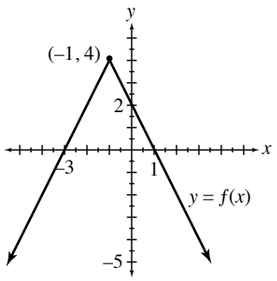
Name:_____

Chapter 1 Test Form A

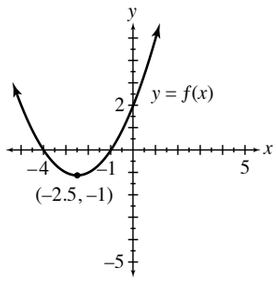
Date:_____

1. For each of the functions, determine the (i) domain (ii) range (iii) x-intercept(s) (iv) y-intercept(s).

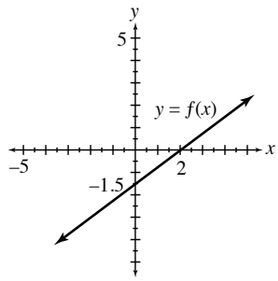
(a)



(b)

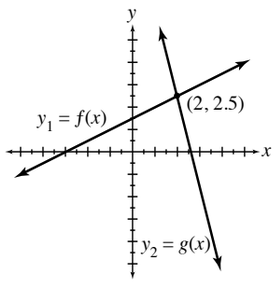


(c)



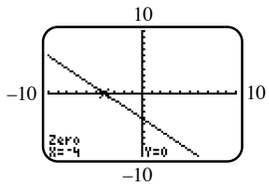
2. Use the figure to solve each equation or inequality.

(a) $f(x) = g(x)$ (b) $f(x) < g(x)$ (c) $f(x) \geq g(x)$ (d) $y_2 - y_1 = 0$



3. Use the screen to solve the equation or inequality. Here the function $y_1 = f(x)$ is a linear function defined over the domain of real numbers.

(a) $y_1 = 0$ (b) $y_1 \leq 0$ (c) $y_1 \geq 0$ (d) $y_1 > 0$



4. Consider the linear functions $f(x) = \frac{3}{4}(4 - x) + x - 8$ and $g(x) = 3(x - 3) + 2(x + 2)$.

(a) Solve $f(x) = g(x)$ analytically, showing all steps. Also, check analytically.

(b) Graph $y_1 = f(x)$ and $y_2 = g(x)$ and use your result in part (a) to find the solution set of $f(x) < g(x)$. Explain your answer.

(c) Repeat part (b) for $f(x) > g(x)$.

5. Consider the linear function $f(x) = \frac{1}{4}(5x - 8) - (x - 3)$.

(a) Solve the equation $f(x) = 0$ analytically.

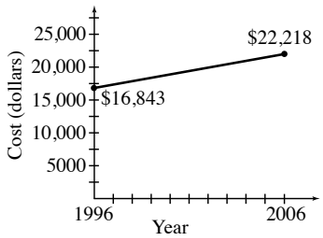
(b) Solve the inequality $f(x) \leq 0$ analytically.

(c) Graph $y = f(x)$ in an appropriate viewing window and explain how the graph supports your answers in parts (a) and (b).

Test Form 1-A *(continued)*

Name:_____

6. During the period from 1996 to 2006 the average annual cost (in dollars) of tuition and fees at private four-year colleges rose in an approximately linear fashion. The graph depicts this growth using a line segment. (Source: The College Board)



(a) Use the midpoint formula to approximate the cost during the year 2001.

(b) Find the slope of the line and explain its meaning in the context of this situation.

7. Find the equation of the line passing through the point $(1, -4)$ and

(a) parallel to the line with equation $y = 2x + 3$.

(b) perpendicular to the line with equation $3x + y = 0$.

