Honors Pre-Calculus
Practice Problems

Name:

Remember! Get common denominators!

Complete the stated operation (addition, subtraction) to simplify the expression.

1) $\frac{u-v}{8v}+\frac{6u-3v}{8v}$

$\frac{7u-4v}{8v}$

3) $\frac{5}{a^2+3a+2}+\frac{5a+1}{a^2+3a+2}$

$\frac{6+5a}{a^2+3a+2}$

5) $\frac{r+6}{3r-6}+\frac{r+1}{3r-6}$

$\frac{2r+7}{3r-6}$

7) $\frac{6}{x-1}-\frac{5x}{4}$

$\frac{24-5x^2+5x}{4(x-1)}$

9) $\frac{3}{x+7}+\frac{4}{x-8}$

$\frac{7x+4}{(x+7)(x-8)}$

Identify the zeros, the vertical asymptotes, and the horizontal asymptotes of the function.

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

zeros: $x=0$
VA: $x=-1, x=1$
HA: $\frac{2x}{x^2}=\frac{2}{x}\Rightarrow 0=y$

2. $y=\frac{8}{x^2-x-6}=\frac{8}{(x-3)(x+2)}$

zeros: none
VA: $x=3, x=-2$
HA: $\frac{8}{x^2}\Rightarrow y=0$

3. $f(x)=\frac{x^2-9}{2x^2+1}=\frac{(x-3)(x+3)}{2x^2+1}$

zeros: $x=3, x=-3$
VA: none. denom has no real zeros
HA: $\frac{x^2}{2x^2}=\frac{1}{2}\Rightarrow y=\frac{1}{2}$

4. $y=\frac{x^2-5x+6}{x^2-4x+3}=\frac{(x-3)(x-2)}{(x-3)(x-1)}$

zeros: $x=2$
VA: $x=3$
HA: $\frac{x^2}{x^2}=1\Rightarrow y=1$

5. $y=\frac{x^2+11x+18}{2x+1}=\frac{(x+9)(x+2)}{2x+1}$

zeros: $x=-9, -2$
VA: $x=-\frac{1}{2}$
HA: $\frac{x^2}{x}=x\Rightarrow$ none

6. $g(x)=\frac{x-4}{x^2-3x}=\frac{x-4}{x(x-3)}$

zeros: $x=4$
VA: $x=0, x=3$
HA: $\frac{x}{x^2}=\frac{1}{x}\Rightarrow y=0$

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If $f(x) = 2x^2$ and $g(x) = 3x^3$ and $h(x) = 4x$, find the following

$h(g(x)) = h(3x^3) = 4(3x^3) = 12x^3$

$f(g(x)) = f(3x^3) = 2(3x^3)^2 = 2(9x^6) = 18x^6$

$g(f(x)) = g(2x^2) = 3(2x^2)^3 = 3(8x^6) = 24x^6$

$f(h(x)) = f(4x) = 2(4x)^2 = 2(16x^2) = 32x^2$

A

7 Describe the vertical asymptote(s) and hole(s) for the graph of $y = \dfrac{(x-5)(x-2)}{(x-2)(x+4)}$.

hole: at $x=2$ VA: $x=-4$

A asymptote: $x = -4$ and hole: $x = 2$

B asymptotes: $x = -4$ and $x = 2$

C asymptote: $x = -5$ and hole: $x = -4$

D asymptote: $x = 4$ and hole: $x = -2$

A

15 Determine the horizontal asymptote of the function. $y = \dfrac{6x^2+1}{2x^2-3}$. $\Rightarrow \dfrac{6x^2}{2x^2} = 3$

A $y = 3$

B $y = -\dfrac{1}{3}$

C $y = \dfrac{1}{3}$

D $y = -3$

D

16 Which function does **not** have a horizontal asymptote.

A $g(x) = \dfrac{x-6}{x^2+2} \Rightarrow \dfrac{1}{x} \Rightarrow 0$

B $g(x) = \dfrac{x^2}{-3x^2+1} = \dfrac{x^2}{-3x^2} = -\dfrac{1}{3}$

C $g(x) = \dfrac{x-9}{x+3} = \dfrac{x}{x} \Rightarrow 1$

D $g(x) = \dfrac{x^3-2}{6x^2-5} = \dfrac{x^3}{6x^2} = \dfrac{x}{6} \Rightarrow$ none

