QUIZ 3 MATH 161 THOMPSON

Find the following for the function $f(x) = 4x^2 + 2x - 4$.

(a) $f(0)$ **(b)** $f(5)$ **(c)** $f(-5)$ **(d)** $f(-x)$
(e) $-f(x)$ **(f)** $f(x+3)$ **(g)** $f(3x)$ **(h)** $f(x+h)$

(a) $f(0) =$ -4 (Simplify your answer.)

(b) $f(5) =$ 106 (Simplify your answer.)

(c) $f(-5) =$ 86 (Simplify your answer.)

(d) $f(-x) =$ $4x^2 - 2x - 4$ (Simplify your answer.)

(e) $-f(x) =$ $-4x^2 - 2x + 4$ (Simplify your answer.)

(f) $f(x+3) =$ $4x^2 + 26x + 38$ (Simplify your answer.)

(g) $f(3x) =$ $36x^2 + 6x - 4$ (Simplify your answer.)

(h) $f(x+h) =$ $4x^2 + 8hx + 4h^2 + 2x + 2h - 4$ (Simplify your answer.)

$4(x+h)^2 + 2(x+h) - 4$
$4(x^2 + 2xh + h)^2 + 2(x+h) - 4$

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.

$f(x) = x^2 - 8x + 1$

$\frac{f(x+h) - f(x)}{h} =$ $2x + h - 8$

$(x+h)^2 - 8(x+h) + 1 - (x^2 - 8x + 1)$

$x^2 + 2xh + h^2 - 8x - 8h + 1 \; - x^2 + 8x - 1$

$\frac{2xh + h^2 - 8h}{h} = 2x + h - 8$

Determine whether the equation defines y as a function of x.

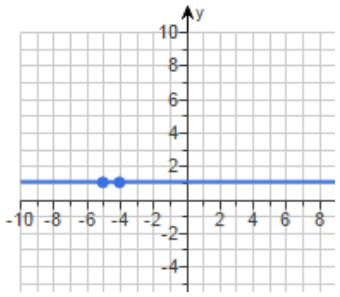
$x - 8 = y^2$

Does the equation define y as a function of x?

- ○ Yes
- ★ No

Graph the line that contains the point P and has slope m. Find the point-slope form of the equation of the line.

$P = (-5, 1)$; $m = 0$ *Slope is zero for y =1*

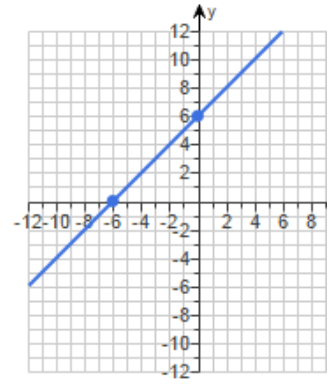


Use the graphing tool to graph the line. Use the given point when drawing the line.

The point-slope form of the equation of the line is $y - 1 = 0$.

Using the given equation,
(a) find the intercepts of its graph and
(b) graph the equation.

$-6x + 6y = 36$



(a) What is the x-intercept? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The x-intercept is -6. (Type an integer.) *-6x = 36 then x = -6*

B. There is no x-intercept.

What is the y-intercept? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

A. The y-intercept is 6. (Type an integer.) *6y = 36 then y = 6*

B. There is no y-intercept.

Find the domain of the function.

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

The domain is $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$ *$x \neq -2, 2$*

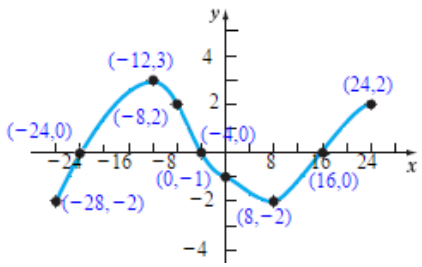
Find the equation of a line that is perpendicular to the line $y = \frac{1}{8}x + 4$ and contains the point $(-4, 0)$.

$y =$ $-8x - 32$ (Type your answer in slope-intercept form.)

$y - 0 = -8(x + 4)$

$y = -8x - 32$

Use the graph of the function f shown to the right to answer parts (a)-(n).



(a) Find f(−28) and f(−8).

f(−28) = −2
f(−8) = 2

(b) Find f(24) and f(0).

f(24) = 2
f(0) = −1

(c) Is f(8) positive or negative?

- Positive
- ★ Negative

(d) Is f(−12) positive or negative?

