

Chapter 1 (exam)

1. i) Determine whether each relation represents a function.

ii) For each function, state the domain and range.

a) $\{(2, 5), (4, 6), (6, 7), (8, 8)\}$

b) $\{(1, 3), (4, -2), (-3, 5), (1, 7)\}$

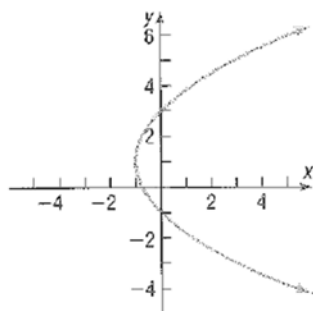
i)

i)

ii)

ii)

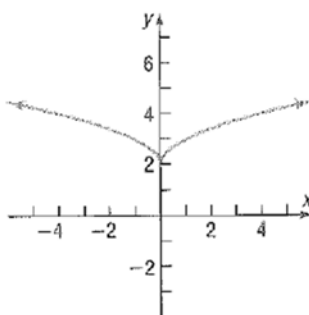
c)



i)

ii)

d)



i)

ii)

In problems 2 – 4; i) Find the domain of each function, ii) Evaluate each function at $x = -1$

2. $f(x) = \sqrt{4 - 5x}$

3. $g(x) = \frac{x+2}{|x+2|}$

4. $h(x) = \frac{x-4}{x^2+5x-36}$

5. Using the graph of the function f to the right:

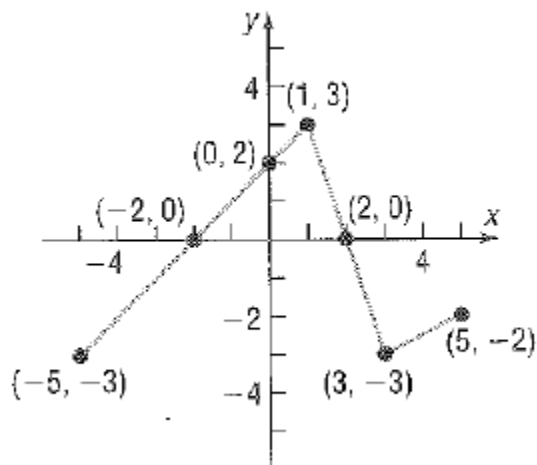
a) Find the domain and the range of f .

b) List the intercepts.

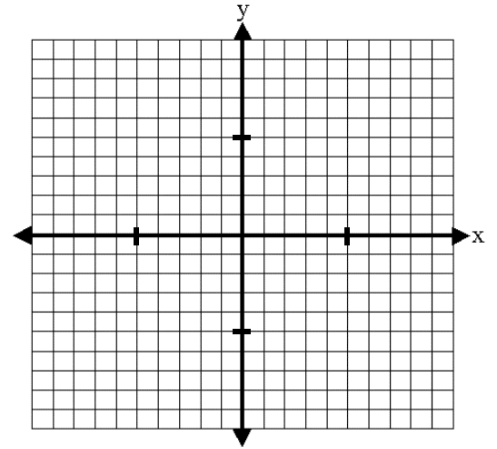
c) Find $f(1)$

d) For what value(s) of x does $f(x) = -3$?

e) Solve $f(x) < 0$

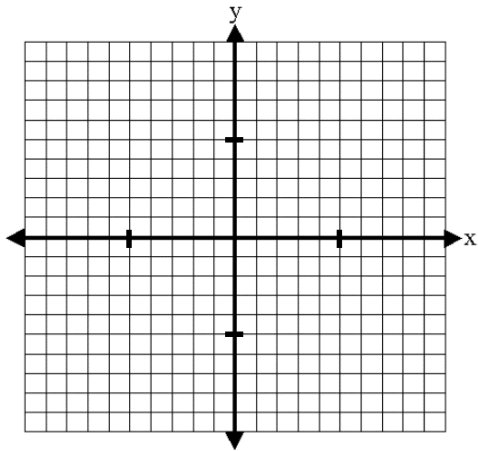
f) List the zeros of f


6. i) Use a graphing utility to graph the function $f(x) = -x^4 + 2x^3 + 4x^2 - 2$ on the interval $(-5, 5)$. (copy to the paper)
 ii) Approximate any local maxima and local minima rounded to the hundredth place.
 iii) Determine where the function is increasing and where it is decreasing.



