Unit 4 Test Review

Name: Key

#9 typo $-6y-36$

Simplify the following rational expressions.

1. $\frac{x^2-4}{x^2+7x+10}$

$\frac{(x-2)(x+2)}{(x+5)(x+2)}$

$\frac{x-2}{x+5}$

2. $\frac{x^2-16}{x^2+x-12}$

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

$\frac{x-4}{x-3}$

3. $\frac{4x}{2x+3}+\frac{9x+2}{2x+3}$

$\frac{4x+9x+2}{2x+3}$

$\frac{13x+2}{2x+3}$

4. $\frac{7x}{4x+1}+\frac{6x+7}{4x+1}$

$\frac{13x+7}{4x+1}$

5. $\frac{4}{x-3}+\frac{x+2}{x}$ LCD: $x(x-3)$

$(x)\quad (x-3)$

$\frac{4x+x^2-x-6}{x(x-3)}$

$\frac{x^2+3x-6}{x(x-3)}$

6. $\frac{6}{x+4}+\frac{x-1}{x}$ LCD: $x(x+4)$

$x\quad x+4$

$\frac{6x+x^2+3x-4}{x(x+4)}$

$\frac{x^2+9x-4}{x(x+4)}$

7. $\frac{x}{x+6}-\frac{x^2}{x^2-36}$ LCD: $(x-6)(x+6)$

$x-6$

$(x-6)(x+6)$

$\frac{x^2-6x-x^2}{(x-6)(x+6)}$

$\frac{-6x}{x^2-36}$

8. $\frac{4}{x+2}-\frac{x^2}{x^2-4}$

$(x-2)$

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

$\frac{4x-8-x^2}{(x+2)(x-2)}$

$\frac{-x^2+4x-8}{x^2-4}$

9. $\frac{x^4-36}{x^2y+6x^2-6y+6}$ → $x^2(y+6)-6(y+6)$

$\frac{(x^2-6)(x^2+6)}{(x^2-6)(y+6)}$

$\boxed{\frac{x^2+6}{y+6}}$

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

$x^2(y+3)+2(y+3)$

$\boxed{\frac{x^2-2}{y+3}}$

11. $\frac{2x}{3x-6} \div \frac{4x^2}{x-2}$

$\frac{2x}{3(x-2)} \cdot \frac{x-2}{2x \cdot 2x}$

$= \boxed{\frac{1}{6x}}$

12. $\frac{6x+9}{4x} \div \frac{2x+3}{16x^2}$

$\frac{3(2x+3)}{4x} \cdot \frac{4 \cdot 4x^2}{2x+3}$

$\boxed{12x}$

For problems 13-14, identify the hole of the function.

13. $f(x) = \frac{x^2+7x+10}{x^2+5x+6}$

$\frac{(x+5)(x+2)}{(x+3)(x+2)}$ $\boxed{x=-2}$

14. $f(x) = \frac{x^2-x-12}{x^2-6x+8}$

$\frac{(x-4)(x+3)}{(x-4)(x-2)}$

$\boxed{x=4}$

Simplify.

15. $\frac{x^2+7x+12}{x^2+x-30} \cdot \frac{x-5}{x+3}$

$\frac{(x+3)(x+4)}{(x+6)(x-5)} \frac{(x-5)}{x+3}$

$= \boxed{\frac{x-4}{x+6}}$

16. $\frac{x^2-9x+14}{x^2-5x-24} \cdot \frac{x+3}{x-7}$

$\frac{(x-7)(x-2)}{(x-8)(x+3)} \frac{(x+3)}{x-7}$

$\boxed{\frac{x-2}{x-8}}$

Calculate the vertical and horizontal asymptotes of the rational function.

