Math 1220 Test 2 Review

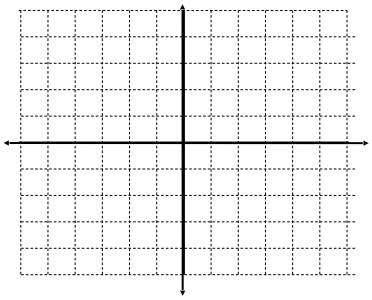
Linear Functions

1. Are the functions given below linear or nonlinear? If a function is linear, determine the equation that defines $y = f(x)$

x	f(x)
–1	–7
0	3
1	8
3	18
6	33

x	f(x)
–1	–3
0	4
1	7
2	6
3	1

2. Suppose $f(x) = 3x - 1$ and $g(x) = -2x + 3$.
   (a) Graph f and g on the same set of axes.



   (b) Solve $f(x) = 0$
   (c) Solve $f(x) > 0$
   (d) Solve $f(x) = g(x)$
   (e) Solve $f(x) > g(x)$

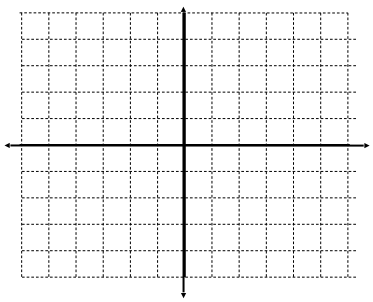
3. The weekly rental cost of a 20–foot recreational vehicle is $129.50 plus $0.15 per mile. Write a linear function that expresses the cost C as a function of miles driven, m. That is, write the linear function $C(m)$.

Quadratics

4. Find the zeros of the following quadratic functions. What are the x–intercepts of the graph of the function?

$f(x) = x^2 + x - 72$ $\quad f(x) = (x-3)^2 - 4$ $\quad f(x) = -2x^2 + 4x + 1$ $\quad f(x) = 3x^2 - 2x - 8$

5. Given $f(x) = x^2 + 3x, \quad g(x) = 5x + 3$, solve $f(x)=g(x)$. Then graph each function and label the points of intersection.

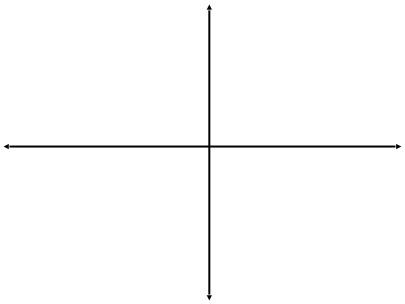


6. Determine the quadratic function whose vertex is at (1, –32) and which goes through the point (0, –30)

Graphing Quadratic Functions

7. Graph each of the following functions. Determine
   a) whether the graph opens up or down.
   b) the vertex of the graph of the quadratic function.
   c) the axis of symmetry
   d) the intercepts
   e) the domain and range
   f) where the function is increasing or decreasing.

$f(x)=3x^2+4x+1$



opens up/down?_____

vertex:_____

axis of sym:_____

D: _____

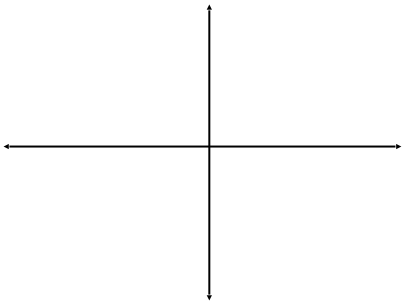
R: _____

x-int(s): _____

y-int(s): _____

interval increasing:_____

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



opens up/down?_____

vertex:_____

axis of sym:_____

D: _____

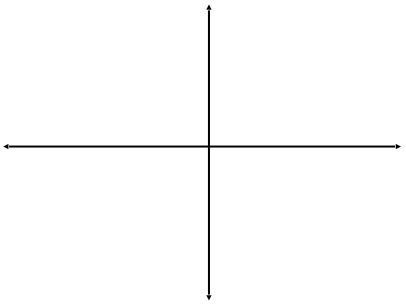
R: _____

x-int(s): _____

y-int(s): _____

interval increasing:_____

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



opens up/down?_____

vertex:_____

axis of sym:_____

D: _____

R: _____

x-int(s): _____

y-int(s): _____

interval increasing:_____

Quadratic Applications

7. A projectile is launched vertically upward and its height (in feet) at time t (in seconds) is described by $h(t)=-16t^2+32t+24$.

   a. When does the projectile reach its maximum height?

   b. What is the maximum height of the projectile?

   c. At what height was the projectile when it was launched?

   d. When does the projectile hit the ground?

