Math-1050 HW #17 (Ch-5 Test Preview)

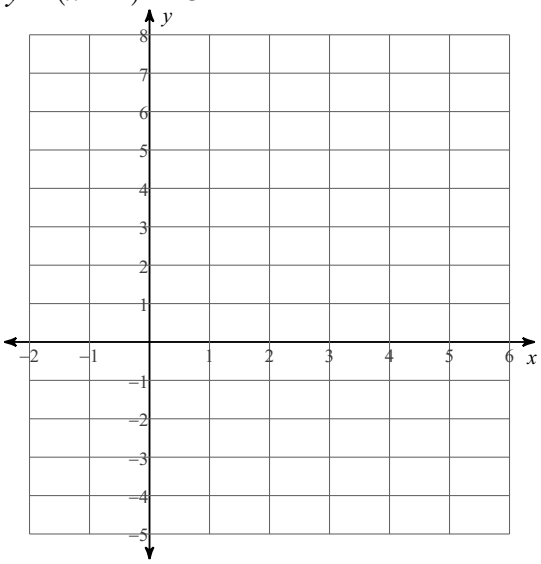
1) Which of the following is not a polynomial? If it is not, explain why.

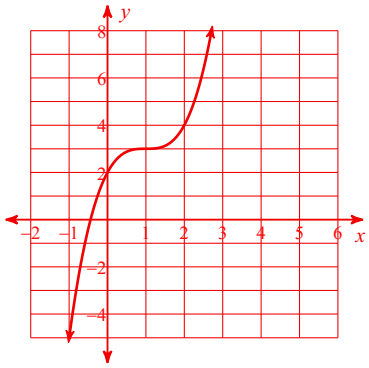
a) $y = -0.3x^3 + 7.1x - \frac{5}{x} + 3.7$ (b) $y = 3xc - 2c + 6$ (c) $y = 3x^4 - 4x^2 - 8$

(a) $-\frac{5}{x} = -5x^{-1}$ which is not a whole number exponent.

2) Graph the following polynomial using transformations.

$y = (x-1)^3 + 3$





3) $f(x) = -5(x+3)(x+4)(x-6)^2$

a) List the x-intercepts as x-y pairs.

b) List the y-intercept as an x-y pair.

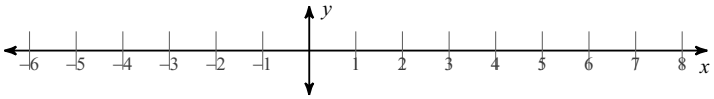
c) Write the power function that has the same end behavior as f(x).

d) What is the maximum number of turns for the graph of f(x)?

e) Determine the behavior of the graph near $x = 6$.

f) Graph the general shape of f(x).

a) (-4, 0), (-3, 0), (6, 0)
b) (0, -2160)
c) $y = -5x^4$
d) 3 turns max
e) $y = -60(x-6)^2$
f) down left/right, kiss at x = 6



4) a) Find the domain.

b) Find the Range.

c) List any x-intercepts as x-y pairs.

d) List the y-intercept as an x-y pair.

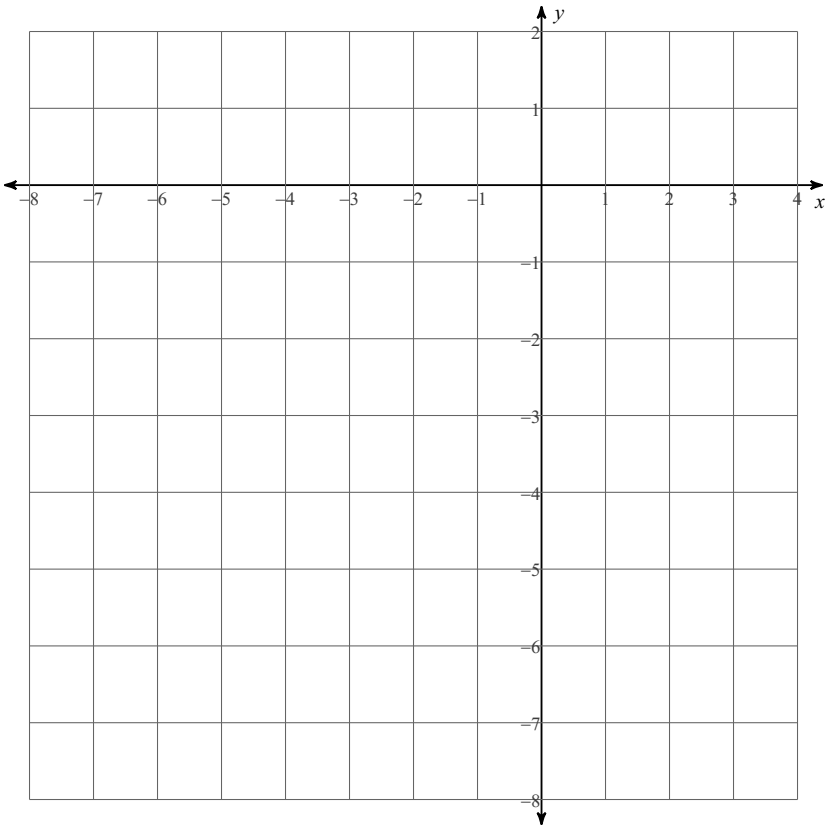
e) Write the equation for every vertical asymptote.

