Math 11 Principles: Chapter 3 Review Sheet:

1. **Section 3.1: Polynomial Function**:
   a. What is a polynomial Function: (All coefficients must be real numbers and all exponents of variables must be positive integers)

Ex#1) Indicate which of the following are polynomial functions:

$y=\sqrt{3x^2}-2x+5$ $y=\sqrt{3}x^2-4x+5$ $y=10$ $y=2^x$ $y=2x$

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

$y=\sqrt{3x^4}-3x$ $y=(x-5)^{-1}$

   b. Recognizing graphs with given functions: (How many degrees? What is the Y-intercept when x=0? Which way does the graph open?)

Ex#2) Indicate which of the following graphs correspond with which function:

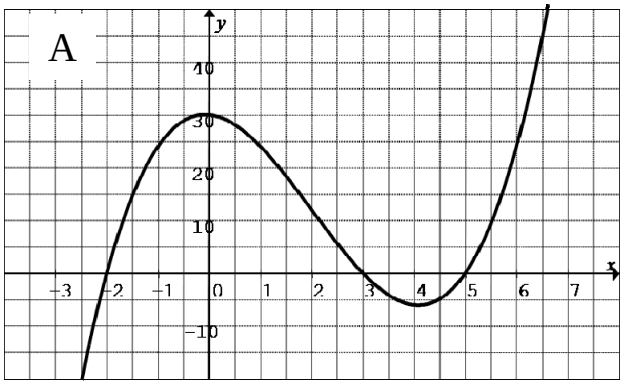
