Student Journal Answers

Chapter 1

Chapter 1 Maintaining Mathematical Proficiency

1. -4 **2.** -12
3. 7 **4.** -11
5. *Sample answer:* -2 and -4, -8 and 2
6. 60°F **7.** -26
8. 40 **9.** -7
10. 10
11. *Sample answer:* -5 and 4, 10 and -2
12. -9

1.1 Explorations

1. a. 110; 90; 92; 68; 360°

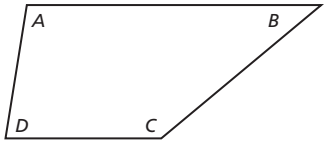
b. 65; 147; 58; 90; 360°

c. 91; 79; 75; 115; 360°

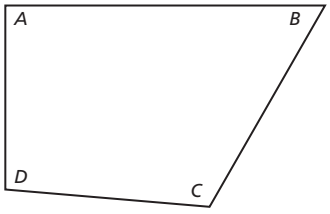
Answers will vary.

2. equals 360°

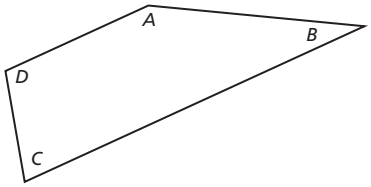
Sample answer:



$100 + 40 + 140 + 80 = 360$



$90 + 60 + 115 + 95 = 360$



$150 + 30 + 75 + 105 = 360$

Divide the quadrilateral into two triangles.

The sum of the angle measures of a triangle is 180°, so the sum of the angle measures of a quadrilateral is $2(180°) = 360°$.

3. a. $85 + 100 + x + 80 = 360$; $x = 95$

b. $x + 78 + 60 + 72 = 360$; $x = 150$

c. $90 + 30 + 90 + x = 360$; $x = 150$

4. Simple equations can relate parts of geometric shapes and can be used to find missing parts.

5. The corners can be arranged so the angles complete a full circle, which is 360°.

1.1 Extra Practice

1. $w = 12$; Subtract 4 from each side.
2. $x = -19$; Subtract 7 from each side.
3. $w = 21$; Add 15 to each side.
4. $z = 13$; Add 5 to each side.
5. $y = 7$; Add 9 to each side.
6. $q = 5$; Divide each side by 7.
7. $b = -13$; Divide each side by 4.
8. $q = 33$; Multiply each side by 11.
9. $n = 30$; Multiply each side by -2.
10. $p - 17.95 = 71.80$; \$89.75
11. 40

1.2 Explorations

1. a. $(30 + x) + 9x + 30 = 180$; Write the equation.
$10x + 60 = 180$; Combine like terms.
$10x = 120$; Subtract 60 from each side.
$x = 12$; Divide each side by 10.
42°, 108°, 30°

b. $(x + 10) + (x + 20) + 50 = 180$; Write the equation.
$2x + 80 = 180$; Combine like terms.
$2x = 100$; Subtract 80 from each side.
$x = 50$; Divide each side by 2.
60°, 70°, 50°

c. $50 + (2x + 30) + (2x + 20) + x = 360$; Write the equation.
$5x + 100 = 360$; Combine like terms.
$5x = 260$; Subtract 100 from each side.
$x = 52$; Divide each side by 5.
50°, 134°, 124°, 52°

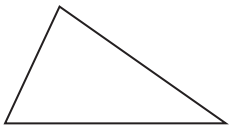
d. $(x - 17) + x + (x + 42) + (x + 35) = 360$; Write the equation.
$4x + 60 = 360$; Combine like terms.
$4x = 300$; Subtract 60 from each side.
$x = 75$; Divide each side by 4.
58°, 75°, 117°, 110°

e. $(5x + 2) + (3x + 5) + (8x + 8) + (4x + 15) + (5x + 10) = 540$; Write the equation.
$25x + 40 = 540$; Combine like terms.
$25x = 500$; Subtract 40 from each side.
$x = 20$; Divide each side by 25.
102°, 65°, 168°, 95°, 110°

f. $(3x + 16) + (3x + 16) + (2x + 8) + (4x - 18) + (2x + 25) + (3x - 7) = 720$; Write the equation.
$17x + 40 = 720$; Combine like terms.
$17x = 680$; Subtract 40 from each side.
$x = 40$; Divide each side by 17.
136°, 136°, 88°, 142°, 105°, 113°

Measure the angles with a protractor.