f) Write the equation of the non-vertical asymptote.

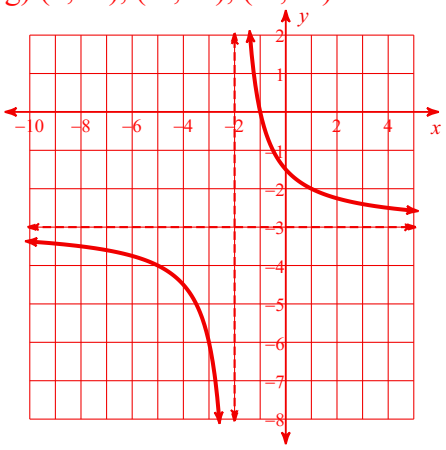
g) Label 2 xy pairs that are not on either the x-axis or the y-axis

h) Graph the function.

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



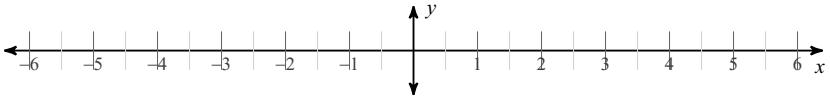
a) Domain: $x \neq -2$
b) Range: $y \neq -3$
c) x-int: $(-1, 0)$
d) $(0, -\frac{3}{2})$
e) VA: $x = -2$
f) non-VA: $y = -3$
g) (1, -2), (-3, -6), (-5, -4)



5) a) Write the solution of the polynomial inequality in interval notation.

b) Graph the solution set.

$$x^3 + 2x^2 < 4x + 8$$



x=(- ∞, -2) U (-2, 2)

6) Write the solution to the inequality in interval notation.

$$0 \leq \frac{(x-4)(x+2)}{x-3}$$

z= {-2, 3)∞) U {4, ∞)

7) Is $g(x)$ a factor of $f(x)$? (YES or NO) Show your work.

$g(x) = 2x + 1$
$f(x) = 4x^3 + 6x^2 - 6x + 5$

f(x) ÷ g(x) = $2x^2 + 2x - 4 + \frac{9}{2x+1}$ --> remainder $r \neq 0$ implies not a factor.

8) Descarte's Rule of Signs:

a) How many possible positive real number zeroes are there?

b) How many possible negative real number zeroes are there?

$y = -3x^4 - 4x^3 + 5x^2 - 6x + 7$

a) (+) zeroes: 3 or 1
b) (-) zeroes: 1

9) State the possible rational zeroes of the polynomial.

$y = -5x^4 + 4x^2 - x + 6$

$\pm 1, \pm 2, \pm 3, \pm 6, \pm\frac{1}{5}, \pm\frac{2}{5}, \pm\frac{3}{5}, \pm\frac{6}{5}$

10) The following is a zero of a polynomial. $5 - i$. What is another zero of the polynomial?

$5 + i$

11) Write a polynomial in standard form that has the following zeroes. (Assume a vertical stretch factor of 1). x = 1, -2, $1 - 2i$, and $1 + 2i$

$y = x^4 - x^3 + x^2 + 9x - 10$

12) Find all the zeroes of: $y = 2x^4 + 5x^3 - 5x - 2$

x = 1, -2, -1, $-\frac{1}{2}$

13) $7 \geq \frac{x+3}{x-3}$

Write the solution in interval notation.

a) $x < 3$ or $x \geq 4$

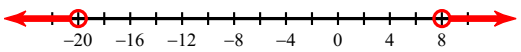
Solve each equation.