$i)\ y=x^3-6x^2-x+30$

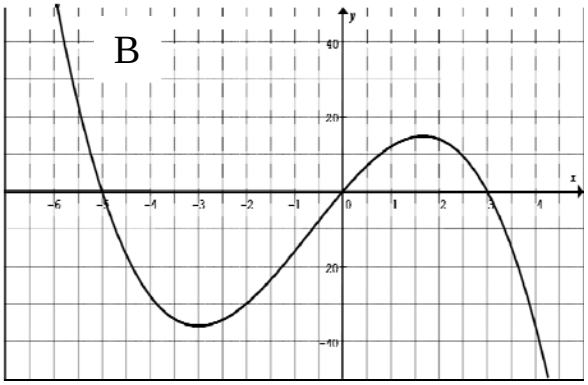
$ii)\ y=-x^3+2x^2+16x-32$

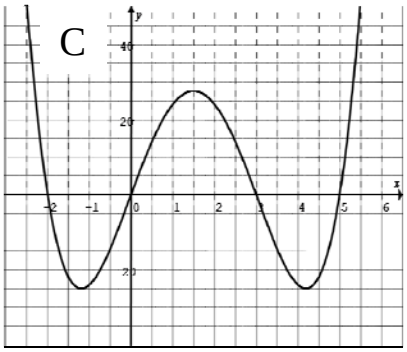
$iii)\ y=-x^3-2x^2+15x$

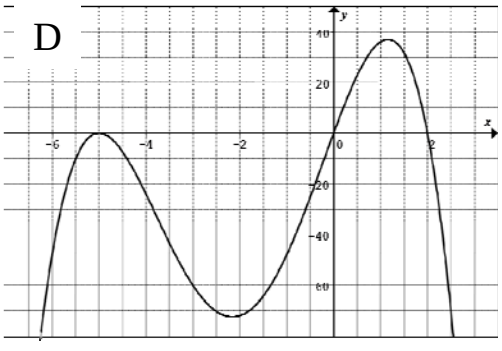
$iv)\ y=-x^4-8x^3-5x^2+50x$

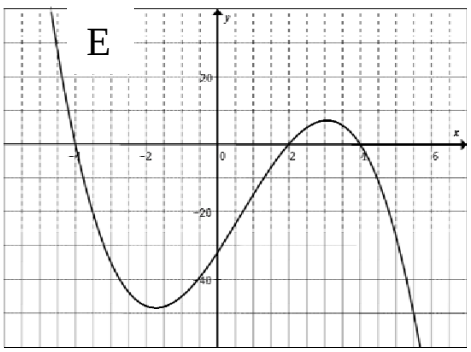
$v)\ y=x^4-6x^3-x^2+30x$







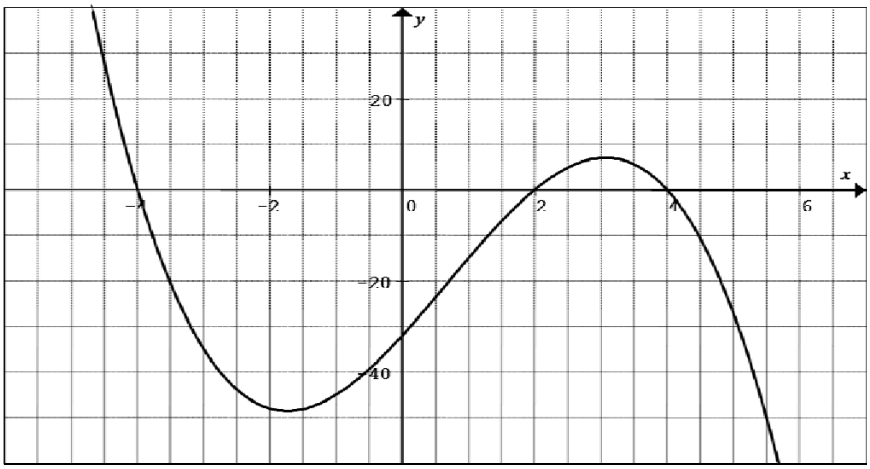


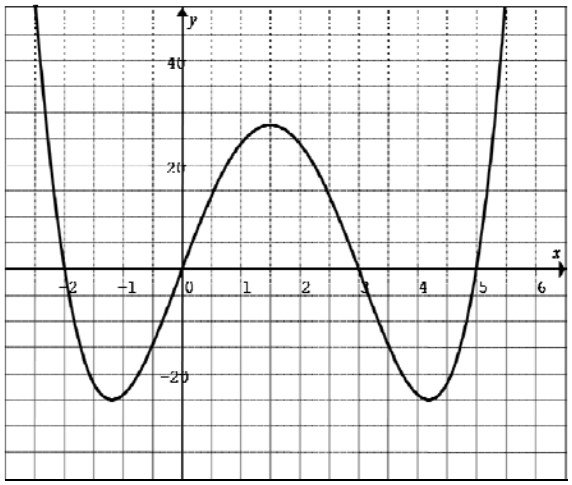


2. Section 3.2: Properties of graphs of polynomial functions

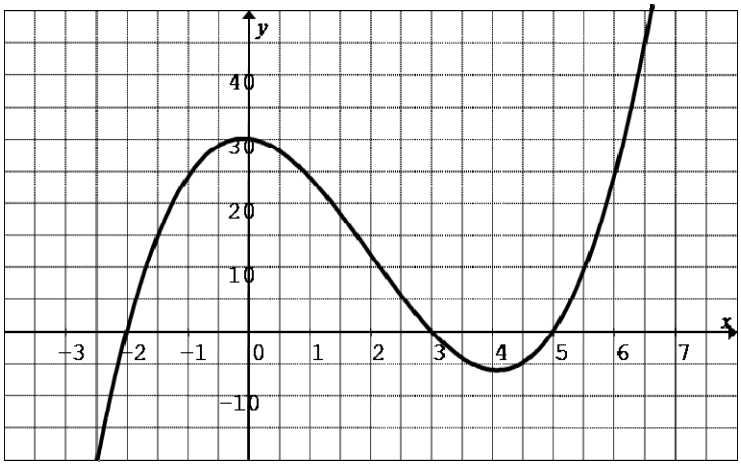
Ex#3) For each of the following graphs,

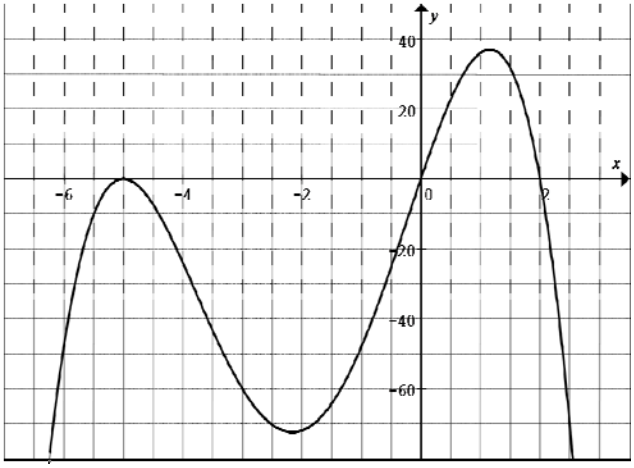
- Indicate the Domain and Range
- Indicate all Absolute/Relative Maximums and Minimums





