IM2 Book 1 Selected Answers

IM2 Dream Team

September 16, 2025

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) $x = 0, -\frac{7}{2}$
5.

$2 \leq x$	–	all values that are at least 2	–
$-4 < x < 0$	–	–	$(-4, 0)$
$x < 1$	–	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

24.

Words	Function Formula
	$f(x) = 2x$
	$f(x) = 5x - 1$
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) –

36.

–	all values that are 2 units away from -5	–	$x = -3, -7$
$\|x\| = 5\|$	–	–	$x = -5, 5$
$\|x + 1\| = 2$	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) blob $= -5, 5$

55. Yes