7. Consider the function $g(x) = \begin{cases} 2x + 1, & \text{if } x < -1 \\ x - 4, & \text{if } x \geq -1 \end{cases}$

a) Graph the function



b) List the intercepts.

c) Find $g(-5)$

d) Find $g(2)$

8. For the function $f(x) = 3x^2 - 2x + 4$, find the average rate of change of f from 3 to x . (you will need to look this up)

9. For the functions $f(x) = 2x^2 + 1$ and $g(x) = 3x - 2$, find the following and simplify:

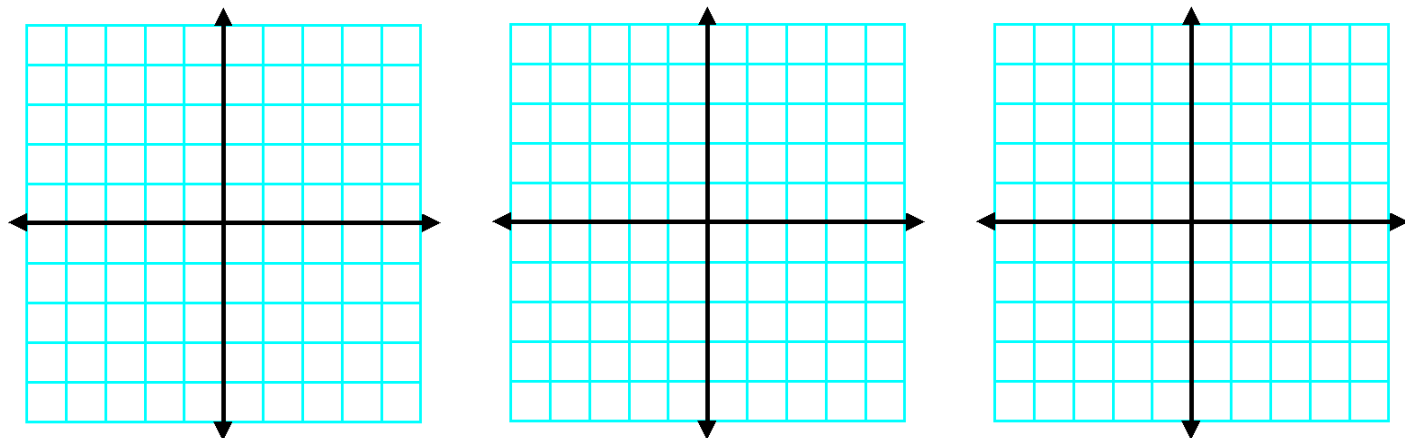
a) $f - g$

b) $f \cdot g$

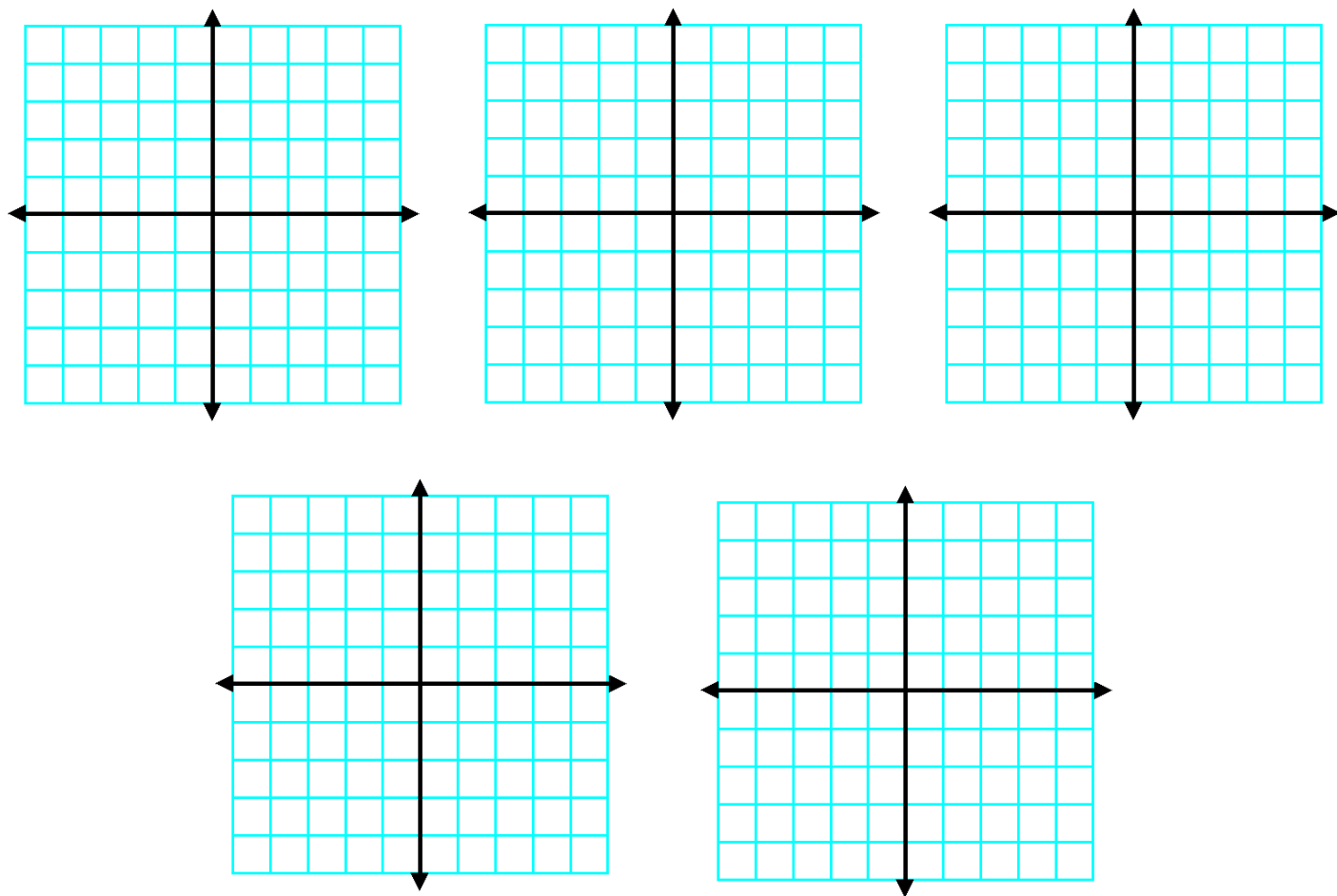
c) $f(x + h) - f(x)$

10. Graph each function using the techniques of shifting, compressing or stretching, and reflections. Start with the graph of the basic function and show ALL stages.

a) $g(x) = |x + 4| + 2$



b) $h(x) = -2(x + 1)^3 + 3$