2. a. *Sample answer:*



b. *Sample answer:* 80°, 35°, 65°

c. *Sample answer:* $x = 10$; $8x$, $3x + 5$, $6x + 5$

d. Check students' work.

e. *Sample answer:* $(16x + 4) + (6x + 4) + (23x + 2) + (13x + 2) = 360$, $x = 6$; 100°, 40°, 140°, 80°; yes; The angles are close to those measured with a protractor.

3. Use multi-step equations to find the values of missing parts in an object with the shape of a geometric figure.

4. Connecting a vertex with each of the other vertices in a polygon creates $n - 2$ triangles, each of which has a total angle measure of 180°.

5. 8; Solve the equation $180(n - 2) = 1080$ for n.

1.2 Extra Practice

1. $x = 5$ **2.** $z = 2$

3. $z = 8$ **4.** $d = -9$

5. $f = -16$ **6.** $q = 29$

7. $x = 3.5$ **8.** $z = -1$

9. $x = 2.5$ **10.** $z = 0$

11. $z = 0$ **12.** $z = 1.5$

13. $r = 4$ **14.** $g = -3$

15. $(2n + 1) + (2n + 3) + (2n + 5) = 63$, $n = 9$; 19, 21, 23

16. 76°; 38° **17.** 19; 11

1.3 Explorations

1. $2x + 14 = 3x + 10$; $x = 4$; Add the side lengths of each figure to get the perimeters and set them equal to each other; $P = 22$

2. a. $x + 18 = 4x + \frac{3}{2}x$; $x = 4$; Add the side lengths to get the perimeter. Add the area of the triangle to the area of the rectangle to get the total area. Then set the perimeter equal to the area; $P = 22$ ft, $A = 22$ ft^2

b. $2x + 14 = 6x - 2$; $x = 4$; Add the side lengths to get the perimeter. Subtract the area of the small rectangle from the area of the large rectangle to get the total area. Then set the perimeter equal to the area; $P = 22$ ft, $A = 22$ ft^2

c. $2\pi + 2x + 4 = 2\pi + 4x$; $x = 2$; Add the circumference of the semicircle to the remaining 3 side lengths to find the perimeter. Add the area of the semicircle to the area of the rectangle to find the total area. Then set the perimeter equal to the area; $P = 2\pi + 8$ ft, $A = 2\pi + 8$ ft^2

3. Collect the variable terms on one side of the equation and the constant terms on the other side of the equation, then solve.

4. *Sample answer:* $5x - 7 = 2x + 5$, $x = 4$; $-x + 3 = 4x + 13$, $x = -2$; $7x = 6x + 4$, $x = 4$

1.3 Extra Practice

1. $x = -4$ **2.** $z = -1$

3. $k = 4$ **4.** $x = 1$

5. $q = -4$ **6.** $x = 2$

7. $a = 3$ **8.** $b = 4$

9. $r = 5$ **10.** $x = 6$

11. no solution **12.** infinitely many solutions

13. $n = 0$; one solution **14.** $j = 1$; one solution

15. $36x = 2(6x + 6x + 36)$, 6

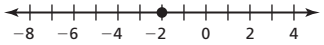
1.4 Explorations

1. a. The equation is true if the expression inside the absolute value symbol is 3 or -3; $x + 2 = 3$; $x + 2 = -3$

b. $x = 1$, $x = -5$

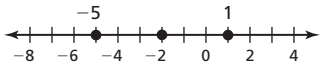
c. Set the expression inside the absolute value symbol equal to both the positive and negative of the constant value, then solve both equations.

2. a.



$x = -2$

b.



$x = 1$ and $x = -5$; They are the solutions of the equation.

c. Set the expression inside the absolute value symbol equal to 0 and solve. Plot the solution on a number line. Then plot the points that are the constant amount of units from that point. These last 2 points are the solutions to the original equation.

3. a. $x = 1$, $x = -5$

b. They are the same.

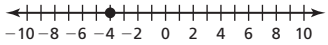
c. Have the spreadsheet calculate the value of the absolute value expression for many values of x, and find the ones that give the expected solution.

4. solving algebraic equations, graphically on a number line, or by trial and error with a spreadsheet

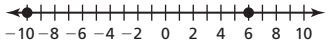
5. *Sample answer:* The algebraic method is favorable because it is the quickest method. The graphical method is also favorable because it helps to visualize absolute value. The numerical method is not favorable because setting up the spreadsheet is time consuming.

1.4 Extra Practice

1. $x = -4$



2. $y = 6$, $y = -10$



3. no solution

4. $d = -9$, $d = 9$

5. $x = -7$, $x = 2$

6. $x = -\frac{2}{3}$, $x = 1$ **7.** $p = -1$

8. $q = -5$, $q = -\frac{4}{3}$ **9.** $x = -\frac{1}{2}$

1.5 Explorations

1. a. $A = bh$

b. $30 = b \cdot 5$; Write the equation.

