

Directions: Answer the following question(s).

1 Combine into a single fraction and reduce to lowest terms:

$$\frac{11x+10}{2x-1} + \frac{-7x+12}{2x-1}$$

A. $\frac{36x^2+22}{(2x-1)(2x+1)}$

B. $\frac{4x+22}{2x-1}$

C. 2

D. Undefined

2 What is the product of $\frac{7}{x+2}$ and $\frac{x+1}{3x+6}$?

A. $\frac{7x+7}{3x^2+12x+12}$

B. $\frac{7x+7}{x+2}$

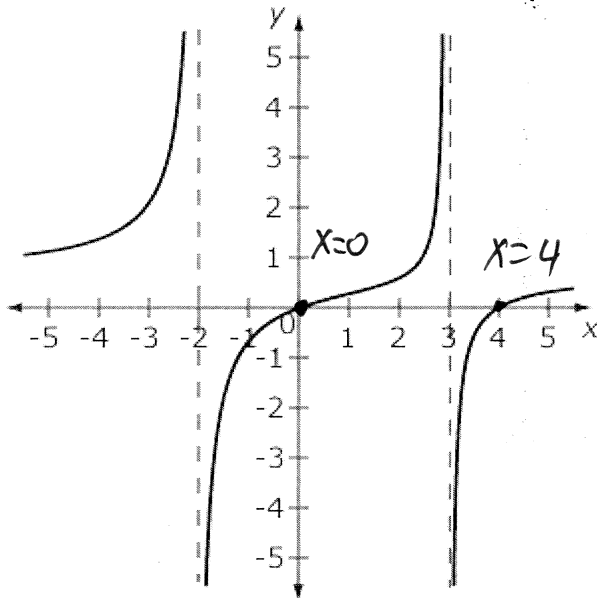
C. $\frac{21}{x+1}$

D. $\frac{x+22}{3x+6}$

$$\left(\frac{7}{x+2}\right)\left(\frac{x+1}{3x+6}\right) = \frac{7x+7}{(x+2)(3x+6)} = \frac{7x+7}{3x^2+12x+12}$$

Directions: Answer the following question(s).

- 3 Which of the following rational functions share a zero with the graph shown? Select two that apply.



A. ~~$f(x) = \frac{x-3}{x+2}$ zeros: $x=3$~~

B. $f(x) = \frac{x-4}{x-1}$ zeros: $x=4$

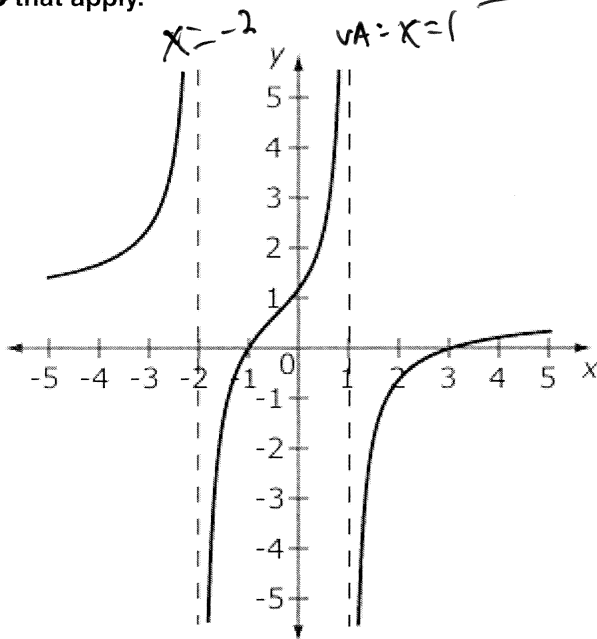
C. $f(x) = \frac{x^2-x}{x^2+2x-3} = \frac{x(x-1)}{x^2+2x-3}$ zero: $x=0$

D. $f(x) = \frac{x^2+x-12}{x^2-x-6} = \frac{(x+4)(x-3)}{(x-3)(x+2)}$ zero: $x=-4$

E. $f(x) = \frac{x^2-x-6}{x^2-4x} = \frac{(x-3)(x+2)}{x(x-4)}$ z: $x=3, x=-2$

Directions: Answer the following question(s).

