

**Simplify Rational Expressions**

Simplify. State any restrictions on the variable.

1.  $\frac{x^2-4}{x+4} = 32$

$$\boxed{p-8}$$

$$\{p \neq -4\}$$

2.  $\frac{x^2-3x-28}{x^2-49}$

$$\boxed{\frac{x-4}{x-7}}$$

$$\{x \neq 7, -7\}$$

3.  $\frac{2m^2+10m-48}{8m+64}$

$$\boxed{\frac{m-3}{4}}$$

$$\{m \neq 3\}$$

**Multiply/Divide Rational Expressions**

Simplify. Remember to keep, change, flip when dividing.

4.  $\frac{x^2}{x+1} \cdot \frac{x^2+3x+2}{x^2+3x}$

$$\boxed{\frac{z+2}{z+3}}$$

5.  $\frac{c+1}{c-5} \div \frac{c-2}{c^2-7c+10}$

$$\boxed{c+1}$$

**Add/Subtract Rational Expressions**

Simplify. Remember to get a common denominator first.

8.  $\frac{3}{m+5} + \frac{8}{m^2-25}$

$$\boxed{\frac{3m-7}{(m+5)(m-5)}}$$

9.  $\frac{k^2-2k-8}{k^2+k-2} - \frac{6}{k-1}$

$$\boxed{\frac{k-10}{k-1}}$$

10.  $\frac{w^2+2w-24}{w^2+w-30} + \frac{8}{w-3}$

$$\boxed{\frac{w+4}{w-5}}$$

11.  $\frac{3}{x+7} - \frac{4}{x-8}$

$$\boxed{\frac{-(x+52)}{(x+7)(x-8)}}$$

**Solve Rational Equations**

Solve. Remember to check for extraneous solutions.

12.  $\frac{-2}{x+4} = \frac{4}{x+3}$

No Solution  
 ~~$x = -4$~~

13.  $\frac{x^2}{x-4} = \frac{16}{x-4}$

~~$x = 4$~~   
 ~~$x = -4$~~

EXTRANEALOUS  
 14.  $\frac{a}{a-36} + \frac{2}{a-6} = \frac{1}{a+6}$

$a = -9$

6.  $\frac{x^2-16}{x^2+5x+6} \div \frac{x^2+5x+4}{x^2-2x-8}$

$$\boxed{\frac{(x-4)^2}{(x+3)(x+1)}}$$

7.  $\frac{b}{b+9} \cdot \frac{b^2+5b+34}{b^2-4b}$

$$\boxed{\frac{b(b+6)}{b-4}}$$

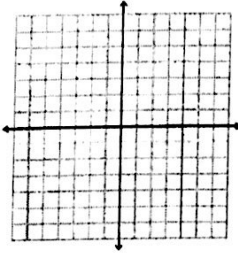
**Graphs of Rational Functions**

Identify holes, vertical asymptotes, horizontal asymptotes, and domain of the rational functions. Then graph the function.

15.  $f(x) = \frac{3x^2+21x}{x^2+5x-14}$

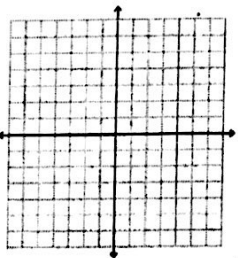
$$\frac{3x}{x-2}$$

Hole:	$x = -7$
VA:	$x = 2$
HA:	$y = 3$
Domain:	All reals $x \neq -7, 2$



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

Hole:	None
VA:	$x = -3, 1$
HA:	$y = 0$
Domain:	All reals $x \neq -3, 1$



17.  $f(x) = \frac{x^2-9x+20}{4x^2-12x-40}$

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

Hole:	$x = 5$
VA:	$x = -2$
HA:	$y = \frac{1}{4}$
Domain:	All reals $x \neq 5, -2$

