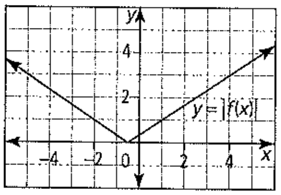
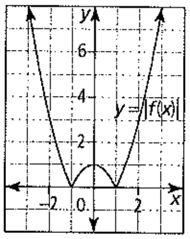
ANSWERS

2. a)



b)



3. a) $x = \frac{5}{2}$ **b)** $x = 3$ **c)** $x = 3$

4. a) $x = \pm 1$ **b)** $x = -3, x = 2$ **c)** $x = -\frac{2}{3}, x = 1$

5. a) $y = \begin{cases} x - 2, & \text{if } x \geq 2 \\ -x + 2, & \text{if } x < 2 \end{cases}$ **b)** $y = \begin{cases} 2x + 2, & \text{if } x \geq -1 \\ -2x - 2, & \text{if } x < -1 \end{cases}$

Section 7.4

1. a) $-\frac{1}{3}$ **b)** 4 **c)** $\frac{1}{2x}$ **d)** $\frac{x-3}{5x}$

2. a) none **b)** $x \neq 2$ **c)** $x \neq \pm 1$ **d)** $x \neq -2$ and $x \neq -1$

3. a) $x = 3$ and $x = -\frac{5}{3}$; both solutions check

b) $x = 2$ and $x = -4$; both solutions check

c) $x = -5$ and $x = 1$; solution $x = -5$ is extraneous

d) $x = 1$ and $x = 0$; both solutions check

4. a) $y = (x + 1)^2 + 2$ or $y = x^2 + 2x + 3$

b) $y = -x^2 + 2x + 8$ **c)** $y = x^2 - 4x + 4$

5. Let each denominator equal zero and solve the resulting equation. Each solution is a non-permissible value for the rational expression.

Answers

BLM 7–4 Section 7.1 Extra Practice

1. a) 42 **b)** $\frac{82}{3}$ **c)** 3.75 **d)** $1\frac{5}{6}$

2. a) $|-3|, |-3.9|, |-4|, |-4.1|, |-4.5|$

b) $-\left|\frac{6}{10}\right|, \left|\frac{6}{25}\right|, \left|-\frac{6}{20}\right|, \left|-\frac{6}{15}\right|, \left|-\frac{6}{5}\right|$

3. a) $|-2.1|, \left|-\frac{5}{3}\right|, \left|-\frac{3}{4}\right|, |-0.6|, -|1.2|$

b) $\left|\frac{46}{2}\right|, \left|-\frac{1}{23}\right|, \left|-\frac{2}{46}\right|, -2\left(\left|\frac{1}{23}\right|\right), -23$

4. a) 14 **b)** 32 **c)** 13 **d)** −2.4

5. a) 16 **b)** −6.25 **c)** $\frac{10}{3}$ **d)** 49

6. a) 8 **b)** 16 **c)** 9 **d)** 8

7. a) 1.5 **b)** 4 **c)** 2 **d)** 3

BLM 7–5 Section 7.2 Extra Practice

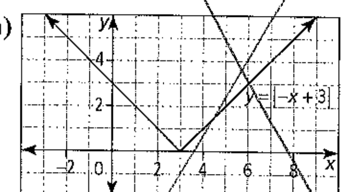
1. a)

x	y
0	1
2	0
4	1
6	2
8	3

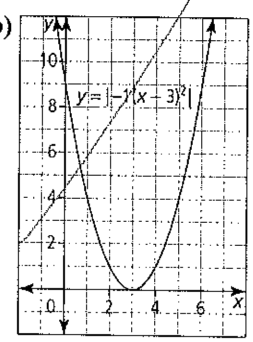
b)

x	y
−4	8
−2	0
0	0
2	8
4	24

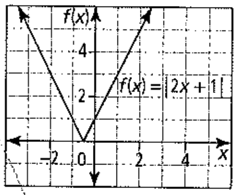
2. a)



b)