4. Which of the following rational functions shares a vertical asymptote with the graph shown? Select two that apply.



A. ~~$f(x) = \frac{x-1}{x-2}$~~

B. $f(x) = \frac{x+3}{x-1}$

C. ~~$f(x) = \frac{(x+1)(x-3)}{(x-2)(x+1)}$~~

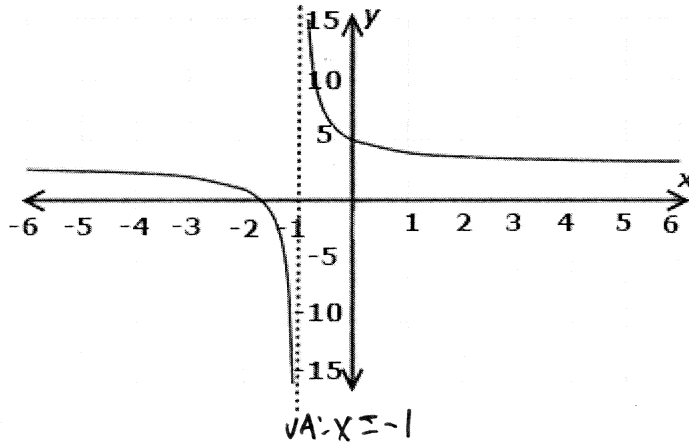
D. ~~$f(x) = \frac{(x+2)(x-1)}{(x+3)(x-3)}$~~

E. ~~$f(x) = \frac{x^2 - 2x - 3}{x^2 - x - 2} = \frac{x^2 - 2x - 3}{(x-2)(x+1)} = \frac{(x-3)(x+1)}{(x-2)(x+1)}$~~

F. $f(x) = \frac{x^2 - 4x - 5}{x^2 - 5x + 4} = \frac{(x-5)(x+1)}{(x-4)(x-1)}$

Directions: Answer the following question(s).

5



Select the equation represented by the graph shown above.

- A. $y = \frac{3x+5}{x+1}$
- B. ~~$y = \frac{3x+5}{x+2}$~~
- C. ~~$y = \frac{x^2}{x+3}$~~
- D. ~~$y = \frac{x}{x-1}$~~

6

Stan's hours spent in the office each day can be expressed as $h(t)$, a function of the number of transactions that occurred that day. His weekly pay can be represented by $w(p)$, a function of the number of hours that he worked each week. Which functions can be used to calculate Stan's total earnings for the week? Select *all* that apply.

- A. ~~$(h \cdot w)(t)$~~
 - B. ~~$h(w(t))$~~
 - C. $(w \cdot h)(t)$
 - D. $w(h(t))$
 - E. ~~$h(p)$~~
 - F. ~~$w(t)$~~
- $h(t)$ transactions \rightarrow hours $w(p)$ hours \rightarrow pay
- $w(h(t))$ or $(w \circ h)(t)$
- transactions \rightarrow pay

Directions: Answer the following question(s).

7 If $f(x) = x^2 - 9$, what is $f(f(x))$?

A. $x^2 - 9$

B. $x + 3$

C. $x^4 - 18x^2 + 72$

D. $x^2 - 18x + 72$

$$\begin{aligned} f(x) &= x^2 - 9 \\ f(x^2 - 9) &= (x^2 - 9)^2 - 9 \\ &= x^4 - 18x^2 + 81 - 9 \\ &= x^4 - 18x^2 + 72 \end{aligned}$$

8 If $f(x) = 3x + 2$ and $g(x) = x^2$, what is $f(g(x))$?

A. $3x^2 + 2$

B. $9x^2 + 12x + 4$

C. $9x^2 + 4$

D. $3x^2 + 4$

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

9 What is the inverse of the function $y = x^2 + 3$?

A. $y = x - 3$

B. $y = \sqrt{x - 3}$

C. $y = \sqrt{x^2 + 3}$

D. $y = (x - 3)^2$

$$\begin{aligned} x &= y^2 + 3 \\ x - 3 &= y^2 \\ \sqrt{x - 3} &= y \end{aligned}$$

10 Which expression represents $f^{-1}(x)$ if $f(x) = 11 - 10x$?

A. $-11 + 10x$

B. $-11 + \frac{1}{10}x$

C. $11 + 10x$

D. $\frac{11 - x}{10}$

$$\begin{aligned} y &= 11 - 10x \\ x &= \frac{11 - y}{10} \\ x - 11 &= -10y \\ \frac{x - 11}{-10} &= y \\ \frac{-x + 11}{10} &= y \\ \frac{11 - x}{10} &= y \end{aligned}$$

Directions: Answer the following question(s).

11 What is the value of the following expression:

$$f^{-1}(f(x))$$

A. 0

B. 1

C. x

D. cannot be determined without knowing the exact functions

an inverse and it's function = X when composed

12 Which of the following pairs of functions are inverses of each other?

A.

$$f(x) = 3x + 5$$

$$g(x) = \frac{x}{3} - \frac{5}{3}$$

~~B.~~

~~$$f(x) = 2x + 3$$~~

~~$$g(x) = 2x - 3$$~~

C.

