

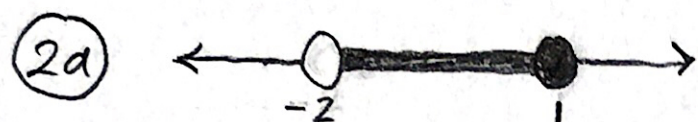
Section 1.3

In Exercises 1-3, express the set in interval notation.

1a) $x < 15$

1b) $-3 < x \leq 5$

1c) $\{x \mid x \leq 2 \text{ or } x > 10\}$



3a) $\{x \mid x \neq 0\}$

3b) $\{x \mid x \neq -3 \text{ and } x \neq 1\}$

4) Find the domain of f . Use interval notation.

(a) $f(x) = 3x + 5$

(d) $f(x) = |x - 5|$

(b) $f(x) = 2x^2 + 6x + 1$

(e) $f(x) = \sqrt{2x - 1}$

(c) $f(x) = 5x^3$

(f) $f(x) = \frac{x+1}{x-7}$

5) Explain why $x^2 + y^2 = 16$ is not a function.

Section 1.4

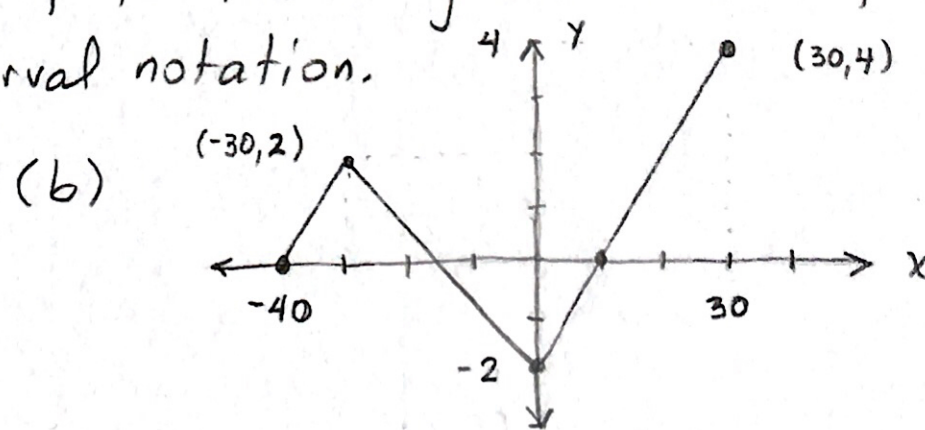
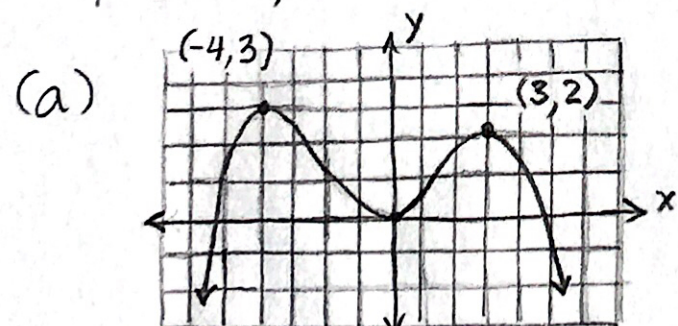
In Exercises 6-8, identify where f is increasing and where f is decreasing.

6) $f(x) = 2x^2 + 6x + 1$

7) $f(x) = |x - 5|$

8) $f(x) = \sqrt{2x - 1}$

9) Use the graph to determine: (1) the domain of f , (2) the range of f and (3) intervals where f is increasing and where f is decreasing. Express your answers in interval notation.



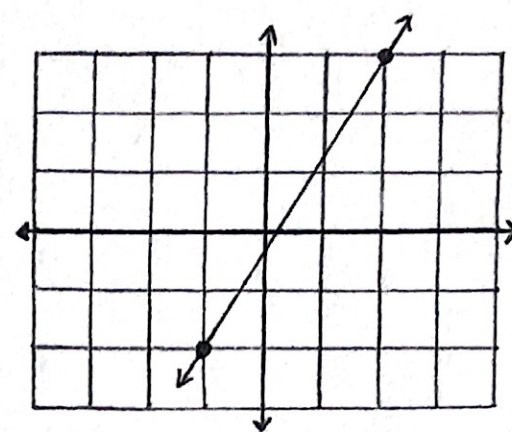
10) Use the function $f(x) = 9x^2 + 5$ to:

(a) Calculate the average rate of change on $[-2, 4]$. (Show work!)