8. Find the x- and y-intercepts of the line whose standard form is $-3x + 2y = 9$. What is the slope of this line?

9. Give the equations of both the horizontal and vertical lines passing through the point $(-2, 12)$.

10. The table lists the Gross Domestic Product (GDP) from 2004 to 2008 in billions of dollars. (Source: U.S. Department of Commerce)

Year	2004	2005	2006	2007	2008
GDP	11,868	12,638	13,399	14,078	14,441

(a) Find the least-squares regression line for the data. Give the correlation coefficient.

(b) Use this line to predict the federal debt in 2009.

11. Suppose that an empty circular wading pool has a radius of 7 feet. During a storm, rain falling at a rate of 1 inch per hour begins to fill the pool. A small drain at the bottom of the pool is capable of draining 35 gallons of water per hour.

(a) Determine the number of cubic inches of water falling into the pool in one hour. (*Hint*: Each hour a layer of water 1 inch thick falls into the pool.)

(b) One gallon of water equals about 231 cubic inches. Write a formula for a function g that computes the gallons of water landing in the pool in x hours.

(c) How many gallons of water land in the pool during a 3 hour storm?

(d) Will the drain be able to keep up with the rainfall? If not, how many such drains would be needed?

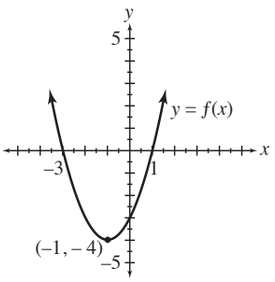
Name:_____

Chapter 1 Test Form B

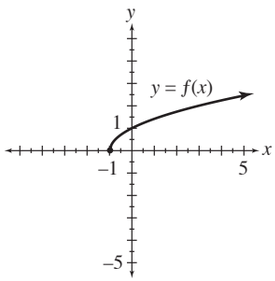
Date:_____

1. For each of the functions, determine the (i) domain (ii) range (iii) x-intercept(s) (iv) y-intercept(s).

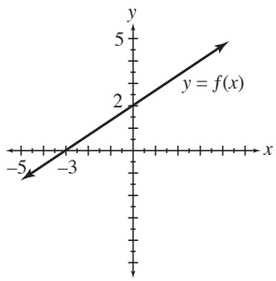
(a)



(b)

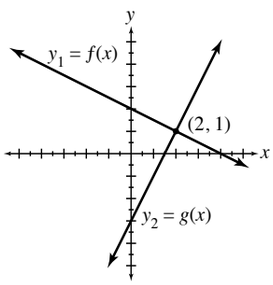


(c)



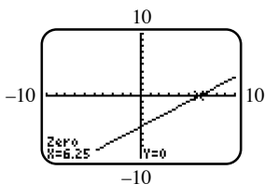
2. Use the figure to solve each equation or inequality.

(a) $f(x) = g(x)$ (b) $f(x) < g(x)$ (c) $f(x) \geq g(x)$ (d) $y_2 - y_1 = 0$



3. Use the screen to solve the equation or inequality. Here the function $y_1 = f(x)$ is a linear function defined over the domain of real numbers.

(a) $y_1 = 0$ (b) $y_1 < 0$ (c) $y_1 > 0$ (d) $y_1 \leq 0$



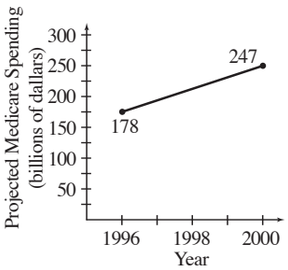
4. Consider the linear functions $f(x) = 4 - 3x + 4(x + 1)$ and $g(x) = 3(x + 1) - 5(x + 2)$.
   (a) Solve $f(x) = g(x)$ analytically, showing all steps. Also, check analytically.
   (b) Graph $y_1 = f(x)$ and $y_2 = g(x)$ and use your result in part (a) to find the solution set of $f(x) < g(x)$. Explain your answer.
   (c) Repeat part (b) for $f(x) > g(x)$.

5. Consider the linear function $f(x) = 3(x - 1) - \frac{1}{3}(6x - 9)$.
   (a) Solve the equation $f(x) = 0$ analytically.
   (b) Solve the inequality $f(x) \leq 0$ analytically.
   (c) Graph $y = f(x)$ in an appropriate viewing window and explain how the graph supports your answers in parts (a) and (b).