8. The price p in dollars and the quantity sold, x, of a certain product obey the equation $p = -\frac{1}{10}x + 1000$.

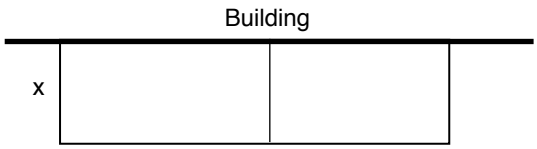
   a. Find a model that expresses the revenue, R, as a function of x.

   b. What is the revenue if 400 units are sold?

   c. What quantity x maximizes the revenue?

   d. What is the maximum revenue?

9. A gardener has 120 meters of fencing to enclose two adjacent rectangular growing plots. One side is to be against a building, as shown, and so requires no fencing.



   a) If x represents the width of the plot, express its area $A(x)$ in terms of x.

   b) Determine the dimensions of the rectangle that will make the area a maximum. What is the maximum growing area?

Quadratic Inequalities

8. Solve. Answer using interval notation

$x^2 < 9x$ $\qquad$ $x^2 + 6x - 16 \geq 0$

Absolute Values

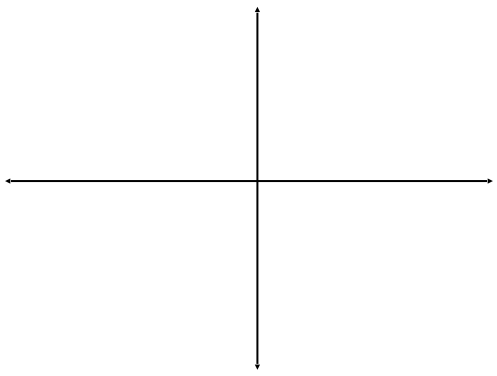
9. Solve. Answer using interval notation

$|2x - 3| = 7$ $\qquad$ $2 + |2 - 3x| \geq 4$ $\qquad$ $\left|\frac{x+3}{4}\right| < 2$

Polynomials

10. Graph the following function

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



degree:_____

end behavior:_____

x-int(s): _____

y-int(s): _____

max number of turning points :_____

zeros: multiplicities: cross/turn

Rationals

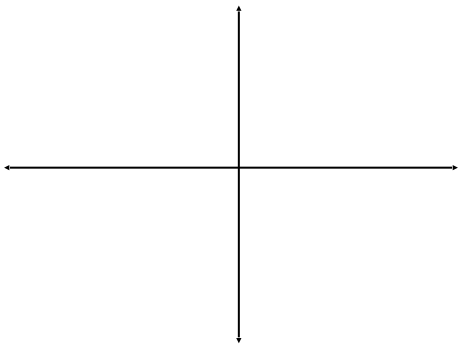
11. Graph each. Final all intercepts and asymptotes that exist.

$f(x)=\dfrac{2x-6}{x}$

D: _____

VA(s) _____ HA(s):_____

x-int(s): _____ y-int(s): _____

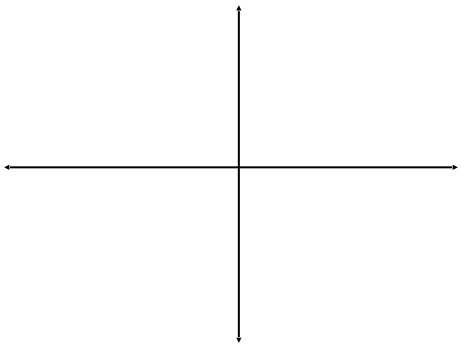


$g(x)=\dfrac{x+2}{x(x-2)}$

D: _____

VA(s) _____ HA(s):_____

x-int(s): _____ y-int(s): _____

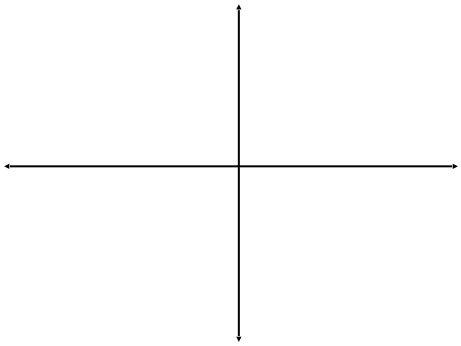


$f(x)=\dfrac{x^2+x-6}{x^2-x-6}$

D: _____

VA(s) _____ HA(s):_____

x-int(s): _____ y-int(s): _____



$g(x)=\dfrac{x^2-4}{x^2-x-2}$

D: _____

VA(s) _____ HA(s):_____

x-int(s): _____ y-int(s): _____

DP (if any):_____