(b) Find the difference quotient. (Show work!)

Section 2.1

⑪ Find the slope-intercept form of the given line.



⑫ The following table lists points that are exactly colinear. Without using a calculator, find the slope-intercept form of the line passing through these points.

x	0	1	2	3	4
y	5.2	3.1	1	-1.1	-3.2

Exercises 13-15: The following table lists points that are approximately colinear.

x	0	1	2	3	4
y	5.2	3.5	1.1	-1.3	-3.4

⑬ Use the linear regression feature on your calculator to model $y = mx + b$. Round to 2 decimal places.

⑭ What is the correlation coefficient r ? Round to 4 decimal places.

⑮a Use your model to predict y when $x = 2.5$ and $x = 5$.

⑮b Decide if your predictions in Exercise 15a involve interpolation or extrapolation.

Section 2.4

⑯ A 500-gallon tank initially contains 300 gallons of water. A pump is filling the tank at a rate of 10 gallons per minute.

(a) Model a function W that gives the number of gallons of water in the tank after t minutes.

(b) Find an appropriate domain for W .

Exercises 17-18: The following table lists the cost of a 30-second Super Bowl commercial for selected years.

Year	1994	1998	2004	2008	2012	2016
Cost*	1.2	1.6	2.3	2.7	3.5	5.0

* in millions of dollars

⑰a Use linear regression to find a function f that models the data. Round to 4 decimal places.

⑰b What is the correlation coefficient r ? Round to 4 decimal places.

⑱a Use f to predict the year when the cost could reach \$6.0 million.

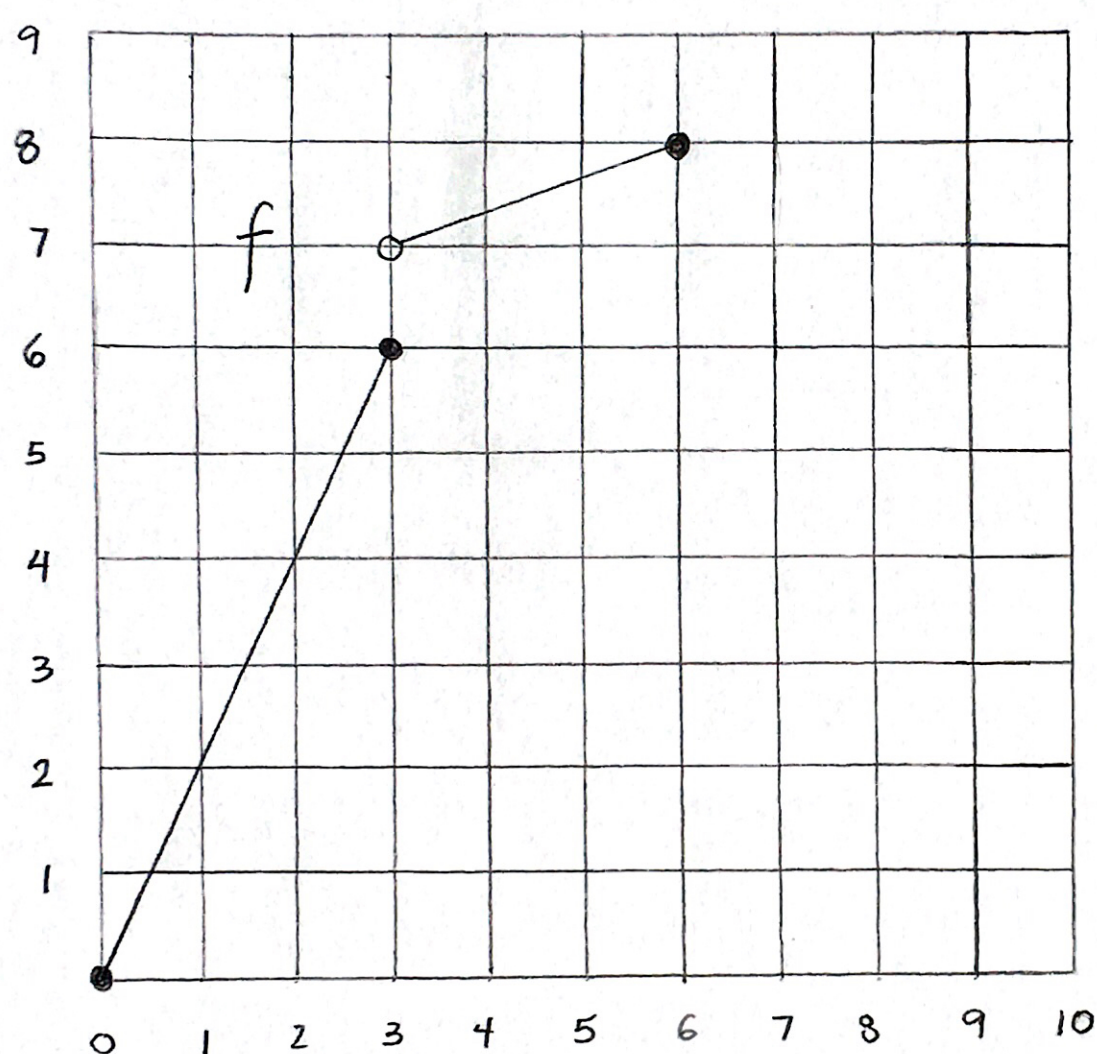
⑱b Decide if your prediction in Exercise 18a involves interpolation or extrapolation.