14) $4\left|4 - 10n\right| - 1 = 103$

$\left\{-\frac{11}{5}, 3\right\}$

Solve each inequality and graph its solution.

15) $\left|6 + x\right| + 10 > 24$



$x > 8$ or $x < -20$

16) $f(x) = x^2 - 5x + 4$

(a) Find f(-2) (b) find x if f(x) = 0 (c) find f(x + 2) (d) find f(x + h)

a) f(-2) = 18, (b) f(4) = 0 and f(1) = 0
(c) $f(x+2) = x^2 - x - 2$
(d) $f(x+h) = x^2 + 2xh + h^2 + 5x + 5h + 4$

17) Find the domain:

$$f \cdot x = \frac{2x^2 + 3x - 1}{x^2 - 16}$$

$x \neq 4, x \neq -4$

18) Find the domain: $x \geq -\frac{7}{2}$

$$f(x) = 5 - 3\sqrt{2x + 7}$$

19) Find the domain: $x \leq \frac{1}{2}$

$$f(x) = 4 + 3\sqrt{1 - 2x}$$

Perform the indicated operation.

20) $f(n) = 2n + 2$
$g(n) = 3n + 2$
Find $(f \cdot g)(n)$

$6n^2 + 10n + 4$

21) $g(x) = x^2 - 2x$
$h(x) = 3x + 5$
Find $(g + h)(-8)$

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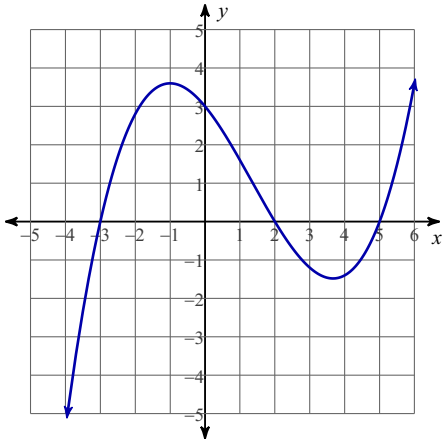
22) a) f(0) = ?

b) f(x) = 0, x = ?

(c) f(-2) = ?

(d) what are the local mimimum/maximum function values?



(a) f(0)=3
(b) f(-3)=0, f(2)=0, f(5)=0
(c) f(-2)=3
(d) local max at (-1, 3.5)
local min at (3.7, -1.5)

23) $f(x) = 2x^2 + 3x - 10$

Construct and simplify the "difference quotient for the funtion $f(x)$.

Difference Quotient: $\frac{f(x+h) - f(x)}{h}$

$4x + 3 + 2h$

24) For the following function: $y = 2x^2 - 8x + 7$

(a) What is the vertex form equation?

(b) What are the x-intercepts?

a) $y = 2(x-2)^2 - 1$

b) $x = 2 \pm \frac{\sqrt{2}}{2}$

25) The relationship between the number of units sold ('x') and the price of the unit ('P') is given by:
$x = 1500 - 25P$
Recall that "Revenue" is given by the relation: $R = px$
a) Write a relation that gives "revenue" as a function of "price".
b) What price will yield maximum revenue?
c) What is the maximum revenue?
d) How many units must be sold for maximum revenue?

a) $R = p(1500 - 25P)$
b) Price = \$30
c) Max Revenue = \$22,500
d) Number of units: x = 750

26) A horse owner has 1000 feet of fence. She wants to have a fenced rectangular corral. Because her property is adjacent to a river, she decides to put the corral right next to the river so that she doesn't have to fence that side.

a) Write a relation for the total amount of fencing used in the 3 sides of the corral (using "L" for length which are the sides that are perpendicular to the river and "W" for width which is the side of the corral that is parallel to the river).
b) Write a relation for area "A" of the corral as a function of "L" only.
c) What length gives the maximum area for the corral?
d) What is the maximum area of the corral?
e) What will be the width of the corral?

a) $1000 = 2L + W$
b) $A(L) = L(1000 - 2L)$
c) length = 250 ft
d) Area = 125,000 ft^2
e) width = 500 ft

27) For the following x-y pairs in relation 'f': (2, 3)

find:

a) $3f(x) + 1$
b) $f(x - 3)$
c) $f(2x) - 2$

a) (2, 10)
b) (5, 3)
c) (1, 1)