Test Form 1-B *(continued)*

Name:_____

6. For the years 1996 to 2000, it was estimated that Medicare costs (in billions of dollars) would rise in a linear fashion. See the graph below. (*Source:* U.S. Office of Management and Budget)



(a) Use the midpoint formula to approximate Medicare costs during the year 1998.

(b) Find the slope of the line and explain its meaning in the context of this situation.

7. Find the equation of the line passing through the point $(2, -1)$ and

(a) parallel to the line with equation $y = \frac{1}{2}x + 3$.

(b) perpendicular to the line with equation $-3x - y = 4$.

8. Find the x- and y-intercepts of the line whose standard form is $3x + 7y = -9$. What is the slope of this line?

9. Give the equations of both the horizontal and vertical lines passing through the point $(7, 3)$.

10. The table lists the average cost (in dollars) of tuition and fees at public four-year colleges for selected years. (Source: The College Board)

Year	1997	1999	2001	2003	2005
Tuition and Fees	3111	3362	3766	4645	5491

(a) Find the least-squares regression line for the data. Give the correlation coefficient.

(b) Use this line to predict the average annual cost of tuition and fees in 2007.

11. Suppose that an empty circular wading pool has a radius of 5 feet. During a storm, rain falling at a rate of 1.5 inches per hour begins to fill the pool. A small drain at the bottom of the pool is capable of draining 30 gallons of water per hour.

(a) Determine the number of cubic inches of water falling into the pool in one hour. (*Hint*: Each hour a layer of water 1.5 inches thick falls into the pool.)

(b) One gallon of water equals about 231 cubic inches. Write a formula for a function g that computes the gallons of water landing in the pool in x hours.

(c) How many gallons of water land in the pool during a 2.5 hour storm?

(d) Will the drain be able to keep up with the rainfall? If not, how many such drains would be needed?

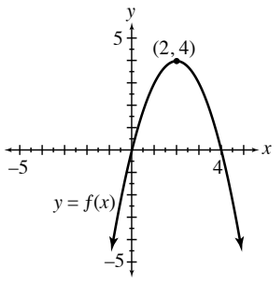
Name:_____

Chapter 1 Test Form C

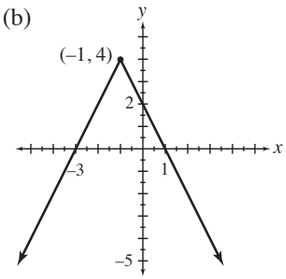
Date:_____

1. For each of the functions, determine the (i) domain (ii) range (iii) x-intercept(s) (iv) y-intercept(s).

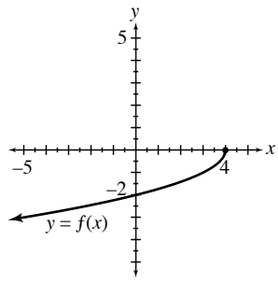
(a)



(b)

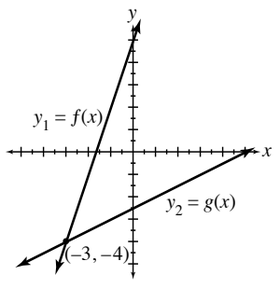


(c)



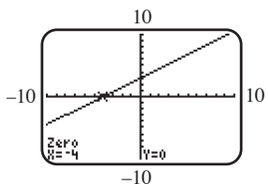
2. Use the figure to solve each equation or inequality.

(a) $f(x) = g(x)$ (b) $f(x) < g(x)$ (c) $f(x) \geq g(x)$ (d) $y_2 - y_1 = 0$



3. Use the screen to solve the equation or inequality. Here the function $y_1 = f(x)$ is a linear function defined over the domain of real numbers.