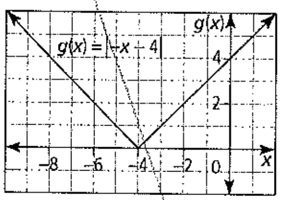
3. a)



x-intercept: $\left(\frac{-1}{2}, 0\right)$; y-intercept: (0, 1);

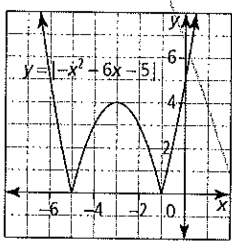
domain: $\{x \mid x \in R\}$; range: $\{y \mid y \geq 0, y \in R\}$

b)



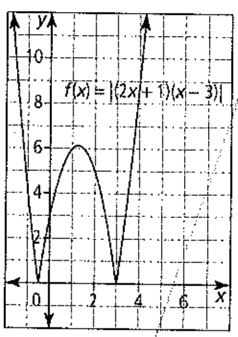
x-intercept: (−4, 0); y-intercept: (0, 4);
domain: $\{x \mid x \in R\}$; range: $\{y \mid y \geq 0, y \in R\}$

4. a)



x-intercepts: (−5, 0) and (−1, 0); y-intercept: (0, 5);
domain: $\{x \mid x \in R\}$; range: $\{y \mid y \geq 0, y \in R\}$

b)



x-intercepts: $\left(\frac{-1}{2}, 0\right)$ and (3, 0); y-intercept: (0, 3);
domain: $\{x \mid x \in R\}$; range: $\{y \mid y \geq 0, y \in R\}$

5. a) $y = \begin{cases} 5x+1, & \text{if } x \geq -\frac{1}{5} \\ -5x-1, & \text{if } x < -\frac{1}{5} \end{cases}$

b) $y = \begin{cases} \frac{-1}{2}x+4, & \text{if } x \leq 8 \\ \frac{1}{2}x-4, & \text{if } x > 8 \end{cases}$

c) $y = \begin{cases} 2(x+2)^2 - 8, & \text{if } x \leq -4 \text{ or } x \geq 0 \\ -2(x+2)^2 + 8, & \text{if } -4 < x < 0 \end{cases}$

d) $y = \begin{cases} -2(x+3)(x-1), & \text{if } -3 \leq x \leq 1 \\ 2(x+3)(x-1), & \text{if } x < -3 \text{ or } x > 1 \end{cases}$

6. a) $h(x)$ and $k(x)$ **b)** all
c) $g(x)$, $h(x)$, and $k(x)$ **d)** all

7. a) all points where $x \geq 3$ **b)** (0, 0)
c) all points where $-4 \leq x \leq 0$ **d)** all points

BLM 7–6 Section 7.3 Extra Practice

Here!

1. a) $x = -3$ or $x = 1$ **b)** no solution
c) $x = \pm\frac{5}{2}$ **d)** $x = 0$

2. a) yes **b)** no **c)** yes **d)** yes

3. a) $x = \frac{1}{4}$ **b)** no solution **c)** $x \geq 5$ **d)** $n = 8$

4. a) $x = 1 \pm \sqrt{2}$ and $x = 1$
b) $x = 4$ and $x = -1$
c) $x = 2$ and $x = -8$
d) $x = 1 \pm \frac{\sqrt{7}}{2}$, $x = \frac{1}{2}$, and $x = \frac{3}{2}$

5. a) $x = -5$ or $x = 5$
b) $x = \frac{-3}{2}$, $x = -1$, $x = \frac{-1}{2}$, and $x = 3$
c) $x = 2, 3, 5, 6$ **d)** $x = 1 \pm 2\sqrt{2}$ and $x = 1$

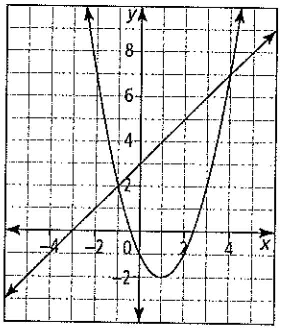
6. a) yes **b)** no **c)** yes **d)** no

