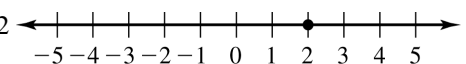
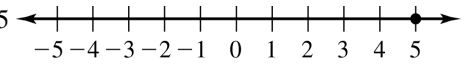
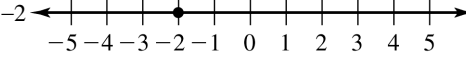
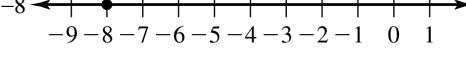
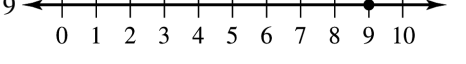


## Chapter 2 Integers

### Exercise Set 2.1

2. +215,000      4. -75,243      6. +35,000  
 8. -220      10. -78      12. +40  
 14. 46°F      16. -1°F
18. The average critical reading score of students whose parents have an associate degree is 19 points below the overall average critical reading score.
20. The average math score of students whose parents have an associate degree is 24 points below the overall average math score.
22. The average writing score of students whose parents have a graduate degree is 59 points above the overall average writing score.
24. The average math score of students whose parents have a graduate degree is 57 points above the overall average math score.
26. 2 
28. 5 
30. -2 
32. -8 
34. 9 
36.  $26 > -18$ : The number 26 is farther to the right on a number line so it is larger.
38.  $12 < 19$ : The number 19 is farther to the right on a number line so it is larger.
40.  $-12 > -19$ : The number -12 is farther to the right on a number line so it is larger.
42.  $-2 > -7$ : The number -2 is farther to the right on a number line so it is larger.
44.  $0 < 5$ : The number 5 is farther to the right on a number line so it is larger.

46.  $-14 < -11$ : The number -11 is farther to the right on a number line so it is larger.

48. 19      50. 9      52. 4      54. 16      56. 7  
 58. 242      60. 9      62. 12      64. 35      66. 200  
 68. 97

### Exercise Set 2.2

2.  $74 + 13 = 87$       4.  $-14 + (-16) = -30$   
 6.  $-31 + (-9) = -40$       8.  $4 + 15 + 41 = 19 + 41 = 60$   
 10.  $-60 + (-19) + (-32) = -79 + (-32) = -111$   
 12.  $17 + (-5) = 12$       14.  $-25 + 16 = -9$   
 16.  $-35 + 47 = 12$       18.  $16 + (-29) = -13$   
 20.  $75 + (-43) = 32$   
 22. Two credits, so we add and the result is a credit/positive; 51.  
 24. Two debts, so we add and the result is a debt/negative; -110.  
 26. A credit with a debt, so we subtract and since the credit of 68 is more than the debt, the result is a credit/positive; 53.  
 28. A debt with a credit, so we subtract and since the credit of 65 is more than the debt, the result is a credit/positive; 11.  
 30. A debt with a credit, so we subtract and since the debt of -45 is more than the credit, the result is a debt/negative; -24.  
 32. A credit with a debt, so we subtract and since the debt, -92 is more than the credit, the result is a debt/negative; -30.  
 34. Paying 64 on a 64 debt means the balance is 0.  
 36. The total credits are 80 and the total debts are 35. Since the credits outweigh the debts, we end up with a credit of 45.  
 38. The total credits are 25 and the total debts are 106. Since the debts outweigh the credits, we end up with a debt/negative of -81.  
 40. The total credits are 59 and the total debts are 59. Since the debts equal the credits, we end up with a 0 balance.

42. The total credits are 111 and the total debts are 112. Since the debts outweigh the credits, we end up with a debt/negative of -1.

44. -42: The additive inverse of 42 is -42.

46. 37: The additive inverse of -37 is 37.

48. We must find Charlene's new credit card balance. Write an addition statement adding all assets and debts.

$$\begin{aligned} & -1243 + (-58) + (-13) + (-15) + (-18) + 150 \\ &= (-1347) + 150 \\ &= -\$1197 \end{aligned}$$

Since the total debt of -1347 is a number with higher absolute value than the total assets 150, Charlene's balance is a debt/negative amount of -\$1197.