Section 2.4 (cont'd)

①9 Complete the following for $g(x) = \begin{cases} 2x+1 & \text{if } -3 \leq x < 0 \\ x-1 & \text{if } 0 \leq x \leq 3 \end{cases}$

- (a) Determine the domain of g .
- (b) Evaluate $g(-2)$, $g(0)$ and $g(3)$.
- (c) Graph g .
- (d) Is g continuous on its domain?

②0 Find a piecewise-defined formula for f .



Section 2.5

In Exercises 21-22, solve each equation or inequality. Use I.N.*

②1 (a) $|x| = 9$

(b) $|x| < 9$

(c) $|x| \geq 9$

②2 (a) $|2x-9| = 7$

(b) $|2x-9| \leq 7$

(c) $|2x-9| > 7$

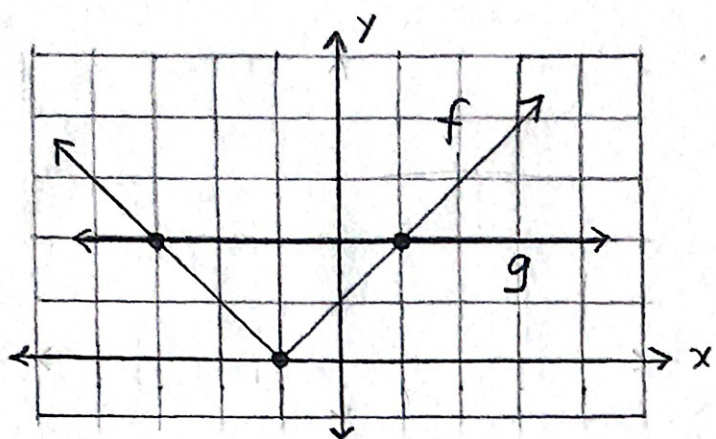
②3 Graph by hand: $y = |2x-9|$. Include all intercepts.

②4 Explain why $|2x-9| = -1$ has no solution.