17. $f(x) = \frac{40x+21}{x}$

VA: $x=0$

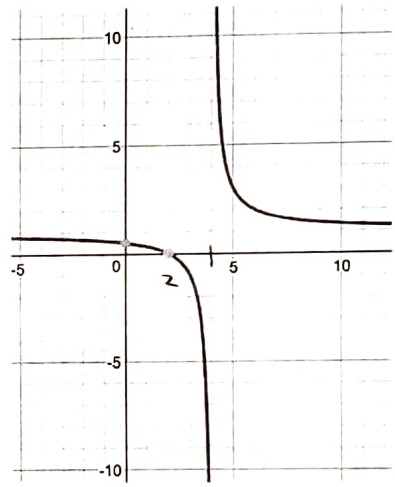
HA: $y=40$

18. $f(x) = \frac{21x+39}{x+1}$

VA: $x=-1$

HA: $y=21$

19. Select the equation that represents the graph below.



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

B. $f(x) = \frac{x-2}{x-4}$

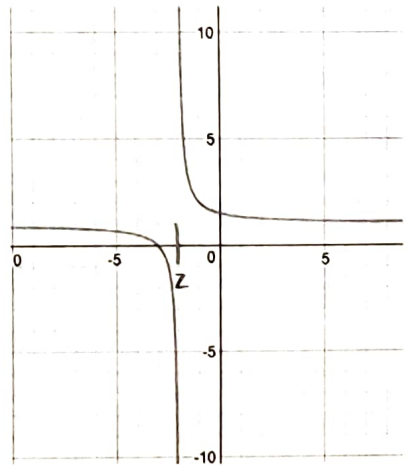
C. $f(x) = \frac{x-4}{x-2}$

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

Zero $x-2$

VA $x-4$

20. Select the equation that represents the graph below.



A. $f(x) = \frac{x+2}{x+3}$

B. $f(x) = \frac{x-2}{x-4}$

C. $f(x) = \frac{x-4}{x-2}$

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

Zero $x+3$

VA $x+2$

21. Which of the following rational functions could represent the graph shown?

zero -3 2

(A) $f(x) = \frac{(x+3)(x-2)}{(x+2)(x-4)}$

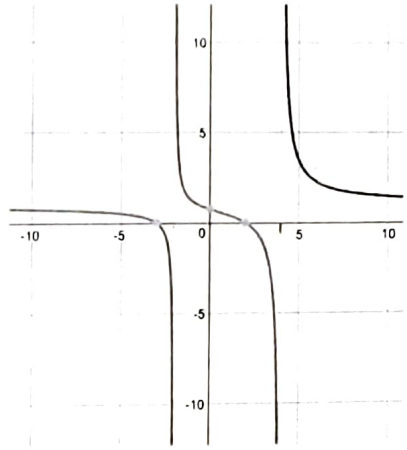
B. $f(x) = \frac{(x+4)(x-1)}{(x+3)(x-2)}$

C. $f(x) = \frac{(x+3)(x-2)}{(x+4)(x-1)}$

D. $f(x) = \frac{(x+2)(x-4)}{(x+5)(x-6)}$

$\frac{(X+3)(X-2)}{(X+2)(X-4)}$

VA -2, 4



22. Which of the following rational functions could represent the graph shown?

zero -6, 2

A. $f(x) = \frac{(x+3)(x-4)}{(x+6)(x-2)}$

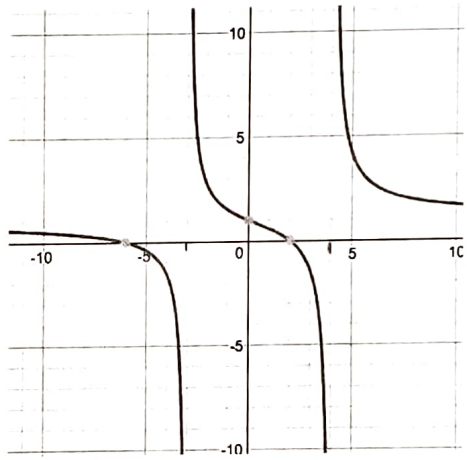
B. $f(x) = \frac{(x+4)(x-1)}{(x+3)(x-2)}$

C. $f(x) = \frac{(x+6)(x-2)}{(x+3)(x-4)}$

D. $f(x) = \frac{(x+2)(x-4)}{(x+5)(x-6)}$

$\frac{(X+6)(X-2)}{(X+3)(X-4)}$

VA -3, 4



23. Identify the function that contains the zeros shown in the graph below.

A. $f(x) = \frac{(x+3)(x-5)}{(x+2)(x-4)}$

B. $f(x) = \frac{(x+4)(x-1)}{(x+3)(x-2)}$

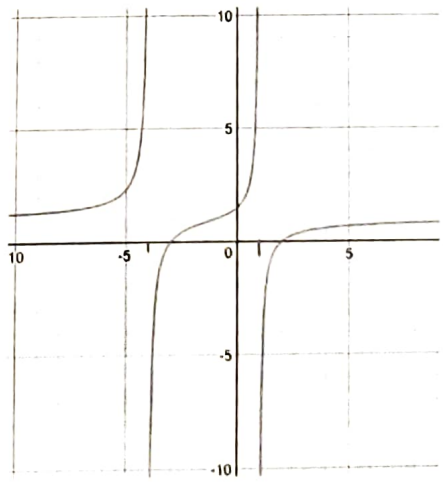
(C) $f(x) = \frac{(x+3)(x-2)}{(x+4)(x-1)}$

D. $f(x) = \frac{(x+2)(x-4)}{(x+5)(x-6)}$

Zero -3, 2

VA -4, 1

$\frac{(X+3)(X-2)}{(X+4)(X-1)}$



24. Identify the function that contains the zeros shown in the graph below.

A. $f(x) = \frac{(x+3)(x-4)}{(x+6)(x-2)}$

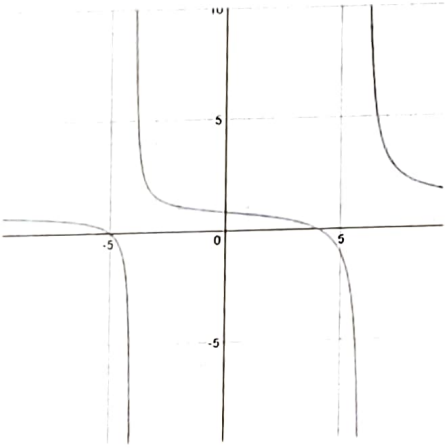
B. $f(x) = \frac{(x+4)(x-1)}{(x+3)(x-2)}$

C. $f(x) = \frac{(x+6)(x-2)}{(x+3)(x-4)}$

(D.) $f(x) = \frac{(x+5)(x-4)}{(x+4)(x-6)}$

Zero -5 4

VA -4, 6



25. Calculate the horizontal asymptote, vertical asymptote, and zeros (x-intercepts) of the rational function.

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

Vertical Asymptote: $-3 = x$

Horizontal Asymptote: $y = 1$

Zeros: $x = 5$ $(5, 0)$

26. Calculate the horizontal asymptote, vertical asymptote, and zeros (x-intercepts) of the rational function.

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

Vertical Asymptote: $x = 4$

Horizontal Asymptote: $y = 1$

Zeros: $x = -2$ $(-2, 0)$