(a) $y_1 = 0$ (b) $y_1 < 0$ (c) $y_1 > 0$ (d) $y_1 \leq 0$



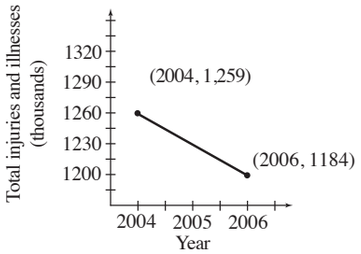
4. Consider the linear functions $f(x) = 2(x - 1) + 7$ and $g(x) = x + 3 - 3(x - 2)$.
   (a) Solve $f(x) = g(x)$ analytically, showing all steps. Also, check analytically.
   (b) Graph $y_1 = f(x)$ and $y_2 = g(x)$ and use your result in part (a) to find the solution set of $f(x) < g(x)$. Explain your answer.
   (c) Repeat part (b) for $f(x) > g(x)$.

5. Consider the linear function $f(x) = 5(x + 4) - (2x + 5)$.
   (a) Solve the equation $f(x) = 0$ analytically.
   (b) Solve the inequality $f(x) \leq 0$ analytically.
   (c) Graph $y = f(x)$ in an appropriate viewing window and explain how the graph supports your answers in parts (a) and (b).

Test Form 1-C *(continued)*

Name:_____

6. The graph below shows a line segment depicting the number of injuries and illnesses resulting in days away from work from 2004 to 2006. (Source: U.S. Department of Labor Statistics)



(a) Use the midpoint formula to approximate the number of illnesses and injuries during the year 2005.

(b) Find the slope of the line and explain its meaning in the context of this situation.

7. Find the equation of the line passing through the point (2, 3) and

(a) parallel to the line with equation $2x + 3y = 4$.

(b) perpendicular to the line with equation $y = \frac{1}{4}x + 2$.

8. Find the x- and y-intercepts of the line whose standard form is $-2x + 5y = -4$.
What is the slope of this line?

9. Give the equations of both the horizontal and vertical lines passing through the point (3, 0).

10. The table lists the period of revolution (in days) of each planet and the mean distance of the sun (in millions of miles) from each planet.

Planet	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
Distance from Sun	36	67	93	142	484	887	1784	2796
Period of Revolution	88	225	365	687	4329	10,753	30,660	60,225

(a) Find the least-squares regression line for the data. Give the correlation coefficient.

(b) Use this line to predict the period of revolution of an asteroid that has a mean distance of 260 million miles from the sun.

11. Suppose that an empty circular wading pool has a radius of 9 feet. During a storm, rain falling at a rate of 0.5 inch per hour begins to fill the pool. A small drain at the bottom of the pool is capable of draining 20 gallons of water per hour.

(a) Determine the number of cubic inches of water falling into the pool in one hour. (*Hint*: Each hour a layer of water 0.5 inch thick falls into the pool.)

(b) One gallon of water equals about 231 cubic inches. Write a formula for a function g that computes the gallons of water landing in the pool in x hours.

(c) How many gallons of water land in the pool during a 2.5 hour storm?

(d) Will the drain be able to keep up with the rainfall? If not, how many such drains would be needed?

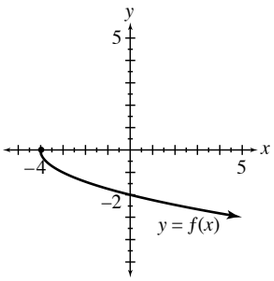
Name:_____

Chapter 1 Test Form D

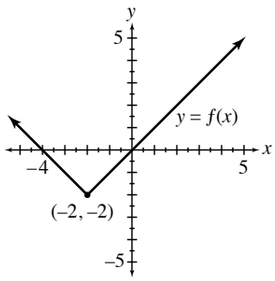
Date:_____

1. For each of the functions, determine the (i) domain (ii) range (iii) x-intercept(s) (iv) y-intercept(s).

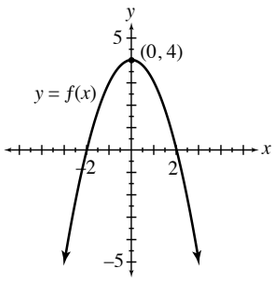
(a)



