

TASK 1: Restrict the domain. Write your answer in interval notation.

a) $f(x) = \frac{8x-3}{x^2-5x+6}$

$(x-3)(x-2) \neq 0$
 $x-3 \neq 0$ $x-2 \neq 0$
 $x \neq 3$ $x \neq 2$

D: $(-\infty, 2) \cup (2, 3) \cup (3, \infty)$

b) $f(x) = \frac{8x^3+7x^2+20}{2}$

$2 \neq 0$ ✓
 D: $(-\infty, \infty)$

c) $g(x) = \frac{7x-2}{x^2-2x-15}$

$(x-5)(x+3) \neq 0$
 $x-5 \neq 0$ $x+3 \neq 0$
 $x \neq 5$ $x \neq -3$

D: $(-\infty, -3) \cup (-3, 5) \cup (5, \infty)$

~~$\frac{a \cdot c}{b} = \frac{-3}{-5}$~~

~~$\frac{a \cdot c}{b} = \frac{-15}{-2}$~~

OBJECTIVE 2: Simplifying Rational Expressions

$$\frac{x^2 - 9}{x^2 + x - 6} = \frac{(x-3)(x+3)}{(x-2)(x+3)}$$

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

$$= \frac{x-3}{x-2} \cdot \frac{x+3}{x+3}$$

$$= \frac{x-3}{x-2} \cdot 1$$

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

Factor the numerator and the denominator.
 Look for common factors.
 Write $\frac{x+3}{x+3}$ as 1.
 Multiply to remove a factor of 1.

STEPS:

1. Factor the top and bottom.
2. Cancel any factors that are on both top and bottom, one for one.

$$\frac{a.c}{30} \begin{array}{r} 3 \\ 10 \\ \hline 3 \\ 13 \\ \hline b \end{array}$$

$$\frac{a.c}{-60} \begin{array}{r} +12 \\ +7 \\ \hline b \end{array}$$

$$\frac{a.c}{-4} \begin{array}{r} 2 \\ -2 \\ \hline 0 \\ b \end{array}$$

$$\frac{a.c}{-6} \begin{array}{r} 3 \\ -2 \\ \hline 1 \\ b \end{array}$$

TASK 2: Simplify each rational expression.

a) $\frac{9x^2+13x+4}{8x^2+x-7} = \frac{(9x+4)(x+1)}{(8x-7)(x+1)}$

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

b) $\frac{5x^2+13x+6}{6x^2+7x-10} = \frac{(5x+3)(x+2)}{(6x-5)(x+2)}$

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

$$\frac{5x^2+10x+3x+6}{5x(x+2)+3(x+2)}$$

$$\frac{6x^2+12x-5x-10}{6x(x+2)-5(x+2)}$$

TASK 3: Simplify each rational expression

a) $\frac{18-2x^2}{x^2-2x-3} = \frac{-2x^2+18}{x^2-2x-3} = \frac{-2(x^2-9)}{(x-3)(x+1)}$

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

b) $\frac{20-5x^2}{x^2+x-6} = \frac{-5x^2+20}{x^2+x-6} = \frac{-5(x^2-4)}{x^2+x-6}$

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

Common Mistakes:

All or nothing!

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

DONE

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

WRONG!

Still need help with:

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

DONE

~~$$\frac{-5(x+2)}{(x+3)} = \frac{-5(2)}{3} = \frac{-10}{3}$$~~

WRONG!