Honors Algebra 2

Extra Practice Problems

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Contents

Chapter 1

Equations and Inequalities

Equations

Solve each equation. For decimal equations, round your answers to 2 decimal places.

1. $-7x + 5 = -10x + 11$
2. $\frac{2}{3}x - 10 = \frac{5}{8}$
3. $-0.2x - 3(x + 1.4) = -5.2x + 1$
4. $1.3 + 2.1(6.3x + 12) = -19.7$
5. $\frac{1}{4}x + \frac{3}{7} = -2\left(x + \frac{3}{8}\right)$
6. $\frac{1}{3}\left(\frac{2}{5}x - \frac{4}{7}\right) = 3x - 8$

Solve each for the variable indicated.

7. $F = ma$; for a
8. $PV = nRT$; for n
9. $m = \frac{y_2 - y_1}{x_2 - x_1}$; for y_2
10. $m = \frac{y_2 - y_1}{x_2 - x_1}$; for y_1
11. $v = v_0 + gt$; for t
12. $S = 180(n - 2)$; for n

Inequalities

Solve each inequality. Graph your answers on a number line.

1. $2(x + 2) \leq 4x - 2(x - 1)$
2. $-3.2x - 5(x - 1.5) > 7.7 + 1.8x$

1.1 Answer Key

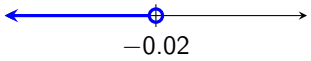
Equations

1. $x = 2$
2. $x = \frac{255}{16}$
3. $x = 2.6$
4. $x \approx -3.49$
5. $x = -\frac{11}{21}$
6. $x = \frac{820}{301}$
7. $a = \frac{F}{m}$
8. $n = \frac{PV}{RT}$
9. $y_2 = m(x_2 - x_1) + y_1$
10. $y_1 = y_2 - m(x_2 - x_1)$
11. $t = \frac{v - v_0}{g}$
12. $n = \frac{S}{180} + 2$

Inequalities

1. $\emptyset$

2. $x < -0.02$



Chapter 2

Compound Inequalities

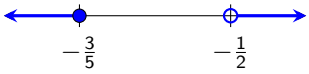
Solve each. Graph your answers on a number line.

1. $-3 < x - 8 \leq 12$
2. $7 \leq 2x - 5 < 18$
3. $x + 8 < 10$ or $5x - 9 \geq 26$
4. $x - 1.5 > 8$ or $-x + 2 > 9$
5. $4 \leq x + 7 < 9$
6. $-2 < 6x + 10 \leq 5$
7. $3x > 9$ or $-5x > 25$
8. $8x + 12 \leq 20$ or $x + 12 > 9$
9. $-8 \leq 3x + 7 < 40$
10. $-5x + 9 \geq 12$ or $2x + 6 > 5$
11. $3x - 1 < x + 5$ or $-x \geq 5 + 7x$

2.1 Answer Key

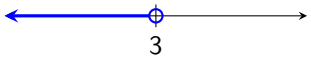
1. $5 < x \leq 20$
2. $6 \leq x < \frac{23}{2}$
3. $x < 2$ or $x \geq 7$
4. $x < -7$ or $x > \frac{19}{2}$
5. $-3 \leq x < 2$
6. $-2 < x \leq -\frac{5}{6}$
7. $x < -5$ or $x > 3$
8. $\mathbb{R}$
9. $-5 \leq x < 11$

10. $x \leq -\frac{3}{5}$ or $x > -\frac{1}{2}$



11.

12. $x < 3$



Chapter 3

Absolute Value Equations and Inequalities

3.1 Absolute Value Equations

Solve each of the following.

1. $|2x| = 10$
2. $|3x - 7| = 8$
3. $|5x + 1| = -4$
4. $|x + 7| = 9$
5. $|8x + 16| = -24$
6. $|-x - 4| = -3$
7. $\left|\frac{1}{2}x + 2\right| = x - 3$

3.2 Absolute Value Inequaltiies

Solve each. Graph your answers on a number line.

