Find the x and y intercepts of each.

1. 4x - 6y = 48

2. $y = x^2 - x - 12$

$$0 = (x-4)(x+3)$$

x-int = $\dfrac{48}{4} = 12$

x-int = $4, -3$

y-int= $\dfrac{48}{-6} = -8$

y-int= -12

Y-Intercepts: the result of replacing x with zero.

Find the y-intercepts of each function.

$$y = \frac{x^2 - 9x + \boxed{20}}{x^2 + 7x + \boxed{10}}$$

y-int: $\dfrac{20}{10} = 2$

$$y = \frac{x^2 - 4}{2x^2 + 6x}$$

y-int: NO Y-int
because
$\dfrac{-4}{0}$ ← undefined ☺

In general, the y-intercepts of Rational Functions are the:

Ratio of the Constants

A graph can have at most ONE y-intercept.

X-Intercepts: the result of replacing y with zero.

This means you are setting the ratio equal to zero and solving for x.

Find the x-intercepts of this rational function:

$$y = \frac{x^2 + 3x - 10}{x^2 - 1} = \frac{(x+5)(x-2)}{(x+1)(x-1)}$$

$$0 = x^2 + 3x - 10 \qquad \text{x-int}$$
$$0 = (x+5)(x-2) \qquad -5, 2$$

Find the x-intercepts of this Rational Function

$$y = \frac{x^2 - 6x + 8}{x^2 + 4x + 3} = \frac{(x-4)(x-2)}{(x+3)(x+1)} =$$

The only way a fraction equals zero is if the NUMERATOR equals zero.

x-int =

2, 4

In general, the x-intercepts of a Rational Function are the:

Zeros of the numerator.

Exception to this rule?
Zeros of the numerator as long as they don't match zeros of the denominator

A graph can have multiple x-intercepts.

find the x and y-intercepts of each function.

1. $y = \frac{x^2 + x - 30}{x^2 - 4} = \frac{(x+6)(x-5)}{(x+2)(x-2)}$

x-int:

-6, 5

y-int:

$$\frac{30}{4} = \frac{15}{2} = \boxed{7.5}$$

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

x-int:

± 3

y-int:

NONE

3. $y = \dfrac{3x^2 + 5}{x^2 - 2x - 3}$

x-int: NONE

y-int: $\dfrac{5}{-3}$

As we've seen before, there are exceptions to most rules:

4. $y = \dfrac{x^2 + 4x + 3}{x^2 - 1} = \dfrac{(x+3)(x+1)}{(x+1)(x-1)}$

x-int:

-3 ONLY! -1 IS A HOLE!

y-int: $\dfrac{3}{-1} = -3$

You can now finish Hwk #38.

Practice Sheet: Horizontal Asymptotes and x & y-intercepts