

Simplify:  $\frac{7}{a+8} + \frac{7}{a^2-64}$   
 $(a-8)(a+8)(4-X)$

**A**  $\frac{7a-49}{(a-8)(a+8)}$       **C**  $\frac{14}{(a-8)(a+8)}$   
**B**  $\frac{14}{a^2+a-56}$       **D**  $\frac{7a+63}{(a-8)(a+8)}$

Multiply. State the excluded values:  $\frac{z^2+2z}{z+3} \cdot \frac{z^2+3z+2}{z^2+3z}$   
 $\frac{(z+2)(z+1)}{z+3} \cdot \frac{(z+2)(z+1)}{z(z+3)}$

**A**  $\frac{z^2+2z}{z+3}, z \neq -1, -3$       **C**  $\frac{z+2}{z+3}, z \neq -1, -3$   
**B**  $\frac{z+2}{z+3}, z \neq -1, 0, -3$       **D**  $\frac{z^2+2z}{z+3}, z \neq -1, 0, -3$

Simplify the expression and state the excluded values:  $\frac{p^2-4p-32}{p+4}$   
 $(p+4)(p-8)$

**A**  $-p+8; p \neq -4$       **C**  $-p-8; p \neq 4$   
**B**  $p-8; p \neq -4$       **D**  $p+8; p \neq 4$

Describe the vertical asymptote(s) and hole(s) for the graph of  $y = \frac{(x-5)(x-2)}{(x-2)(x+4)}$   
**A** asymptote:  $x = -4$  and hole:  $x = 2$       **C** asymptote:  $x = -5$  and hole:  $x = -4$   
**B** asymptotes:  $x = -4$  and  $x = 2$       **D** asymptote:  $x = 4$  and hole:  $x = -2$

Solve the equation for  $x$ :  $\frac{-2}{x+4} = \frac{4}{x+3}$   
 $(x+3)(x+4)$

**A**  $-\frac{13}{6}$       **C**  $-\frac{8}{3}$   
**B**  $-11$       **D**  $-\frac{11}{3}$

$-2x-6 = 4x+16$   
 $2x = 6x$

Solve the equation for  $w$ :  $\frac{5}{6w} + \frac{1}{w} = -\frac{4}{11}$   
 $5+6 = -24w$   
 $11 = -24w$

**A**  $-\frac{3}{14}$       **C**  $\frac{11}{24}$   
**B**  $\frac{11}{6}$       **D**  $-\frac{31}{24}$

Simplify the following expression:  $\frac{x+2}{x-1} \div \frac{x+4}{x^2+4x-5}$

**A**  $\frac{(x+2)(x+5)}{x+4}, x \neq -5, -4$       **C**  $\frac{(x+2)(x+4)}{(x-1)^2(x+5)}, x \neq 1, -5, -4$   
**B**  $\frac{(x+2)(x+4)}{(x-1)^2(x+5)}, x \neq 1, -5$       **D**  $\frac{(x+2)(x+5)}{x+4}, x \neq 1, -4, -5$

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

**A**  $y = 3$       **C**  $y = \frac{1}{3}$   
**B**  $y = -\frac{1}{3}$       **D**  $y = -3$

$\frac{x+2}{x-1} \cdot \frac{(x+5)(x-1)}{x+4} = \frac{(x+2)(x+5)}{x+4}$

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

- A  $g(x) = \frac{x-6}{x^2+2}$
- B  $g(x) = \frac{x^2}{-3x^2+1}$
- C  $g(x) = \frac{x-9}{x+3}$
- D  $g(x) = \frac{x^3-2}{6x^2-5}$

Solve the equation  $\frac{1}{x+2} + \frac{1}{x-2} = \frac{4}{x^2-4}$  for  $x$ .

- A  $x = 1$
- B  $x = 4$
- C No solution
- D  $x = 2$

$x=2$  but also a restriction

Determine the horizontal asymptotes of the function:  $g(x) = \frac{x^2+1}{x-2}$ .

- A Horizontal asymptote:  $y = -1$
- B Horizontal asymptote:  $y = 2$
- C Horizontal asymptote:  $y = 1/2$
- D There is no horizontal asymptote

Simplify the following rational expression, state any excluded values.

$$\frac{x^3 - 5x^2 + 6x}{x^2 - 4} \cdot \frac{x^2 + 3x + 2}{x^2 - 2x - 3}$$

- A 1
- B  $x, x \neq \pm 2, x \neq 3, x \neq -1$
- C  $\frac{x(x-2)}{(x+2)}, x \neq \pm 2, x \neq 3, x \neq -1$
- D  $x$ , no restrictions

$$\frac{x(x-3)(x-2)}{(x+2)(x-2)} \cdot \frac{(x+2)(x+1)}{(x+2)(x+1)}$$

Reduce the fraction to lowest terms:

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

- A  $2x + 1$
- B  $4x^2 + 2$
- C  $2x^2 + 1$
- D  $4x + 2$

Describe the holes for the graph of the rational function  $y = \frac{(x-2)}{(x-2)(x+5)}$ .

- A Hole:  $x = -2$
- B Hole:  $x = 2$
- C Hole:  $x = -5$
- D Hole:  $x = 5$

Simplify the following rational expression, state any excluded values.

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

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

Simplify the following rational expression, state any excluded values.

$$\frac{x^2 - 5x + 6}{x^3} \cdot \frac{x^2 + 3x - 10}{4x^2}$$

- A  $\frac{8(x-3)}{3(x+5)}, x \neq -5, x \neq 0, x \neq 2$
- B  $\frac{(x^2 - 5x + 6)(x^2 + 3x - 10)}{4x^3}, x \neq 0$
- C  $\frac{4(x-3)(x+2)}{x(x+5)(x-2)}, x \neq -5, x \neq 0, x \neq 2$
- D  $\frac{4(x-3)}{x(x+5)}, x \neq -5, x \neq 0, x \neq 2$

$$\frac{(x-3)(x-2)}{x^3} \cdot \frac{4x^2}{(x+5)(x-2)}$$