Domain:		
Range:		
Absolute Max		
Absolute Min:		
Relative Max		
Relative Min:		





Domain:		
Range:		
Absolute Max		
Absolute Min:		
Relative Max		
Relative Min:		

3. Section 3.3: Relating Polynomial functions and Equations

a. Solving for roots, zeroes, and x-intercepts (Use Factoring)

Ex#4) Solve for the roots (Algebraically)

a) $y = 2x^2 + 9x - 5$ *b*) $6x^2 - x - 12 = 0$ *c*) $0 = 3x^3 - x^2 - 10x$

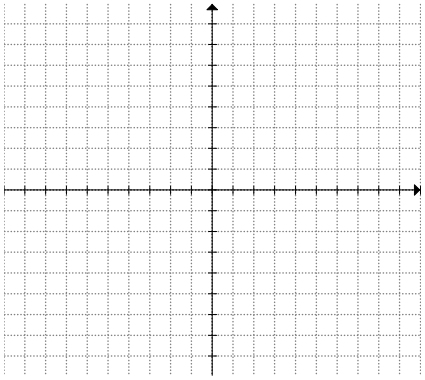
_____ _____ _____

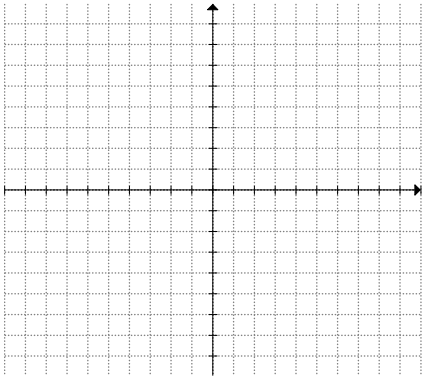
b. Obtaining polynomial equation with roots and another given point
(Watch out for double roots)

Ex#5) Determine the equation of each function and sketch its graph: (Use General Formula)

a) *zeroes* : $-1,\ 4,\ 3$; Graph has y-intercept 24 b) *zeroes* : $4,\ 4, -3$; Graph has y-intercept -8

Equation:_____ Equation:_____





c. Solving for missing constant when one root is double, triple, or equal to second root

Ex#6) Determine the value(s) of *k*, so that one root is triple the other root:

a) $16x^2 + kx + 27 = 0$ b) $4x^2 + kx + 27 = 0$

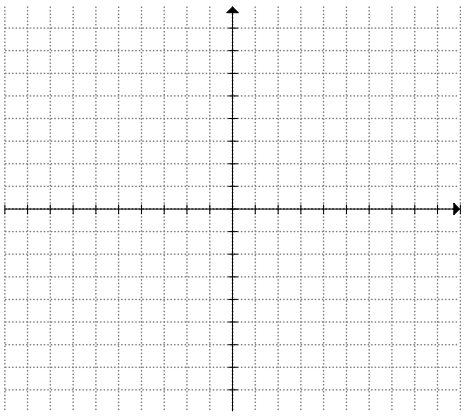
Answer:_____ Answer:_____

4. Section 3.4: Solving Polynomial Equations:

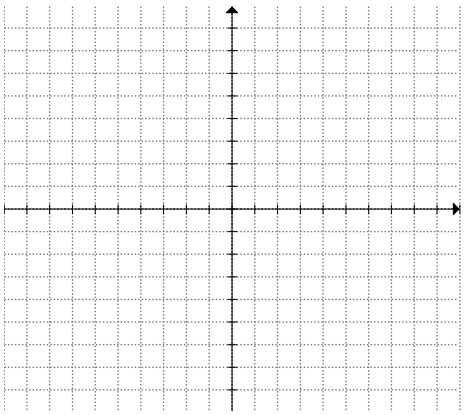
a. Solving for zeroes graphically: (Use Graphing Calculator)

Ex#7) Solve Graphically:

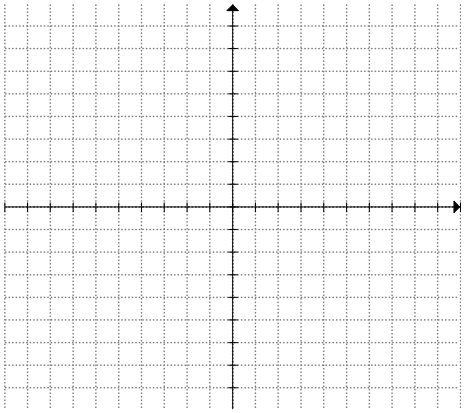
$a) y = 3x^2 - 2x - 7$



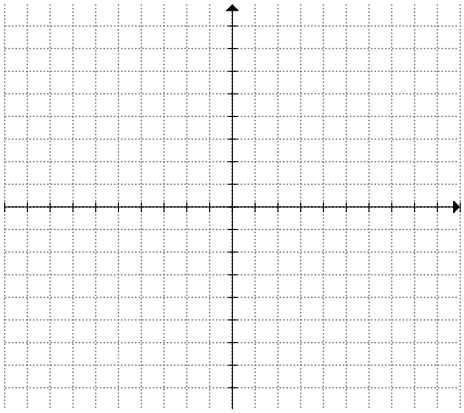
b) $y = 4x^3 - 2x^2 + 7x - 13$



$c) x^3 + 3x = 7 - 8x$



$d) 3x^2 - 2x = 7x^2 - 10x + 4$



5. Function Operations

Ex#8) *Given*: $f(x) = 3x^2 - 3x$ $\quad g(x) = 5x + 2$

Find the following:

$a) f(x) + g(x)$ $\quad$ b) $f(x) - g(x)$ $\quad$ $c) f(x) \times g(x)$ $\quad$ $d) f(3) + g(7)$

_____ $\quad$ _____ $\quad$ _____ $\quad$ _____

e) $f(-1) - g(3)$ $\quad$ f) $3f(x)$ $\quad$ g) $5g(x)$ $\quad$ h) $-2f(x) - 4g(x)$

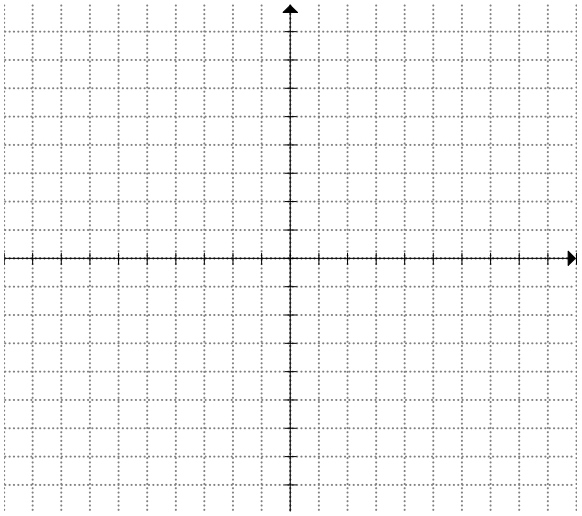
_____ $\quad$ _____ $\quad$ _____ $\quad$ _____

6. Section 3.6: Reciprocal Functions

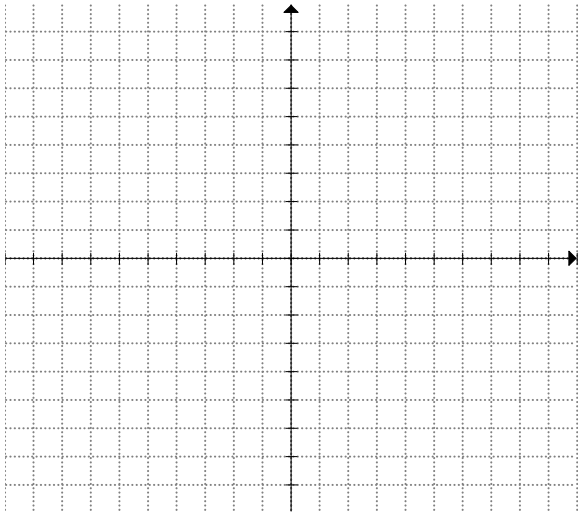
a. 3 Step Process:
   i. Graph the Vertical Asymptote at the X-Intercepts
   ii. Draw the Common Points where the y-co-ordinate equals 1 and -1.
   iii. Big → Small & Small→ Big OR Near → Far & Far → Near.