1. $|x - 9| < 10$
2. $|-x + 1| \geq 7$
3. $|x + 8| < -1$
4. $|6x - 18| < 42$
5. $|-2x + 1| \geq 9$
6. $|5x + 2| < 3x$
7. $|3x + 2| > 1$
8. $|2x - 1| \leq 7$
9. $|2x - 8| \leq 3x$
10. $3\left|\frac{1}{3}x + 9\right| > 27$
11. $|0.1x + 5.4| < 4.7$

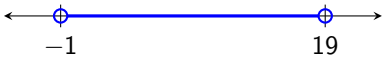
3.3 Answer Key

Absolute Value Equations

1. $x = \pm 5$
2. $x = -\frac{1}{3}$ or $x = 5$
3. $\emptyset$
4. $x = 2$ or $x = -16$
5. $\emptyset$
6. $\emptyset$
7. $x = 10$

Absolute Value Inequalities

1. $-1 < x < 19$



2. $x \leq -6$ or $x \geq 8$

3. $\emptyset$

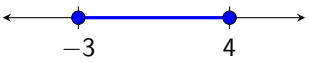
4. $-4 < x < 10$

5. $x \leq -4$ or $x \geq 5$

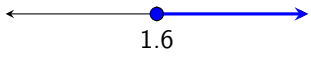
6. $\emptyset$

7. $x < -1$ or $x > \frac{1}{3}$

8. $-3 \leq x \leq 4$

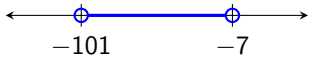


9. $x \geq 1.6$



10. $x < -54$ or $x > 0$

11. $-101 < x < -7$



Chapter 4

Factoring Techniques

Factor each completely.

1. $x^2 + 2x - 15$
2. $a^2 - 15a + 56$
3. $8x^2 + 10x + 3$
4. $w^2 + w - 12$
5. $5b^2 - 9b - 2$
6. $12x^2 + 40x - 7$
7. $4x^2 - 4x - 24$
8. $18t^2 - 9t - 5$
9. $6a^2 + 23a + 21$
10. $x^2 - 12x + 36$
11. $9x^2 - 1$
12. $4x^2 + 4x + 1$
13. $x^3 - x^2 - 2x$
14. $6x^2 - 32x + 10$
15. $2x^3 - 9x^2 - 51x - 40$
16. $2x^3 + 3x^2 - 3x - 2$
17. $4x^3 + 3x^2 - 42x + 40$
18. $6x^3 - 27x^2 - 168x$

4.1 Answer Key

1. $(x+5)(x-3)$
2. $(a-8)(a-7)$
3. $(4x+3)(2x+1)$
4. $(w+4)(w-3)$
5. $(b-2)(5b+1)$
6. $(2x+7)(6x-1)$
7. $4(x-3)(x+2)$
8. $(3t+1)(6t-5)$
9. $(3a+7)(2a+3)$
10. $(x-6)^2$
11. $(3x-1)(3x+1)$
12. $(2x+1)^2$
13. $x(x-2)(x+1)$
14. $2(3x-1)(x-5)$
15. $(2x+5)(x+1)(x-8)$
16. $(x+2)(2x+1)(x-1)$
17. $(x+4)(4x-5)(x-2)$
18. $3x(2x+7)(x-8)$

Chapter 5

The Quadratic Formula

Solve each. Exact answers only.

1. $x^2 - 6x = -2$
2. $4x^2 + 7x - 1 = 0$
3. $8x^2 + 4x = 3$
4. $5x^2 + 6x - 2 = 3x^2 + 10$
5. $7x^2 - 5 = 6x + 11$
6. $8x^2 + 2x + 1 = 7x^2 - 8x - 9$
7. $8x^2 - 2x - 7 = 3x + 1$
8. $x^4 + 7x^2 - 5 = x^4 + 3x$
9. $-8x^2 = 3x - 14$

5.1 Answer Key

1. $x = 3 \pm \sqrt{7}$
2. $x = \frac{-7 \pm \sqrt{65}}{8}$
3. $x = \frac{-1 \pm \sqrt{7}}{4}$
4. $x = \frac{-3 \pm \sqrt{33}}{2}$
5. $x = -\frac{8}{7}$, $x = 2$
6. $x = -5 \pm \sqrt{15}$
7. $x = \frac{5 \pm \sqrt{281}}{16}$
8. $x = \frac{3 \pm \sqrt{149}}{14}$
9. $x = \frac{-3 \pm \sqrt{457}}{16}$

Chapter 6

Complex Numbers

Simplify each.