- Negative
- ★ Positive

(e) For what value(s) of x is f(x) = 0?

x = −24, −4, 16
(Use a comma to separate answers as needed.)

(f) For what values of x is f(x) > 0?

−24 < x < −4, 16 < x ≤ 24
(Type a compound inequality. Use a comma to separate answers as needed.)

(g) What is the domain of f?

The domain of f is {x | −28 ≤ x ≤ 24}.
(Type a compound inequality.)

(h) What is the range of f?

The range of f is {y | −2 ≤ y ≤ 3}.
(Type a compound inequality.)

Use y

(i) What are the x-intercept(s)?

x = −24, −4, 16
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

(j) What are the y-intercept(s)?

y = −1
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

(k) How often does the line y = 1 intersect the graph?

3 time(s)

(l) How often does the line x = 2 intersect the graph?

1 time(s)

(m) For what value(s) of x does f(x) = −2?

x = −28, 8
(Use a comma to separate answers as needed.)

(n) For what value(s) of x does f(x) = 3?

x = −12
(Use a comma to separate answers as needed.)

Find x and y intercepts: $4x^2 + 16y^2 = 64$

Set y = 0 to find x $4x^2 = 64 \rightarrow x^2 = 16 \rightarrow x = -4, 4$

Set x = 0 to find x $16y^2 = 64 \rightarrow y^2 = 4 \rightarrow y = -2, 2$

(-4,0),(4,0),(0,2),(0,-2)

Answer the questions about the following function.

$f(x) = 4x^2 - x - 3$

(a) Is the point $(-1,2)$ on the graph of f?
(b) If $x = -2$, what is f(x)? What point is on the graph of f?
(c) If $f(x) = -3$, what is x? What point(s) are on the graph of f?
(d) What is the domain of f?
(e) List the x-intercept(s), if any, of the graph of f.
(f) List the y-intercept, if there is one, of the graph of f.

(a) Choose the correct answer below.

- A. Yes, because substituting $x = 2$ into the given equation results in -1.
- ★ B. Yes, because substituting $x = -1$ into the given equation results in 2.
- C. No, because substituting $x = 2$ into the given equation does not result in -1.
- D. No, because substituting $x = -1$ into the given equation does not result in 2.

(b) If $x = -2$, $f(x) =$ 15.
(Simplify your answer.)

Using the information in the previous step, list the point(s) on the graph of f, where $x = -2$.

$(-2,15)$
(Simplify your answer. Type an ordered pair.)

(c) If $f(x) = -3$, $x =$ $0, \frac{1}{4}$.
(Simplify your answer. Use a comma to separate answers as needed.)

Using the information in the previous step, list the point(s) on the graph of f, where $f(x) = -3$.

$(0,-3), \left(\frac{1}{4}, -3\right)$
(Simplify your answer. Type an ordered pair. Use a comma to separate answers as needed.)

$4x^2 - x = 0$ *{ -3 cancels}*

$x(4x-1)=0$

(d) What is the domain of f?

The domain is $(-\infty, \infty)$.

(e) List the x-intercept(s), if any, of the graph of f. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ★ A. The x-intercept(s) is/are $1, -\frac{3}{4}$.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)
- B. There are no x-intercepts.

Factor original

(f) List the y-intercept, if any, of the graph of f. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- ★ A. The y-intercept(s) is/are -3.
  (Type an integer or a simplified fraction. Use a comma to separate answers as needed)
- B. There is no y-intercept.

Find the following for the function $f(x) = 4x^2 + 4x - 3$.

(a) f(0)	**(b)** f(2)	**(c)** f(−2)	**(d)** f(−x)
(e) −f(x)	**(f)** f(x + 3)	**(g)** f(4x)	**(h)** f(x + h)

(a) $f(0) = -3$ (Simplify your answer.)

(b) $f(2) = 21$ (Simplify your answer.)

(c) $f(-2) = 5$ (Simplify your answer.)

(d) $f(-x) = 4x^2 - 4x - 3$ (Simplify your answer.)

(e) $-f(x) = -4x^2 - 4x + 3$ (Simplify your answer.)

(f) $f(x+3) = 4x^2 + 28x + 45$ (Simplify your answer.)

(g) $f(4x) = 64x^2 + 16x - 3$ (Simplify your answer.)

(h) $f(x+h) = 4x^2 + 8hx + 4h^2 + 4x + 4h - 3$ (Simplify your answer.)

$4(x+h)^2 + 4(x+h) - 3$

$4(x^2 + 2xh + h)^2 + 4(x+h) - 3$