7. a) not possible **b)** $k = 0$, $k > 4$
c) $k = 4$ **d)** $0 < k < 4$

8. Chloe. Mark's solution is incorrect. $0 = (x + 4)(x - 3)$; $x = -4$ or $x = 3$

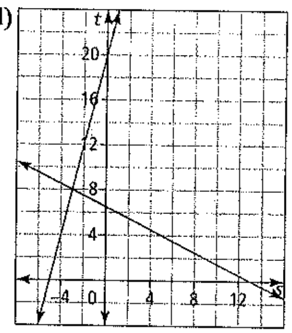
9. a) Rearrange the equation $|-x^2 + 2| - \frac{x}{2} = 0$ to $|-x^2 + 2| = \frac{x}{2}$. The graph $f(x) = \frac{x}{2}$ is the right side and $g(x) = |-x^2 + 2|$ is the left side. $f(x) = g(x)$ at the points of intersection. The intersection points are the solutions to the equation.
b) The solutions are 1.19 and 1.69.

c)



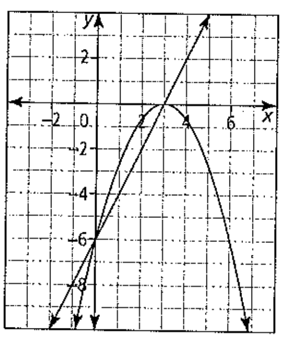
(–1, 2) and (4, 7)

d)



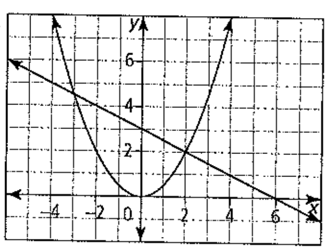
(–3, 8)

e)



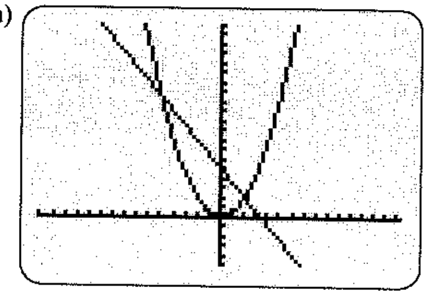
(3, 0) and (0, –6)

f)



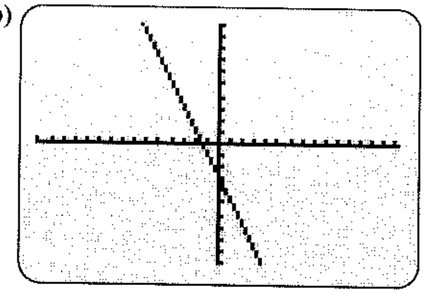
(2, 2) and $\left(-3, \frac{9}{2}\right)$

6. a)



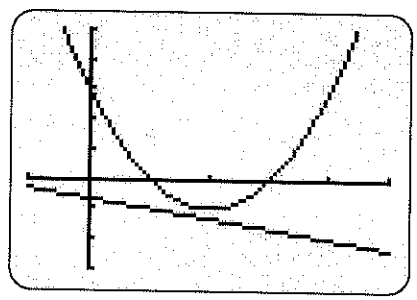
two solutions because there are two intersection points

b)



infinite number of solutions because the two graphs are the same

c)



no solutions, or zero solutions, because the two graphs do not intersect

8.1 Here

BLM 8–4 Section 8.1 Extra Practice

1. Point (1, –3):

$LS = x^2 - 4x - y$ $\quad$ $RS = 0$

$= (1)^2 - 4(1) - (-3)$

$= 0$

LS = RS

$LS = x - y - 4$ $\quad$ $RS = 0$

$= 1 - (-3) - 4$

$= 0$

LS = RS

Therefore, point (1, –3) is a solution.

Point (4, 0):

$LS = x^2 - 4x - y$ $\quad$ $RS = 0$

$= (4)^2 - 4(4) - (0)$

$= 0$

LS = RS

$LS = x - y - 4$ $\quad$ $RS = 0$

$= 4 - (0) - 4$

$= 0$

LS = RS

Therefore, point (4, 0) is a solution.