1. $(4-7i)+(-2+6i)$
2. $(2-4i)-(2-3i)$
3. $6-(8+4i)$
4. $3(-2+7i)$
5. $(2+3i)(-2-5i)$
6. $(4+6i)(4-6i)$
7. $\frac{3+i}{2-i}$
8. $3(7-4i)+2i(1+6i)$
9. $(-2-6i)^2$
10. $\frac{2+3i}{4-5i}$
11. $(2+3i)(-5+i)$
12. $(-7-5i)^2$
13. $\frac{3+2i}{8+9i}$
14. $\frac{-1+5i}{-9-2i}$

Solve each. Exact answers only.

15. $3x^2-7x+6=0$
16. $5x^2-3x+2=0$
17. $3x^2+7x-4=5x^2+2x+5$

6.1 Answer Key

1. $2 - i$
2. $-i$
3. $-2 - 4i$
4. $-6 + 21i$
5. $11 - 16i$
6. 52
7. $1 + i$
8. $9 - 10i$
9. $-32 + 24i$
10. $-\frac{7}{41} + \frac{22}{41}i$
11. $-13 - 13i$
12. $24 + 70i$
13. $\frac{42}{145} - \frac{11}{145}i$
14. $\frac{-1}{85} - \frac{47}{85}i$
15. $x = \frac{7 \pm i\sqrt{23}}{6}$
16. $x = \frac{3 \pm i\sqrt{31}}{10}$
17. $x = \frac{5 \pm i\sqrt{47}}{4}$

Chapter 7

Graphs of Quadratic Expressions

Identify the vertex and axis of symmetry for each.

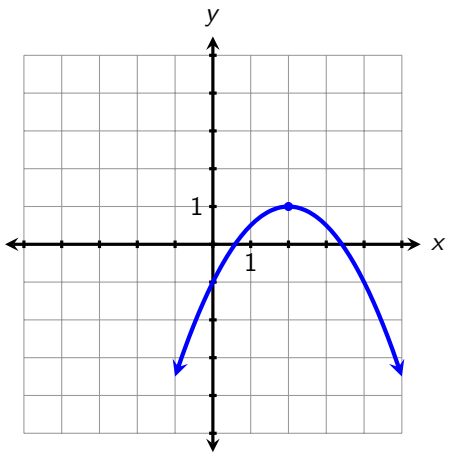
1. $y = 5x^2 - 15x + 7$
2. $y = x^2 + 8x - 1$
3. $y = \frac{1}{4}(x + 3)^2 + 1$

Write each of the following in general, $y = ax^2 + bx + c$, form.

4. $y = (x - 7)^2 + 4$
5. $y = -3(x + 2)^2 - 5$
6. $y = \frac{1}{4}(x - 7)^2 + 1$

Write each of the following in $y = a(x - h)^2 + k$ and $y = ax^2 + bx + c$ form.

7.



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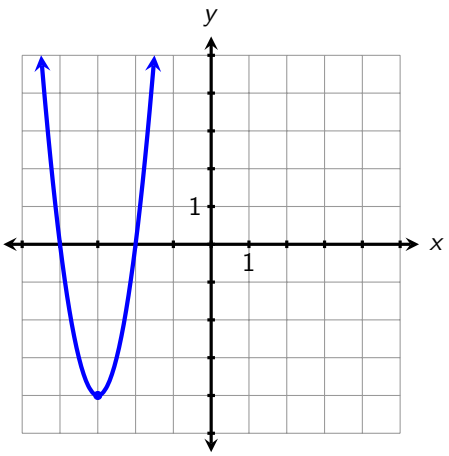


