

IM2 Book 1 Selected Answers

IM2 Dream Team

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1. $x = -3$

2. $-$

3. (a) $x(x + 4)$
 (b) $3x(x - 5)$
 (c) $-x(2x + 7)$

4. (a) $x = 0, 4$
 (b) $x = 0, 5$
 (c) $x = 0, -\frac{7}{2}$

	$2 \leq x$	$-$	all values that are at least 2	$-$
5.	$-4 < x < 0$	$-$	$-$	$(-4, 0)$
	$x < 1$	$-$	all values that are less than 1	$(-\infty, 1)$

6. Answers may vary. Soln: $(0, 5)$. Non-soln: $(0, 0)$.

7. $4a^2, 2a^2$

8. (a) $-$
 (b) $24 \leq x$

9. $(x + 4)(x + 1)$. 4 and 1 add to 5 and multiply to 4.

10. $x^2 + (q + p)x + pq$. $\nabla = (q + p)$. $\Delta = pq$.

11. (a) $-$
 (b) $37 \leq 37$
 (c) $-$
 (d) $x \geq 18$

12. $x = 1, -4, \frac{3}{2}$

13. (a) Answers may vary.
 System soln: $(2, 4)$
 Soln to one eqn but not the other: $(0, 0)$
 Not a system soln: $(0, 0)$

- (b) –
 (c) One solution.

14. Answers may vary.

$$\begin{cases} y = x \\ y = x + 1 \end{cases}$$

15. Answers may vary.

$$\begin{cases} y = x \\ 2y = 2x \end{cases}$$

16. $(3x)^2$

17. $x > -5$

18. (a) $x \leq -10$

(b) $x \leq -10$

19. (a) $x = -4$

(b) $x = 3, 5$

(c) $x = -1, 7$

20. (a) $(\frac{1}{2}, \frac{1}{3})$

(b) $(1, -2)$

21. (a) –

(b) $y = x^2$

22. (a) $f(2) = 5$

$f(-4) = -1$

(b) $x = -1$

23. (a) $2x + y = 3$

(b) No solutions

	Words	Function Formula
24.		$f(x) = 2x$
		$f(x) = 5x - 1$
	divide the input by 2 and add 5	

25. (a) $f(-3) = 3$

$f(0) = 0$

$f(2) = 2$

(b) $x = \pm 4$

26. (a) $-$
 (b) 6
 (c) $x = \pm 10$

27. $(3x + 4)(x - 3)$

28. (a) $-7 \leq x$
 (b) $x < 4$

29. (a) 5
 (b) 12
 (c) $|x - y|$

30. No

31. $x \geq 0$

32. $|a - b| = |b - a|$

33. $(4x + 1)(x + 5)$

34. (a) 9 and 4
 (b) 9 and -4
 (c) x and 7
 (d) x and 0

35. (a) $-$
 (b) $|x| > 6$
 (c) $-$

	$-$	all values that are 2 units away from -5	$-$	$x = -3, -7$
36.	$ x = 5$	$-$	$-$	$x = -5, 5$
	$ x + 1 = 2$	all values that are 2 units away from -1	$-$	$x = -3, 1$

37. (a) All values that are 5 units away from 2 .
 (b) All values that are 10 units away from -4 .

38. $A = (2a + b)(a + 3b)$

39. (a) $(x - 2)(x - 6)$
 (b) $(3x - 2)(2x + 3)$
 (c) $2x(3x - 1)$

40. $BC = 8$, $AC = 15$, and $AB = 17$

41. (a) $x^2 - 16$
 (b) $x^2 - 49$

(c) $9x^2 - 4$

(d) $x^2 - a^2$

42. (a) $(x - 8)(x + 8)$

(b) $(x - c)(x + c)$

(c) $(2x - 5)(2x + 5)$

(d) $(ax - c)(ax + c)$

43.	–	all values that are at most 2 units away from -5	–	$-7 \leq x \leq -3$
	$ x \geq 6$	–	–	$x < -6$ or $x > 6$
	$ x - 1 \leq 4$	all values that are at most 4 units away from 1	–	–

44. (a) –

(b) $(0, 0)$

(c) $(-\infty, \infty)$

(d) $y = 0$

(e) $[0, \infty)$

45. $y = -x, y = x$

$$|x| = \begin{cases} -x & \text{if } x < 0 \\ x & \text{if } x \geq 0 \end{cases}$$

46. $x = 12$

47. (a) All values at most 2 units away from 7.

(b) $x > -2$ or $x < -8$

48. $(-2, 2)$

$(3, 7)$

49. (a) –

(b) $|x - 52| \leq 3$

50. $|x - y| = 12$. Infinite.

51. (a) $3x(x + 4)$

(b) $(x + 5)(x + 3)$

(c) $2(x + 1)(x - 3)$

(d) $9(x - 2)(x + 2)$

52. 120

53.

$$|x + 2| = \begin{cases} -x + 2 & \text{if } x < -2 \\ x + 2 & \text{if } x \geq -2 \end{cases}$$

54. (a) $x = -5, 5$
 (b) $\text{blob} = -5, 5$
55. Yes
56. $f(x) = |x|$
57. (a) 77 blocks
 (b) 19 blocks
 (c) –
 (d) $y = |x - 91|$
58. –
59. $|l - 12| \leq 0.01$
60. (a) $(-28, 12)$
 (b) $(-\infty, 0] \cup [8, \infty)$
61. (a) $a = -1, -6$
 (b) $x = \frac{-19}{2}, \frac{9}{2}$
62. $-1 \leq a \leq 6$
63. $|x| = 3$
 $x = -3$ or $x = 3$
64. No
65. (a) –
 (b) $y = |x - 34|$
 (c) $x = 18, 50$
66. $x = -4, 4$
67. (a) –
 (b) vertex: $(4, 0)$
 domain: $(-\infty, \infty)$
 range: $[0, \infty)$
 minimum value: $y = 0$
 (c) $x = 4$
68. $x = 6, 1$
- 69.

$$|x - 7| = \begin{cases} x - 7 & \text{if } x \geq 7 \\ -x + 7 & \text{if } x < 7 \end{cases}$$