Degree of num > Degree of denom

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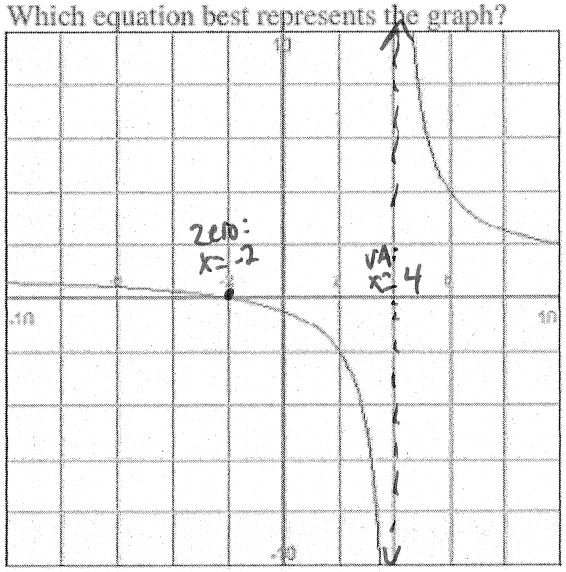
D 22

Which equation best represents the graph?



$y = \frac{x+2}{(x-4)}$

A $y = \frac{(x-2)}{(x-4)}$

B $y = \frac{(x+2)}{(x+4)}$

C $y = \frac{(x+4)}{(x-2)}$

D $y = \frac{(x+2)}{(x-4)}$

C 30 Simplify the following rational expression, state any excluded values.

$$\frac{4}{x^2-9} - \frac{7}{x+3}$$

A $\frac{7x+25}{x^2-9}, x \neq \pm 3$

B $\frac{7x-17}{x^2-9}, x \neq \pm 3$

C $\frac{-7x+25}{x^2-9}, x \neq \pm 3$

D $\frac{-7x-17}{x^2-9}, x \neq \pm 3$

$$\frac{4}{(x-3)(x+3)} - \frac{7}{x+3} = \frac{4}{(x-3)(x+3)} - \frac{7(x-3)}{(x-3)(x+3)} = \frac{4-7(x-3)}{(x-3)(x+3)}$$

Get common denom

$$= \frac{4-7x+21}{(x-3)(x+3)} = \frac{-7x+25}{x^2-9} \qquad x \neq -3, 3$$

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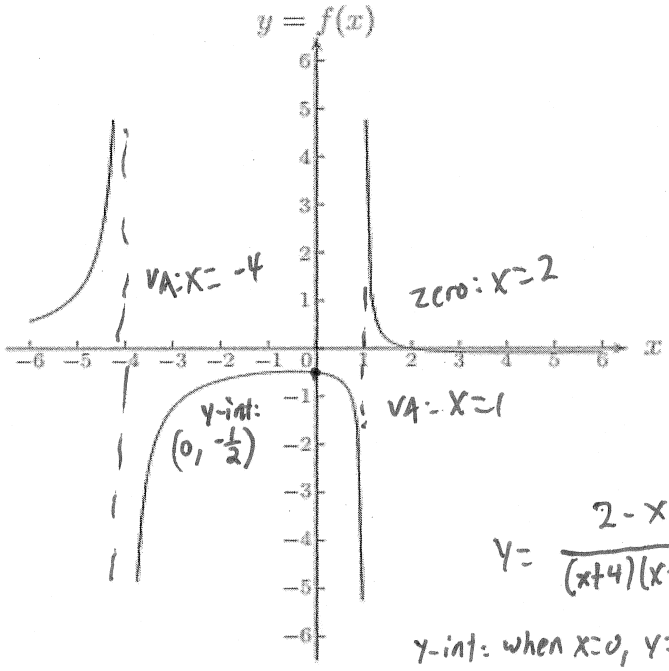
a. $f(x) = \dfrac{x-2}{x^2+3x-4}$