2. a) (–2, –4) and (0, 0);

$y = x^2 + 4x$

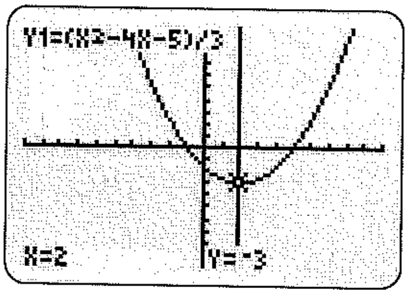
$y = -x^2$

b) (–1, 2) and (–4, 8);

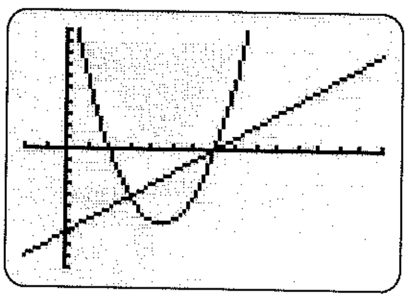
$y = 2x^2 + 8x + 8$

$y = -2x$

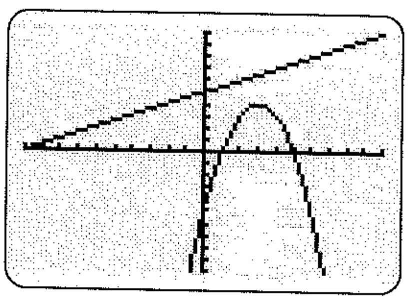
3. a) (2, –3)



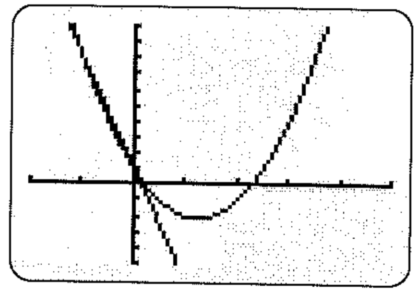
b) (3, –4) and (7, 0)



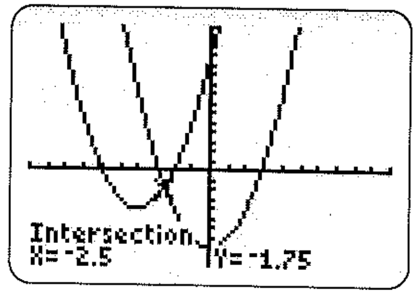
c) no solution



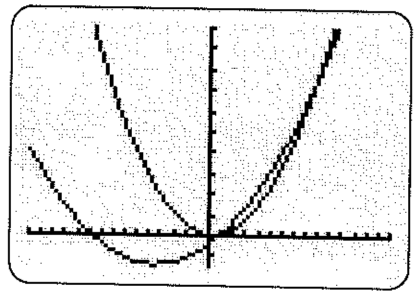
d) (–1, 8) and (0, 1)



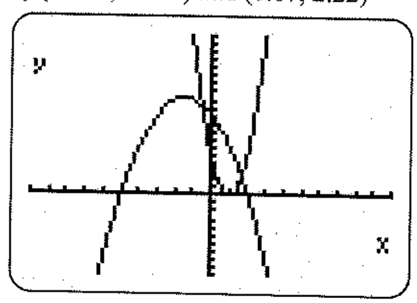
4. a) (–2.50, –1.75)



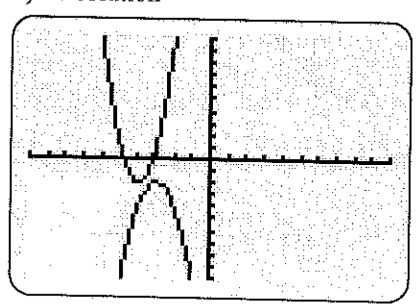
b) (1.00, 2.00) and (9.00, 154.00)