11. The variable interest rate on a student loan changes each July 1 based on the bank prime loan rate. For the years 2004 – 2016, this rate can be approximated by the model $r(x) = -0.115x^2 + 1.183x + 5.623$, where x is the number of years since 2004 and r is the interest rate as a percent.

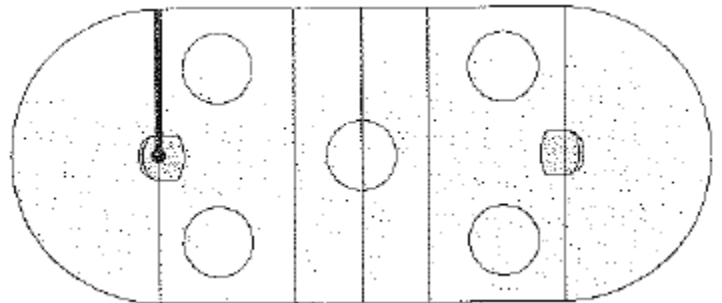
a) Use a graphing utility to estimate the highest rate during this time period. During which year was the interest rate the highest?

b) Use the model to estimate the rate in 2020. Does this value seem reasonable?

12. A community skating rink is in the shape of a rectangle with semicircles attached at the ends. The length of the rectangle is 20 feet less than twice the width. The thickness of the ice is 0.75 inch.

a) Write the ice volume, V , as a function of the width, x .

b) How much ice is in the rink if the width is 90 feet?



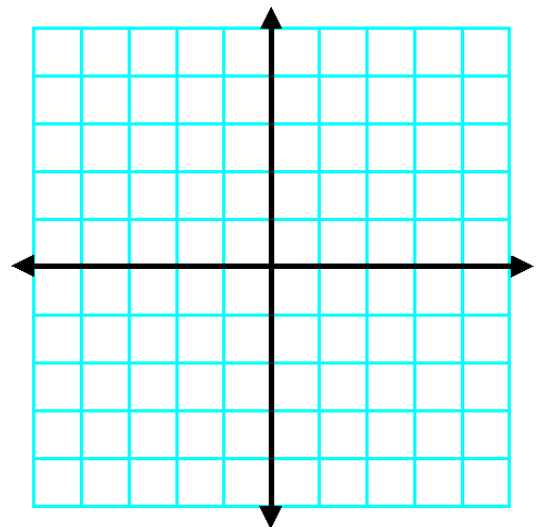
Chapter 2 (exam)

1. For the linear function $f(x) = -4x + 3$,

a) Find the zero of f .