* I.N. = Interval Notation

Section 2.5 (cont'd)

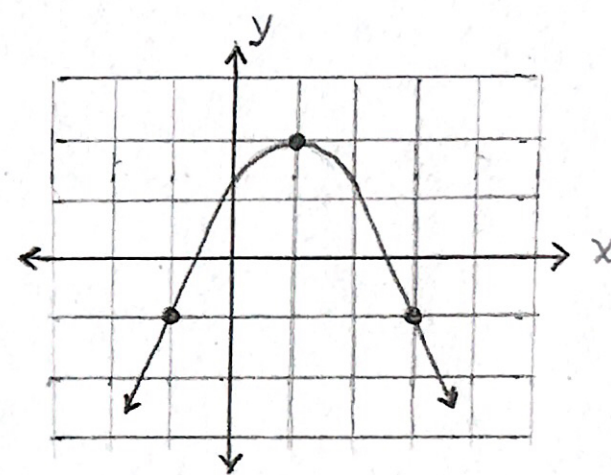
- (25) Use the graph to solve the inequality: $f(x) < g(x)$.



Section 3.1

- (26) For $f(x) = -2x^2 - 8x + 10$, (a) sketch the concavity and identify the (b) vertex, (c) axis of symmetry, (d) range, (e) maximum or minimum value, (f) intervals where f is increasing and where f is decreasing and (g) y -intercept.

- (27) Use the graph to model $f(x) = a(x-h)^2 + k$.



- (28) Perform the following conversions.

(a) $f(x) = 5(x+3)^2 - 42$ to SF.

(b) $f(x) = 3x^2 + 6x - 1$ to VF.

- (29) Sketch the graph of f in Exercises 28(a) and 28(b). Identify vertex, y -intercept and its point of symmetry.

- (30) The following data table lists points that are approximately (but not exactly) quadratic,

x	0	1	2	3
y	1.5	2.2	1.3	-0.7

- (a) Use the quadratic regression feature on your calculator to model the data. Write down the equation. Round to 3 decimal places.
- (b) What is the correlation coefficient R^2 ? Round to 4 decimal places.
- (c) Explain why a linear function would not model this data as well. (Hint: Compare the correlation coefficients.)

Section 3.2

③① Solve the quadratic equation by using the square root property.

(a) $x^2 - 25 = 0$

(b) $x^2 - 17 = 0$

③② Solve the quadratic equation by factoring.

(a) $5x^2 - 2x = 0$

(b) $x^2 + 8x + 7 = 0$

③③ Solve the quadratic equation using the quadratic formula.

(a) $x^2 + 5x + 5 = 0$

(b) $3x^2 + 11x + 10 = 0$

③④ Find the domain of the function.

(a) $f(x) = \frac{x+1}{x^2-15}$

(b) $f(x) = \frac{1}{x^2+2x+1}$

③⑤ Find the x-intercepts of $f(x) = -2x^2 - 8x + 10$ by any method.

Section 3.3

③⑥ Simplify by using the imaginary unit i .

(a) $\sqrt{-81}$

(c) $\sqrt{-50}$

(e) $\frac{6 \pm \sqrt{-28}}{12}$

(b) $\sqrt{-11}$

(d) $\sqrt{-6} \cdot \sqrt{-6}$

③⑦ Write in standard form. Show your work.

(a) $(-5 + 7i) + (3 - 6i)$

(c) $\frac{1 + 3i}{2 + i}$

(b) $(3 + 2i)(1 - 2i)$

In Exercises 38-40, determine the imaginary solutions. Write answers in standard form and simplify.

③⑧ $3x^2 + 24 = 0$

③⑨ $x^2 - 5x + 7 = 0$

④⑩ $2x^2 + 8x + 11 = 0$

Section 3.5

- (41) Use transformations to sketch the graph of $f(x) = \sqrt{x+2} + 2$.
- (42) Write an equation for a function that has a graph with the shape of $y = \sqrt{x}$, but is shifted left 3 units and upward 1 unit and then reflected about the y-axis.
- (43) Use transformations to determine how the graph of $y = -3|x-1|$ can be obtained from its base function $y = |x|$.
- (44) Let $D_f = [0, 4]$ and $R_f = [-3, 3]$. Find D_h and R_h if $h(x) = 2f(x-1) + 6$.
- (45) Use the graph of f to sketch $-2f(x+3)$.

