

**Simplify Rational Expressions**

Simplify each rational expression. Remember to factor first!!

1. $\frac{3h^2-3h-18}{h^2-5h+6}$

$$\frac{3(h+2)}{h-2}$$

2. $\frac{k^2-5k-14}{k^2-49}$

$$\frac{k+2}{k+7}$$

3. $\frac{2x^2+9x+9}{x^2-6x-27}$

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

Multiply and Divide Rational Expressions

Simplify each rational expression. Pay attention to whether you are multiplying or dividing!!

4. $\frac{x^2+3x-10}{x^2-4} \cdot \frac{x+2}{x^2-9}$

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

5. $\frac{b^2-2b-8}{b^2+3b+2} \cdot \frac{4b+4}{b^2-b-12}$

$$\frac{4}{b+3}$$

6. $\frac{3m-15}{4} \div \frac{m^2-25}{2m-10}$

$$\frac{3(m-5)}{2(m+5)}$$

7. $\frac{x^2+6x+5}{x^2+2x-8} \cdot \frac{x^2-5x+6}{x^2+2x-15}$

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

8. $\frac{a^2-a-2}{a^2+6a+5} \div \frac{2a^2-3a-2}{4a^2-1}$

$$\frac{2a-1}{a+5}$$

9. $\frac{c^2-3c-10}{c^2-4} \div \frac{c^2-25}{c^2+2c-15}$

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

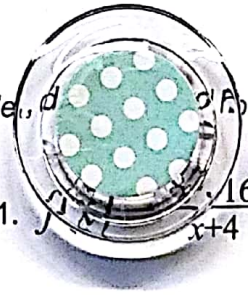
Asymptotes, Holes, and Domain.

Determine the vertical asymptotes, hole, domain, and horizontal asymptotes of each rational function.

10. $f(x) = \frac{4x+8}{x^2-6x-16}$

11. $f(x) = \frac{16}{x+4}$

12. $f(x) = \frac{6x^2-4x-2}{x^2-8x+15}$



| | |
|--------|----------------|
| VA | $x = 8$ |
| Hole | $x = -2$ |
| Domain | $x \neq 8, -2$ |
| HA | $y = 0$ |

| | |
|--------|----------------|
| VA | none |
| Hole | $x = -4$ |
| Domain | $x \neq -4$ |
| HA | does not exist |

| | |
|--------|----------------|
| VA | $x = 5, x = 3$ |
| Hole | none |
| Domain | $x \neq 5, 3$ |
| HA | $y = 6$ |

Add Rational Expressions (Common Denominator)

Simplify each rational expression.

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

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

14. $\frac{-v^2+3}{v^2+5v-14} + \frac{2v^2-52}{v^2+5v-14}$

$$\frac{v-7}{v-2}$$

15. $\frac{w+3}{w^2-64} + \frac{1}{w^2-64}$

$$\frac{w+4}{(w+8)(w-8)}$$