$6 = b$; Divide each side by 5.

c. $A = bh$; Write the formula.

$\frac{A}{h} = b$; Divide each side by h.

d. applied the same steps to solve; used variables instead of constants

2. a. $A = \frac{1}{2}h(b_1 + b_2)$; $h = \frac{2A}{b_1 + b_2}$; $h = 7$ cm

b. $C = 2\pi r$; $r = \frac{C}{2\pi}$; $r = 12$ ft

c. $V = Bh$; $h = \frac{V}{B}$; $h = 5$ yd

d. $V = \frac{1}{3}Bh$; $h = \frac{3V}{B}$; $h = 6$ m

3. Solve the formula for a different variable; *Sample answer:* (volume of a cylinder) $V = \pi r^2 h$; $h = \frac{V}{\pi r^2}$

1.5 Extra Practice

1. $y = 2x + 15$ **2.** $y = -4x + 2$

3. $y = x - 2$ **4.** $y = -x + 11$

5. $y = 3x + 4$ **6.** $y = -\frac{3}{4}x + \frac{3}{2}$

7. $x = \frac{1}{6}y$ **8.** $x = \frac{q}{3(1 + 3z)}$

9. $x = \frac{r - 4}{7 - s}$ **10.** $x = \frac{1}{6}y + 1$

11. $x = \frac{r - 4g}{2}$ **12.** $x = \frac{4z - 4}{3}$

13. $b = \frac{2A}{h}$ **14.** $h = \frac{3V}{\pi r^2}$

15. $R = \frac{V}{I}$ **16.** $R = \frac{PV}{nT}$

17. a. $r = \frac{A - P}{Pt}$

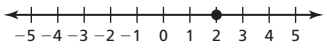
b. 0.04, or 4%

c. $P = \frac{A}{1 + rt}$

Chapter 2

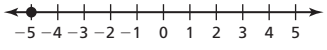
Maintaining Mathematical Proficiency

1.



2.

3.



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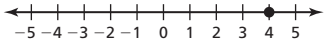


5. > **6.** <

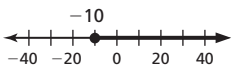
7. > **8.** <

9. = **10.** <

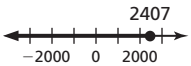
11. $-b$ **12.** $|-b|$

2.1 Explorations

1. a. $t \geq -10$°C



b. $e \leq 2407$ ft



2. a. $x \geq 1$; one and all numbers greater than one

b. $x > 1$; all numbers greater than one

c. $x \leq 1$; one and all numbers less than one

d. $x < 1$; all numbers less than one

3. An inequality can indicate the largest or smallest value for a quantity.

4. a. *Sample answer:* The judge's score is less than 3.5.

b. *Sample answer:* The time in the pool was at most 6 hours.

c. *Sample answer:* The temperature is greater than −2°C.

d. *Sample answer:* The profit was at least $10.

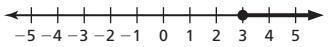
2.1 Extra Practice

1. $12 \geq 5n$ **2.** $\frac{1}{3}h < 15$

3. $7 \leq q - 6$ **4.** $u + 14 > 6$

5. no **6.** yes

7.



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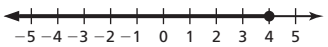

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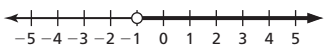

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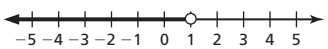


11. $x > 1$ **12.** $x < 0$

13. $x \geq -3$ **14.** $x \leq 3$

2.2 Explorations

1. a. no; It is also possible for the number of touchdowns to equal the number of completed passes.

b. yes; Completed and intercepted passes are both included in attempts.

c. no; It is also possible for the number of intercepted passes to equal the number of attempts.

d. yes; After subtracting completed passes from attempts, all remaining passes could be incomplete.

2. a. *Sample answer:* 25; 5; 100; 0; 10; negative numbers

b. *Sample answer:* 10; 9; 600; 4; 0; numbers greater than or equal to 150

c. *Sample answer:* 10; 7; 300; 2; 1; numbers greater than 170

3. Add or subtract the same number to or from each side of the inequality to create an equivalent inequality.

4. a. $x < 1$

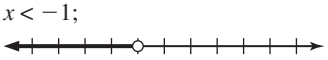
b. $x \geq 8$

c. $x < 6$

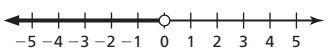
d. $x \geq -3$

2.2 Extra Practice

1. $x < -1$;



2. $h < 0$;



3. $s \geq 1$;