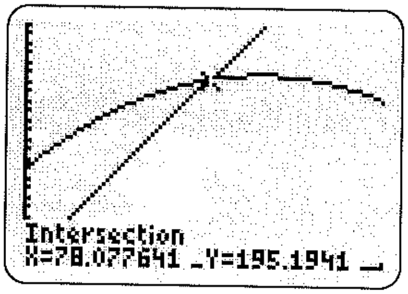
c) (–0.50, 11.25) and (1.67, 2.22)



d) no solution

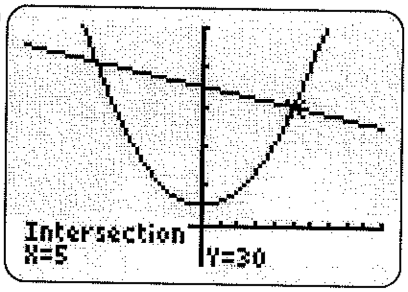


5. 78 items, or \$195



6. a) x = Max's age: $x + y = 35$
y = father's age: $x^2 + 5 = y$

b)



The two solutions to the system are (–6, 41) and (5, 30). (–6, 41) is not meaningful because Max cannot be –6 years old.

c) Max is 5 and his father is 30.

8.2 Here!

BLM 8–5 Section 8.2 Extra Practice

1. Point (–1, 11):

$LS = 2x + y$ $\quad$ $RS = 9$
$= 2(-1) + 11$
$= 9$
$LS = RS$

$LS = 2x^2 - 4x - y$ $\quad$ $RS = -5$
$= 2(-1)^2 - 4(-1) - 11$
$= -5$
$LS = RS$

Therefore, (–1, 11) is a solution.

Point (2, 5):

$LS = 2x + y$ $\quad$ $RS = 9$
$= 2(2) + 5$
$= 9$
$LS = RS$

$LS = 2x^2 - 4x - y$ $\quad$ $RS = -5$
$= 2(2)^2 - 4(2) - 5$
$= -5$
$LS = RS$

Therefore, (2, 5) is a solution.

2. Point (–1, –4):

$LS = y$ $\quad$ $RS = x^2 + 2x - 3$
$= -4$ $\quad$ $= (-1)^2 + 2(-1) - 3$
$= -4$
$LS = RS$

$LS = y$ $\quad$ $RS = -x^2 - 2x - 5$
$= -4$ $\quad$ $= -(-1)^2 - 2(-1) - 5$
$= -4$
$LS = RS$

Therefore, (–1, –4) is a solution.

3. a) (3, 7) and (4, 9)

Verify:

Point (3, 7)

$LS = y$ $\quad$ $RS = 2(3) + 1$
$= 7$ $\quad$ $= 7$
$LS = RS$

$LS = y$ $\quad$ $RS = (3)^2 - 5(3) + 13$
$= 7$ $\quad$ $= 7$
$LS = RS$

Therefore, (3, 7) is a solution.

Point (4, 9)

$LS = y$ $\quad$ $RS = 2(4) + 1$
$= 9$ $\quad$ $= 9$
$LS = RS$

$LS = y$ $\quad$ $RS = (4)^2 - 5(4) + 13$
$= 9$ $\quad$ $= 9$
$LS = RS$

Therefore, (4, 9) is a solution.

b) $\left(\frac{-3}{2}, \frac{17}{2}\right)$ and (2, –2)

Verify:

Point $\left(\frac{-3}{2}, \frac{17}{2}\right)$

$LS = (3)\left(\frac{-3}{2}\right) + \frac{17}{2} - 4$ $\quad$ $RS = 0$
$= \frac{-9}{2} + \frac{17}{2} - 4$
$= 0$
$LS = RS$

$LS = (2)\left(\frac{-3}{2}\right)^2 - (4)\left(\frac{-3}{2}\right) - \left(\frac{17}{2}\right) - 2$ $\quad$ $RS = 0$
$= \frac{18}{4} + \frac{24}{4} - \frac{34}{4} - \frac{8}{4}$
$= 0$
$LS = RS$

Therefore, $\left(\frac{-3}{2}, \frac{17}{2}\right)$ is a solution.

