Describe the zeros and determine the minimum degree.

1.

3 real zeros

min degree: 5

2.

3 real zeros

min degree: 3
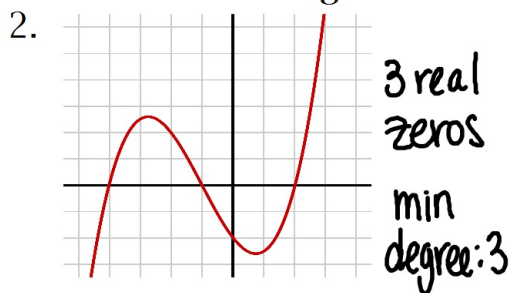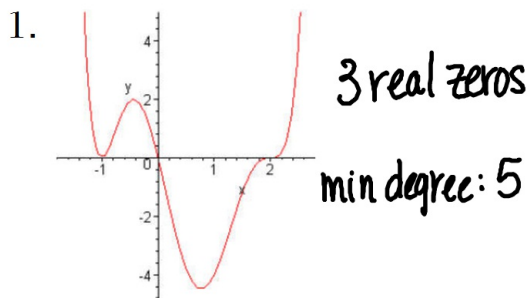
Factor and Simplify.

3. $\dfrac{4x+8}{x^2-25} \bullet \dfrac{x-5}{5x+10}$

$\dfrac{4(x+2)}{(x+5)(x-5)} \cdot \dfrac{x-5}{5(x+2)}$

$\boxed{\dfrac{4}{5(x+5)}}$

4. $\dfrac{x^2+3x+2}{x^2-1}$

$\dfrac{(x+2)(x+1)}{(x+1)(x-1)} = \boxed{\dfrac{x+2}{x-1}}$

HWQ 2.2 & 2.5

1. Find a polynomial function that has the given zeros.

    0, 0, -2, 7

2. Find a polynomial with the given zeros, multiplicities, and degree.

    Zero: -2, Multiplicity: 2
    Zero: 1, Multiplicity: 2
    Degree: 4
    Falls to the left
    Falls to the right

3. Sketch the graph:

    Third degree polynomial with one real zeros and a negative leading coefficient.

$$f\left(x\right) = \frac{x^2+x-2}{x^2-x-6} = \frac{(x+2)(x-1)}{(x-3)(x+2)} = \frac{x-1}{x-3}$$

Vertical Asymptote (VA):
What makes the denominator
zero? (after you cancelled)

$\boxed{X=3}$

Horizontal Asymptote (HA):
n < m, y = 0
n = m, y = a_n/a_m $y = \frac{1}{1}$
n > m, none

exp. of num.
exp. of denom.

$\boxed{y=1}$

Zero:
What make the numerator
zero? (after you cancelled)

$X=1$ $\boxed{(1,0)}$

Hole:
What cancelled out when
you factored?

Cancelled out x+2

$\boxed{\left(-2, \frac{+3}{+5}\right)}$

plug in (-2) to answer

Students will be able to find any asymptotes of the rational function.

Example 1: Find any asymptotes of the rational function.

a.) $f\left(x\right) = \dfrac{3}{(x-2)^3}$

b.) $f\left(x\right) = \dfrac{x^2-4x}{x^2-4} = \dfrac{x(x-4)}{(x-2)(x+2)}$

VA: X=2

HA: y=0

VA: X=2, X=-2

HA: y = $\frac{1}{1}$

y=1

Example 2: Find any asymptotes and holes of the rational function.

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

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

$= \dfrac{x+1}{2x-3}$

VA: $2x-3=0$

$\boxed{x = \dfrac{3}{2}}$

hole: $(-1, 0)$

HA: $\boxed{y = \dfrac{1}{2}}$

b.) $f(x) = \dfrac{3-14x-5x^2}{3+7x+2x^2}$

$= \dfrac{(3+x)(1-5x)}{(3+x)(1+2x)}$

VA: $x = -\dfrac{1}{2}$

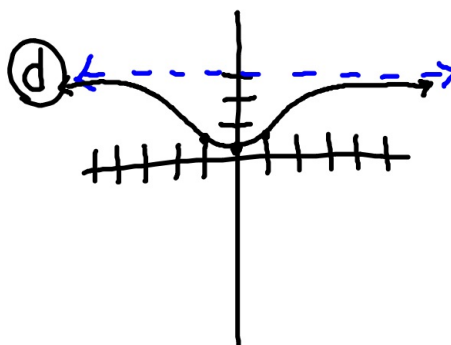HA: $y = \dfrac{-5}{2}$

hole: $\left(-3, \dfrac{16}{-5}\right)$

Example 3: (a) Find the domain of the function (b) decide whether the function is continuous (c) identify any asymptotes (d) Verify part a by graphing using a table

$$f(x) = \dfrac{3x^2+1}{x^2+x+9}$$

ⓐ all real #s

ⓒ VA: none
HA: $y = 3$

ⓑ continuous

ⓓ

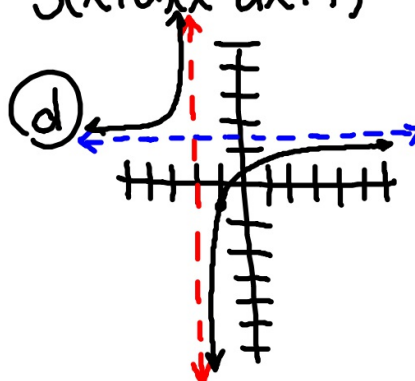$$f\left(x\right) = \frac{4x^3 - x^2 + 3}{3x^3 + 24}$$

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

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

ⓐ all real #s
   except -2

ⓑ not continuous

ⓒ VA: X=-2
   HA: y= $\frac{4}{3}$

ⓓ

Turn-in: Worksheet- finding asymptotes

HW: p.148 (17-27, 37-43 odds)