(b)

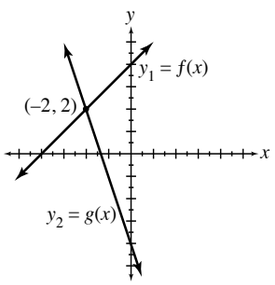


(c)



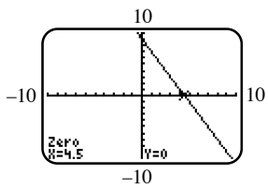
2. Use the figure to solve each equation or inequality.

(a) $f(x) = g(x)$ (b) $f(x) < g(x)$ (c) $f(x) \geq g(x)$ (d) $y_2 - y_1 = 0$



3. Use the screen to solve the equation or inequality. Here the function $y_1 = f(x)$ is a linear function defined over the domain of real numbers.

(a) $y_1 = 0$ (b) $y_1 < 0$ (c) $y_1 > 0$ (d) $y_1 \leq 0$



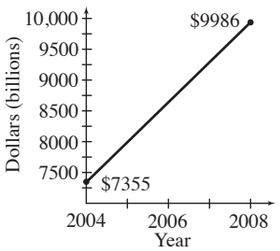
4. Consider the linear functions $f(x) = -3(x + 1) + 2x + 1$ and $g(x) = 2x - 2(3x + 10)$.
   (a) Solve $f(x) = g(x)$ analytically, showing all steps. Also, check analytically.
   (b) Graph $y_1 = f(x)$ and $y_2 = g(x)$ and use your result in part (a) to find the solution set of $f(x) < g(x)$. Explain your answer.
   (c) Repeat part (b) for $f(x) > g(x)$.

5. Consider the linear function $f(x) = 2(x - 3) - \frac{1}{2}(6x + 2)$.
   (a) Solve the equation $f(x) = 0$ analytically.
   (b) Solve the inequality $f(x) \leq 0$ analytically.
   (c) Graph $y = f(x)$ in an appropriate viewing window and explain how the graph supports your answers in parts (a) and (b).

Test Form 1-D *(continued)*

Name:_____

6. From 2004 to 2008 the federal debt (in billion of dollars) rose in approximately linear fashion. See the graph below. (*Source:* U.S. Office of Management and Budget)



(a) Use the midpoint formula to approximate the debt during the year 2006.

(b) Find the slope of the line and explain its meaning in the context of this situation.

7. Find the equation of the line passing through the point $(-4, 0)$ and

(a) parallel to the line with equation $y = 3x + 7$.

(b) perpendicular to the line with equation $\frac{1}{3}x - y = 5$.

8. Find the x- and y-intercepts of the line whose standard form is $3x - y = 5$.
What is the slope of this line?

9. Give the equations of both the horizontal and vertical lines passing through the point $(4, -7)$.

10. The table lists the average cost (in dollars) of tuition and fees at private four-year colleges for selected years. (*Source:* The College Board)

Year	1997	1999	2001	2003	2005
Tuition and Fees	13,785	15,518	17,377	18,950	21,235

(a) Find the least-squares regression line for the data. Give the correlation coefficient.

(b) Use this line to predict the average annual cost of tuition and fees in 2002.

11. Suppose that an empty circular wading pool has a radius of 5 feet. During a storm, rain falling at a rate of 0.6 inch per hour begins to fill the pool. A small drain at the bottom of the pool is capable of draining 35 gallons of water per hour.

(a) Determine the number of cubic inches of water falling into the pool in one hour. (*Hint*: Each hour a layer of water 0.6 inch thick falls into the pool.)

(b) One gallon of water equals about 231 cubic inches. Write a formula for a function g that computes the gallons of water landing in the pool in x hours.

(c) How many gallons of water land in the pool during a 2 hour storm?

(d) Will the drain be able to keep up with the rainfall? If not, how many such drains would be needed?