Point (2, –2):
LS = 3(2) + (–2) – 4 RS = 0
= 0
LS = RS
LS = $2(2)^2 - 4(2) - (-2) - 2$ RS = 0
= 0
LS = RS
Therefore, (2, –2) is a solution.

c) (–4, 10) and (2, 4)
Verify:
Point (–4, 10)
LS = y RS = $-(-4)^2 - 3(-4) + 14$
= 10 = 10
LS = RS
LS = y RS = $3(-4)^2 + 5(-4) - 18$
= 10 = 10
LS = RS
Therefore, (–4, 10) is a solution.
Point (2, 4)
LS = y RS = $-(2)^2 - 3(2) + 14$
= 4 = 4
LS = RS
LS = y RS = $3(2)^2 + 5(2) - 18$
= 4 = 4
LS = RS
Therefore, (2, 4) is a solution.

d) (5, 0) and (–2, 7)
Verify:
Point (5, 0)
LS = 4(5) + 0 + 5 RS = 5^2
= 25 = 25
LS = RS
LS = 5^2 RS = 5(5) + 2(0)
= 25 = 25
LS = RS
Therefore, (5, 0) is a solution.
Point (–2, 7)
LS = 4(–2) + 7 + 5 RS = $(-2)^2$
= 4 = 4
LS = RS
LS = $(-2)^2$ RS = 5(–2) + 2(7)
= 4 = 4
LS = RS
Therefore, (–2, 7) is a solution.

4. a) $\left(-1, \frac{10}{3}\right)$ and $\left(\frac{1}{3}, \frac{26}{9}\right)$ **b)** no solution
c) (0, 2) and (3, 1.5) **d)** $\left(\frac{-1}{4}, \frac{63}{16}\right)$ and (5, 0)

5. a) (3, 18)
b) (–1.62, –0.21) and (0.62, 0.54)

6. a) $k = 7$ **b)** (0, –7)

7. a) $k > -4$ **b)** $k = -4$ **c)** $k < -4$

8. a) $y = -1(x + 4)^2 + 4$ and $y = (x - 1)^2 - 9$
b) (–2, 0) and (–1, –5)

9. a) perimeter: $2(3x) + 2(x + 5) = y$;
area: $(3x)(x + 5) = 3y$
b) (5, 50) and (–2, –6)
c) The only possible solution is (5, 50). You cannot have a negative perimeter or area.
d) $x = 5$; perimeter = 50; area = 150 units^2

BLM 8–6 Chapter 8 Test

1. A **2.** B **3.** B **4.** D **5.** A **6.** {(–5, 8), (0, 3)}

7. Example: An object is released from a launcher on the ground, and a person standing on a platform throws a ball, trying to hit the object with the ball.

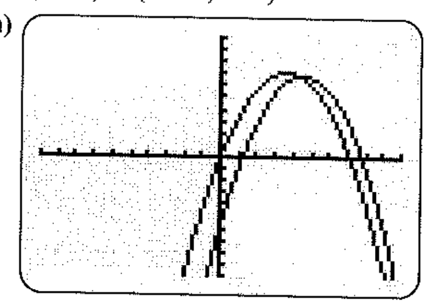
8. Example: $ay = a(x^2 + 6x - 5)$, $a \in$ R

9. a) LS = $2x^2 + x - 7$ RS = y
= $2(3)^2 + 3 - 7$ = 14
= 14
LS = RS
LS = $3x + y - 23$ RS = 0
= 3(3) + 14 – 23
= 0
LS = RS
b) (–5, 38)

10. $\left\{\left(-\frac{5}{2}, -2\right), \left(\frac{1}{2}, 1\right)\right\}$

11. a) $m = 5$, $k = 2$ **b)** $k = 8$, $m = 2$

12. a) two **b)** $k = 4$ or $k = 0$
c) (5.43, 1.08) or (–1.43, 1.08)

13. a)

{(4.3, 6.8), (21.7, –177.3)}
b) The coordinates represent where the two streams of water meet. However, only the (4.3, 6.8) solution makes sense because the distance cannot be negative in this context.

14. a) perimeter: $2y = 4x - 26$;
area: $3y - 9 = x^2 - 13x + 36$
b) $x = 7$ and $y = 1$, or $x = 12$ and $y = 11$
c) Substituting 7 results in a negative dimension, so x must be 12. The dimensions are 8 units and 3 units.
d) perimeter: 22 units; area: 24 square units