b. $f(x) = \dfrac{2-x}{x^2+3x-4}$

c. $f(x) = \dfrac{x-2}{x^2-3x-4}$

d. $f(x) = \dfrac{2-x}{x^2-3x-4}$



$y = \dfrac{2-x}{(x+4)(x-1)} = \dfrac{-2+x}{x^2+3x-4}$

y-int: when $x=0$, $y=-\frac{1}{2}$

8. Which of the following functions has a zero, a vertical asymptote and a horizontal asymptote?

a. $f(x) = \dfrac{x-4}{(x-4)(x-5)}$ HA: $\frac{x}{x^2}$ ✓ no zero ✗ no

b. $f(x) = \dfrac{(x+2)(x^2+1)}{(x-4)(x^2+7)}$ HA: $\frac{x^3}{x^3}$ ✓

c. $f(x) = \dfrac{x^2+5}{(x-4)(x-5)}$ HA: $\frac{x^2}{x^2}$ ✓ no zero: $x^2+5 \neq 0$ ever!

d. $f(x) = \dfrac{(x-5)(x^2+8)}{(x-4)}$ HA: $\frac{x^3}{x}$ ✗ no

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$C(x) = \frac{5}{100}x + 25$ or $C(x) = \frac{1}{20}x + 25$

Name:

D 1. A pre-paid cellular phone charges \$25 for activation and \$0.05 per minute. The relation of cost to minutes can be defined by the function $c(x) = 0.05x + 25$. What is the inverse of the function?

a. $f^{-1}(x) = -20x + 500$
c. $f^{-1}(x) = -0.05x - 25$
b. $f^{-1}(x) = \frac{20}{x} + \frac{1}{25}$
d. $f^{-1}(x) = 20x - 500$

$y = \frac{1}{20}x + 25$
$x = \frac{1}{20}y + 25$
$x - 25 = \frac{1}{20}y$
$20x - 500 = y$

A 2. Which of the following is the inverse relation to the set of ordered pairs {(–10, 5), (–7, 9), (0, 6), (8, –12)}?

a. {(5, –10), (9, –7), (6, 0), (–12, 8)}
c. {(10, –5), (7, –9), (0, –6), (–8, 12)}
b. {(–10, –5), (–7, –9), (0, –6), (8, 12)}
d. {(–5, 10), (–9, 7), (–6, 0), (12, –8)}

A 3. Which of the following is the inverse to the function "Multiply by 8, then subtract 10"?

a. Add 10, then divide by 8
c. Divide by 8, then add 10
b. Subtract 10, then multiply by 8
d. Multiply by 10, then subtract 8

$y = 8x - 10$
$y + 10 = 8x$
$\frac{(y+10)}{8} = x$

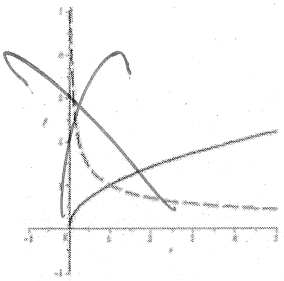
C 4. Which of the following is the inverse to the function $f(x) = -8 - 5x$?

a. $f^{-1}(x) = -\frac{1}{5x} - \frac{1}{8}$
c. $f^{-1}(x) = -\frac{x}{5} - \frac{8}{5}$
b. $f^{-1}(x) = \frac{x}{5} + \frac{8}{5}$
d. $f^{-1}(x) = 5x + 8$

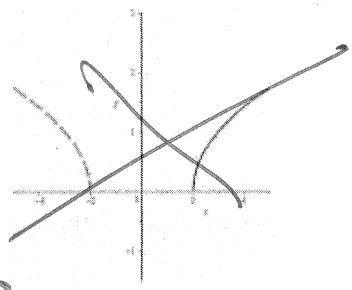
$x = -8 - 5y$
$\frac{x+8}{-5} = y$ or $-\frac{x}{5} - \frac{8}{5} = y$

12. Which of the following images depicts the graph of a function as a solid curve and the graph of its inverse function as a dashed curve?

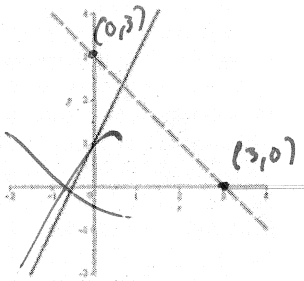
(a)



(b)



(c)



(d)