Ex#8) Graph each of the following functions and its reciprocal. Indicate all asymptotes.

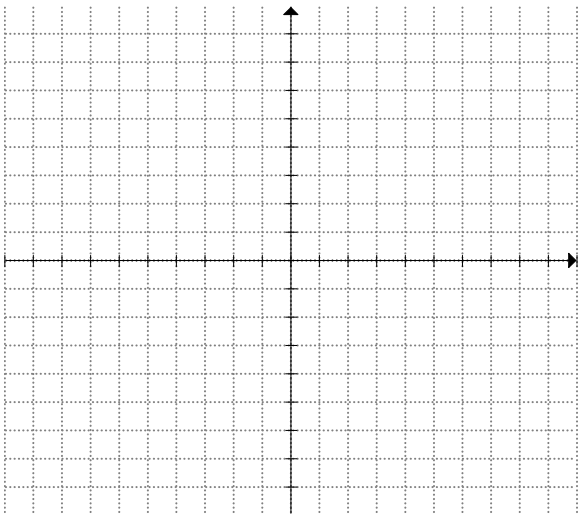
$a) y = (x-3)^2 \qquad y = \dfrac{1}{(x-3)^2}$



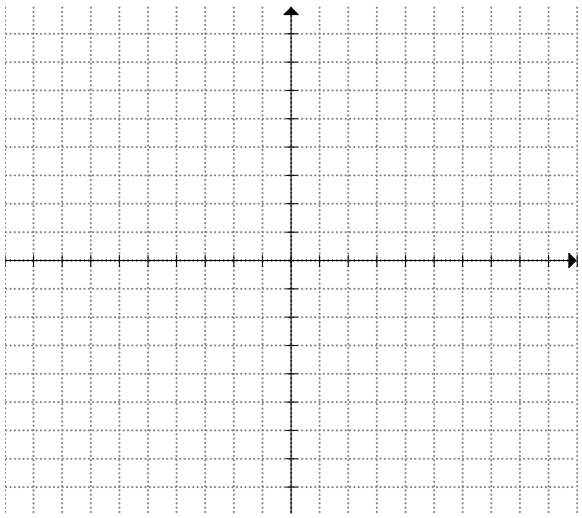
$b) y = (x+2)^2 + 2 \qquad y = \dfrac{1}{(x-2)^2 + 2}$



$c) y = (x-2)^2 - 4 \qquad y = \dfrac{1}{(x-2)^2 - 4}$



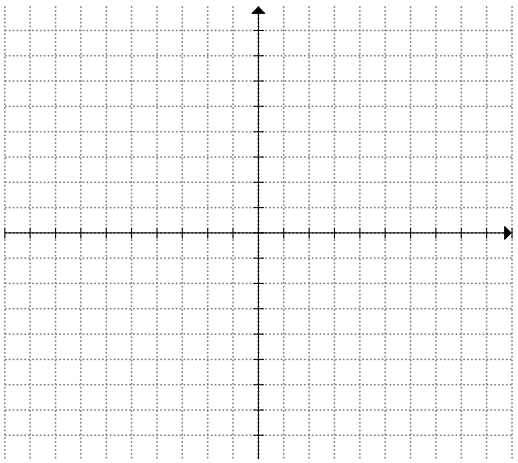
$d)\ y = x^3 + 4x^2 - 4x - 16 \qquad y = \dfrac{1}{x^3 + 4x^2 - 4x - 16}$



7. Section 3.7: Rational Functions

Ex#9) Graph each of the following rational functions: Indicate all asymptotes.