b) Determine whether f is increasing, decreasing, or constant

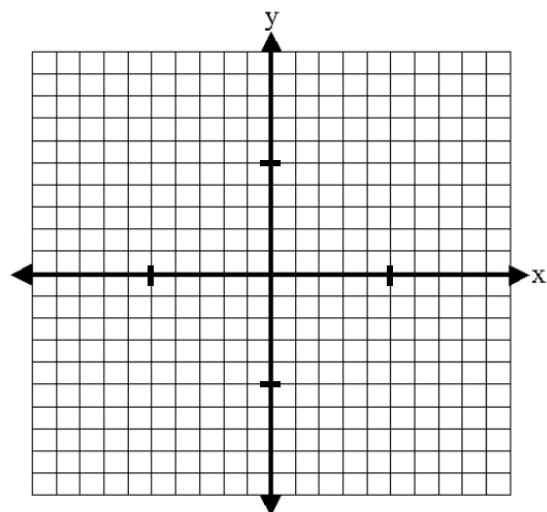
c) Graph f .



2. Find the zeros for $f(x) = 3x^2 - 2x - 8$

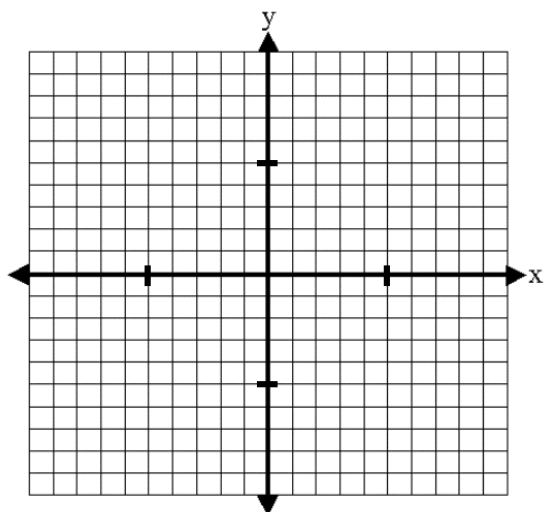
3. Find the zeros for $g(x) = -2x^2 + 4x + 1$

4. Given that $f(x) = x^2 + 3x$ and $g(x) = 5x + 3$, solve $f(x) = g(x)$. Graph each function and label the points of intersection.



5. Find the real zeros of $f(x) = (x - 1)^2 + 5(x - 1) + 4$

6. Graph $f(x) = (x - 3)^2 - 2$ using transformations.



7. For the quadratic function $f(x) = 3x^2 - 12x + 4$,

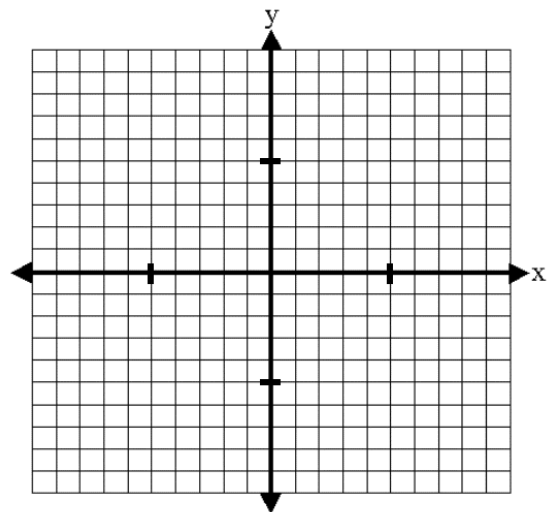
a) Determine whether the graph opens up or down.

b) Determine the vertex.

c) Determine the axis of symmetry

d) Determine the intercepts.

e) Use the information from parts (a) – (d) to graph f .



8. Determine whether $f(x) = -2x^2 + 12x + 3$ has a maximum or minimum value. Then find the maximum or minimum value.

9. Solve $x^2 - 10x + 24 \geq 0$.



10. Find the complex zeros of $f(x) = 2x^2 + 4x + 5$. (hint: use the quadratic formula)

11. Solve $|3x + 1| = 8$.

For problems 12 and 13,

- a) Solve each absolute value inequality.
- b) Express your answer in set-builder notation.
- c) Express your answer in interval notation.
- d) Graph the solution set on a number line.

12. $\left|\frac{x+3}{4}\right| < 2$

13. $|2x + 3| - 4 \geq 3$



14. The weekly rental cost of a 20-foot recreational vehicle is \$129.50 plus \$0.15 per mile.

- a) Find a linear function that expresses the cost C as a function of miles driven m .
- b) What is the rental cost if 860 miles are driven?
- c) How many miles were driven if the rental cost is \$213.80?