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

$$g(x) = \sqrt{x}$$

~~D.~~

~~$$f(x) = 10x - 3$$~~

~~$$g(x) = x + \frac{3}{10}$$~~

13 Which statement below can only be true if the functions, $f(x)$ and $g(x)$, are inverses of each other?

~~A.~~

~~$$f^{-1}(x) = \frac{1}{f(x)} \text{ and } g^{-1}(x) = \frac{1}{g(x)}$$~~

B.

$$f(g(x)) = x \text{ and } g(f(x)) = x$$

~~C.~~

~~$$f(f(x)) = x \text{ and } g(g(x)) = x$$~~

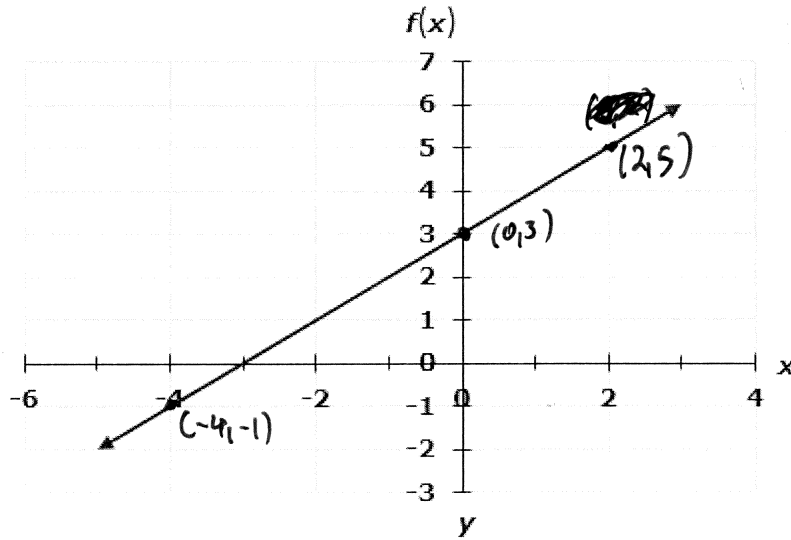
D.

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

arguably this one too

Directions: Answer the following question(s).

- 14 Lila is given the following graph which represents the function $f(x)$.



She is then asked to find two points on the function $g(x)$ which is the inverse function of $f(x)$.

Lila makes the claim that points $(1, 4)$ and $(5, 2)$ are on $g(x)$. \rightarrow inverse

Which statement provides a correct analysis of Lila's claim?

- A. Lila is correct; both points are on $g(x)$ because the points on $g(x)$ are the same as the points on $f(x)$ only the x - and y -values are reversed.
- B. Lila is partially correct; $(1, 4)$ is on $g(x)$ but not $(5, 2)$ because the points on $g(x)$ are the same as the points on $f(x)$ only the x - and y -values will have the opposite sign and will be reversed.
- C. Lila is partially correct; $(5, 2)$ is on $g(x)$ but not $(1, 4)$ because the points on $g(x)$ are the same as the points on $f(x)$ only the x - and y -values will be reversed.
- D. Lila is incorrect; neither points are on $g(x)$ because the points on $g(x)$ will be the same as the points on $f(x)$.

- 15 The table below shows points that are on the graph of the function $h(x)$.

x	0	1	2	3	4	5
$h(x)$	2	5	8	11	14	17

Select *all* of the points that are on the graph of the inverse function $h^{-1}(x)$.

- A. $(1, -1)$
- B. $(2, 0)$
- C. $(3, 11)$
- D. $(4, 10)$
- E. $(5, 1)$

Directions: Answer the following question(s).

16 The function $f(x) = 3 - 5x$. If $g(x)$ is the inverse of $f(x)$, what is $g(-7)$?

- A. 2
 B. 38
 C. 3
 D. -5

$$x = 3 - 5y$$

$$x - 3 = -5y$$

$$\frac{x}{-5} + \frac{3}{5} = y$$

$$\frac{-7}{-5} + \frac{3}{5} = \frac{10}{5} = 2$$

17 What is the inverse of the following function?

$$y = 2^x + 3$$

- A. $y = \log_2(x + 3)$
 B. $y = \log_2(x - 3)$
 C. $y = \log_x(6)$
 D. $y = \log_2(x) - 3$

18 Which of the following is equivalent to the following equation?

$$\log_3(30) = x$$

- A. $3^{30} = x$
 B. $x^{30} = 3$
 C. $3x = 30$
 D. $3^x = 30$

19 Solve for x : $5e^{(2x)} = 30$

- A. 3
 B. $(\ln(6))/2$
 C. $(\log(6))/2$
 D. 6