.594827) = \ln(e^{0.02t})$ $\ln(1.594827) = 0.02t\ln(e)$ $\ln(1.594827) = 0.02t(1)$

$\frac{\ln(1.594827)}{0.02} = \frac{0.02t}{0.02}$ $23.33826332 = t$ $23 = t$ Round to YEAR.

Answer: 2026

ID: 4.5.5

80. An artifact originally had 16 grams of carbon-14 present. The decay model $A = 16\,e^{-0.000121t}$ describes the amount of carbon-14 present after t years. Use the model to determine how many grams of carbon-14 will be present in 5482 years.

The amount of carbon-14 present in 5482 years will be approximately [ ] grams. (Round to the nearest whole number.)

$A = 16e^{-0.000121t}$ $A = 16e^{\wedge}(-0.000121(5482))$ $A = 8.242195525$ or $A = 8$ Round

Answer: 8

ID: 4.5.15

81. Prehistoric cave paintings were discovered in a cave in France. The paint contained 26% of the original carbon-14. Use the exponential decay model for carbon-14, $A = A_0\,e^{-0.000121t}$, to estimate the age of the paintings.

The paintings are approximately [ ] years old. (Round to the nearest integer.)

$\frac{26}{100} = \frac{100\,e^{-0.000121t}}{100}$ $.26 = e^{-0.000121t}$ $\ln(.26) = \ln(e^{-0.000121t})$ $\ln(.26) = -0.000121t\ln(e)$ $\ln(.26) = -0.000121t(1)$ $\ln(.26) = -0.000121t$

$\frac{\ln(.26)}{-0.000121} = \frac{-0.000121t}{-0.000121}$ $11{,}132.84007 = t$ or $11{,}133 = t$ Round

Answer: 11,133

ID: 4.5.19

82. In 1964, paleontologists discovered the bones of a new species of dinosaur. The age of the dinosaur was estimated using potassium-40 dating of rocks surrounding the bones. Analysis of these rocks indicated that 95.1% of the original amount of the potassium-40 was still present. The decay model for potassium-40 is $A = A_0 e^{-0.52912t}$, where t is in billions of years. Let $A = 0.951A_0$ in this decay model and estimate the age of the bones of the dinosaur.

The bones are approximately [ ] billion years old.
(Type an integer or decimal rounded to four decimal places as needed.)

Answer: 0.095

ID: 4.5.27

83. Use the formula $t = \frac{\ln 2}{k}$ that gives the time for a population, with a growth rate k, to double, to answer the following questions.

The growth model $A = 7e^{0.003t}$ describes the population, A, of a country in millions, t years after 2003.

a. What is the country's growth rate?

[ ] %

b. How long will it take the country to double its population?

[ ] years (Round to the nearest whole number.)

Answers 0.3

231

ID: 4.5.35

84. Rewrite the following equation in terms of base e. Round any natural logarithms to three decimal places.

$y = 84(6.1)^x$

Type the model in terms of base e.

y = [ ]

Answer: $84e^{1.808x}$

ID: 4.5.53

85. Rewrite the following equation in terms of base e. Round any natural logarithms to three decimal places.

$y = 4.9(0.2)^x$

$y = 4\,e^{\ln(0.2)x}$

$y = 4\,e^{-1.609437912x}$

$y = 4\,e^{-1.609x}$

Type the model in terms of base e.

$y =$ [ ]

Answer: $4.9\,e^{-1.609x}$

ID: 4.5.55

86. Solve the given system of equations.

$x + y + 5z = 15$
$x + y + 2z = 3$
$x + 8y + 9z = 17$

2ND, matrix, edit, [A], 3 x 4

$[A] = \begin{bmatrix} 1 & 1 & 5 & 15 \\ 1 & 1 & 2 & 3 \\ 1 & 8 & 9 & 17 \end{bmatrix}$

Select the correct choice below and fill in any answer boxes within your choice.

2ND matrix, math, rref, enter

$rref([A]) = \begin{bmatrix} 1 & 0 & 0 & -3 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 4 \end{bmatrix}$ x, y, z

- ○ **A.** There is one solution. The solution set is $\{(\_\_\_\_, \_\_\_\_, \_\_\_\_)\}$. (Simplify your answers.)
- ○ **B.** There are infinitely many solutions.
- ○ **C.** There is no solution.

Answer: A.

There is one solution. The solution set is $\{(-3, -2, 4)\}$. (Simplify your answers.)

ID: 5.2.5

$(x, y, z) = (-3, -2, 4)$

87. Write the first four terms of the sequence whose general term is given.

$$a_n = \frac{2n}{n+6}$$

$a_1 =$ [ ] (Simplify your answer.)

$a_2 =$ [ ] (Simplify your answer.)

$a_3 =$ [ ] (Simplify your answer.)

$a_4 =$ [ ] (Simplify your answer.)

$a_1 = \frac{2(1)}{1+6} = \frac{2}{7}$

$a_2 = \frac{2(2)}{2+6} = \frac{4}{8} = \frac{2(2)}{4(2)} = \frac{1}{2}$

$a_3 = \frac{2(3)}{3+6} = \frac{6}{9} = \frac{3(2)}{3(3)} = \frac{2}{3}$

$a_4 = \frac{2(4)}{4+6} = \frac{8}{10} = \frac{2(4)}{2(5)} = \frac{4}{5}$

Answers $\frac{2}{7}$, $\frac{1}{2}$, $\frac{2}{3}$, $\frac{4}{5}$

ID: 8.1.9

88. Find the indicated sum. $\sum_{i=1}^{3} i(i+2)$

$1(1+2) + 2(2+2) + 3(3+2) =$

$\sum_{i=1}^{3} i(i+2) =$ [ ] (Simplify your answer.)

$1(3) + 2(4) + 3(5) =$

$3 + 8 + 15 =$

Answer: 26

$26 =$

ID: 8.1.33

Use Graphing Calculator

89. Use the binomial theorem to expand the binomial.

$(3x-3)^3$ $\quad {}_3C_0(3x)(-3)^0 + {}_3C_1(3x)^1(-3)^2 + {}_3C_2(3x)^2(-3)^1 + {}_3C_3(3x)^0(-3)^3 =$

$(3x-3)^3 =$ [ ] (Simplify your answer.)

$(1)(3^3x^3)(1) + (3)(3^2x^2)(-3) + 3(3x)(9) + (1)(1)(-27) =$

Answer: $27x^3 - 81x^2 + 81x - 27$

$(1)(27x^3)(1) + (3)(9x^2)(-3) + 3(3x)(9) + (1)(1)(-27) =$

ID: 8.5.13

$27x^3 - 81x^2 + 81x - 27 =$

3, math, Prb, nCr, 0 = 1 3, math, Prb, nCr 2 = 3

3, math, Prb, nCr, 1 = 3 3 math Prb, nCr 3 = 1

90. Write the first three terms of the binomial expansion, expressing the result in simplified form.

$(x+5)^4$

The first three terms of the binomial expansion are _____.
(Simplify your answer.)

Answer: $x^4 + 20x^3 + 150x^2$

ID: 8.5.31

$_4C_0(x)(5)^0 + {}_4C_1(x)^3(5)^1 + {}_4C_2(x)^2(5)^2 =$

$(1)(x^4)(1) + (4)(x^3)(5) + (6)(x^2)(25) =$

$x^4 + 20x^3 + 150x^2$ I

Use Graphing Calculator

4, Math, Prb, nCr, 0 = 1

4, Math, Prb, nCr, 1 = 4

4, Math, Prb, nCr, 2 = 6