7.1 Answer Key

1. Vertex: $\left(\frac{3}{2}, -\frac{17}{4}\right)$; Axis of Symmetry: $x = \frac{3}{2}$
2. Vertex: $(-4, -17)$; Axis of Symmetry: $x = -4$
3. Vertex: $(-3, 1)$; Axis of Symmetry: $x = -3$
4. $y = x^2 - 14x + 53$
5. $y = -3x^2 - 12x - 17$
6. $y = \frac{1}{4}x^2 - \frac{7}{2}x + \frac{53}{4}$
7. $y = -\frac{1}{2}(x-2)^2 + 1 = -\frac{1}{2}x^2 + 2x - 1$
8. $y = 4(x+3)^2 - 4 = 4x^2 + 24x + 32$

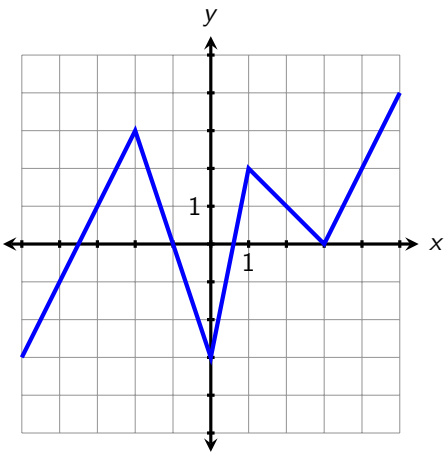
Chapter 8

Intro to Functions

Evaluate each of the following given $f(x) = \frac{x}{5} + 8$.

1. $f(9)$
2. $f(-1)$
3. $f(8)$

Given the graph of $f(x)$ below, find each of the following.



4. $f(-5)$
5. $f(-4)$
6. $f(-1)$
7. $f(-2)$
8. $f(3)$
9. $f(4)$
10. $f(2)$
11. $f(0)$

8.1 Answer Key

1. $\frac{49}{5}$
2. $\frac{39}{5}$
3. $\frac{48}{5}$
4. -3
5. -1
6. 0
7. 3
8. 0
9. 2
10. 1
11. -3

Chapter 9

Operations with Functions

Given $f(x) = x^2 + 2x - 3$ and $g(x) = 5x + 2$, simplify or evaluate each.

1. $(f + g)(x)$
2. $(f - g)(x)$
3. $(g - f)(x)$
4. $(fg)(x)$
5. $\left(\frac{f}{g}\right)(x)$
6. $\left(\frac{g}{f}\right)(x)$
7. $(g + f)(7)$
8. $(fg)(0)$

Given $f(x) = x^2 + 5$ and $g(x) = -3x - 2$, find or evaluate each.

9. $(f + g)(x)$
10. $(fg)(x)$
11. $(f - g)(4)$
12. $\left(\frac{f}{g}\right)(7)$

9.1 Answer Key

1. $x^2 + 7x - 1$
2. $x^2 - 3x - 5$
3. $-x^2 + 3x + 5$
4. $5x^3 + 12x^2 - 11x - 6$
5. $\frac{x^2+2x+3}{5x+2}$
6. $\frac{5x+2}{x^2+2x+3}$
7. 97
8. -6
9. $x^2 - 3x + 3$
10. $-3x^3 - 2x^2 - 15x - 10$
11. 35
12. $-\frac{54}{23}$

Chapter 10

Compositions of Functions

Given $f(x) = x^2 + 5$ and $g(x) = -3x - 2$, find or evaluate each.

1. $(f \circ g)(x)$
2. $(g \circ f)(x)$
3. $(f \circ f)(x)$
4. $g(g(x))$
5. $(f \circ g)(1)$
6. $(g \circ f)(-2)$
7. $(f \circ f)(0)$
8. $g(g(-8))$

Answer Key

1. $9x^2 + 12x + 9$
2. $-3x^2 - 17$
3. $x^4 + 10x^2 + 30$
4. $9x + 4$
5. 30
6. -29
7. 30
8. -68