$a)\ y = \dfrac{2x^2}{x+4}$



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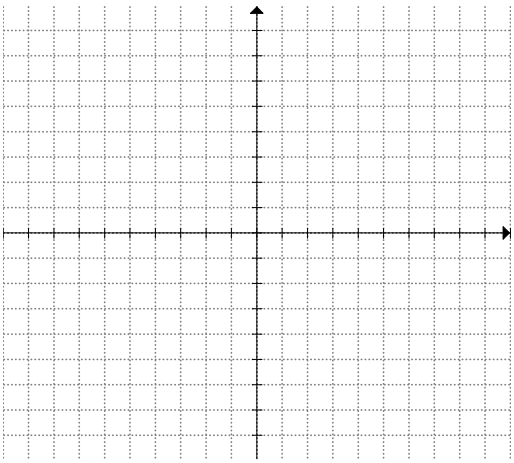
$b)\ y = \dfrac{3x^2}{4x^2 - 8x}$



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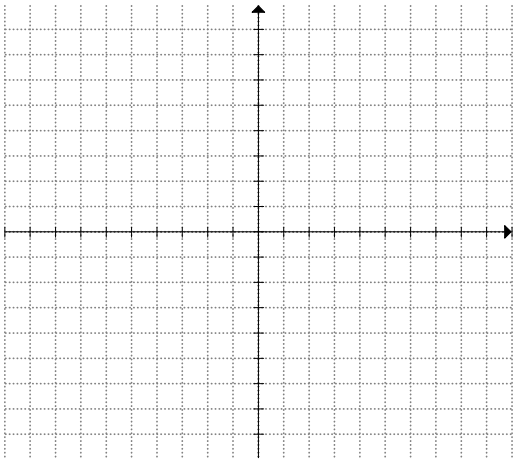
$c)\ y = \dfrac{2x^2 - 18}{x+3}$



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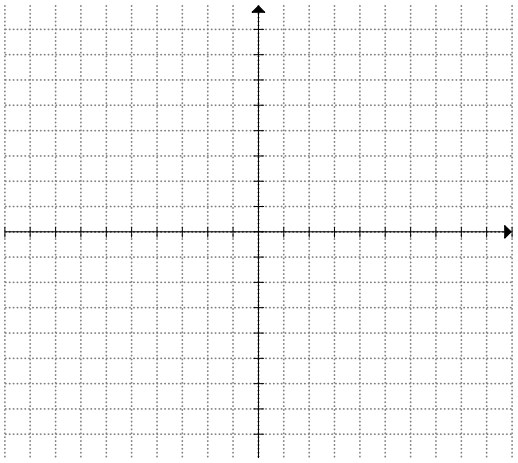
$d)\ y = \dfrac{3x}{x^2 - 16}$



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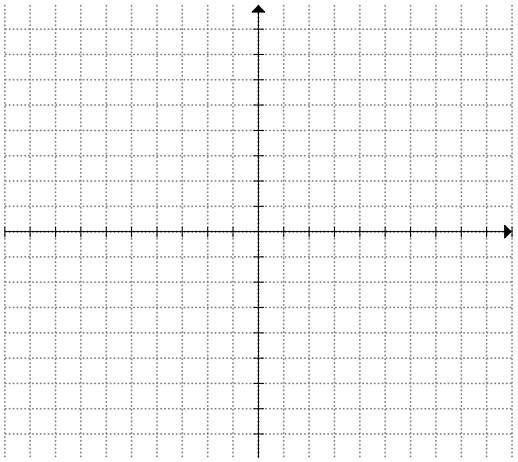
$e) y = \dfrac{3x^2}{x^2+4}$



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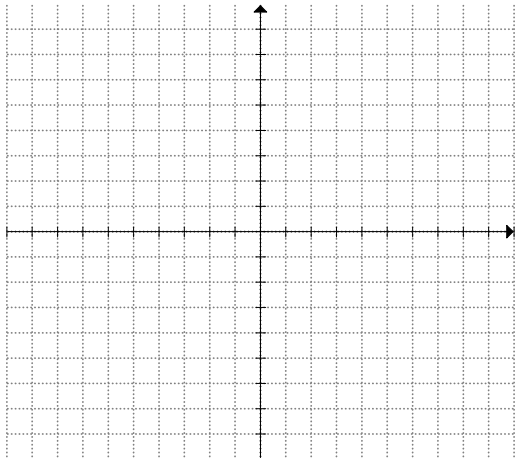
f) $y = \dfrac{2x}{x^2+9}$



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8. Section 3.9: Composite Functions:

Ex#10) Given $f(x) = 3x^2 - 2x$ $g(x) = 3x - 5$

Find the following:

a) $f(g(x))$

b) $f(g(2))$

_____

_____

c) $g(f(x))$

d) $g(f(-1))$

_____

_____