50. Net worth is the sum of all assets and debts. Write an addition statement adding all assets and debts.

$$\begin{aligned} & 214 + 1242 + 21,358 + (-15,988) + (-4857) + (-23,410) \\ &= 22,814 + (-44,255) \\ &= -\$21,441 \end{aligned}$$

Since the total debt -44,255 is a number with larger absolute value than the total assets 22,814, the Jones' net worth was a debt/negative amount of -\$21,441.

52. We must find Greg's new credit card balance. Write an addition statement adding all assets and debts.

$$\begin{aligned} & -1320 + 450 + 700 + (-19) + (-32) + (-27) \\ &= 1150 + (-1398) \\ &= -\$248 \end{aligned}$$

Since the total debt -1398 is a number with higher absolute value than the total assets 1150, Greg's balance is a debt/negative amount of -\$248.

54. We must first calculate the temperature inside the igloo. Since the winter temperature is  $-58^{\circ}\text{F}$  and a heater can raise the inside temperature by  $108^{\circ}\text{F}$ , we can add to get the expected temperature.

$$\text{Expected temperature: } -58 + 108 = 50^{\circ}\text{F}$$

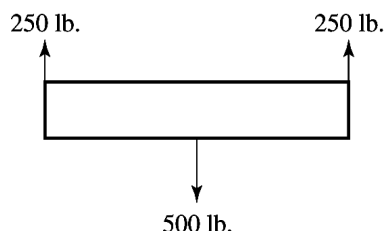
The temperature inside the igloo is  $50^{\circ}\text{F}$ .

56. We must find the depth of the mining team. Calculate the position of the mining team. Since the -147 ft. is the starting position and they are to dig down 28 ft., we can add to get the current elevation.

$$\text{Current elevation: } -147 + (-28) = -175 \text{ ft.}$$

The new position of the mining team is -175 ft.

58. Draw a diagram to get a sense of the direction of the forces. Since weight is a force due to gravity pulling downward on objects, the force has a negative value. The cables are pulling upward against gravity so they have positive values.



To find the resultant force, we compute the sum of the forces. Resultant force:  $-500 + 250 + 250 = -500 + 500 = 0 \text{ lb.}$

The resultant force is 0 lb. meaning that block is not moving.

60. a.

	No H. S. diploma	H. S. diploma	Associate degree
<b>Expression</b>	$515 + (-72)$	$515 + (-41)$	$515 + (-24)$
<b>Sum</b>	443	474	491
	Bachelor's degree	Graduate degree	
<b>Expression</b>	$515 + 20$	$515 + 57$	
<b>Sum</b>	535	572	

b. Students whose parents achieved higher levels of education tend to perform better on the SAT.

**Puzzle Problem:** 3:00 P.M. two days later

### Exercise Set 2.3

2.  $30 - 54 = 30 + (-54) = -24$       4.  $-21 - 6 = -21 + (-6) = -27$

6.  $0 - 16 = 0 + (-16)$   
 $= -16$
10.  $-20 - (-30) = -20 + 30$   
 $= 10$
12.  $-26 - (-14) = -26 + 14$   
 $= -12$
14.  $-13 - 28 = -13 + (-28)$   
 $= -41$
16.  $-19 - (-24) = -19 + 24$   
 $= 5$
18.  $9 - 15 = 9 + (-15)$   
 $= -6$
20.  $26 - (-6) = 26 + 6$   
 $= 32$
22.  $-15 - (-12) = -15 + 12$   
 $= -3$
24.  $0 - 6 = 0 + -6$   
 $= -6$
26.  $0 - (-8) = 0 + 8$   
 $= 8$
28.  $21 + c = 16$   
 $c = 16 - 21$   
 $c = -5$
30.  $a + (-14) = 15$   
 $a = 15 - (-14)$   
 $a = 15 + 14$   
 $a = 29$
32.  $-22 + p = -19$   
 $p = -19 + 22$   
 $p = 3$
34.  $16 + n = 0$   
 $n = 0 - 16$   
 $n = 0 + (-16)$   
 $n = -16$
36.  $r + (-29) = -38$   
 $r = -38 - (-29)$   
 $r = -38 + 29$   
 $r = -9$
8.  $33 - (-12) = 33 + 12$   
 $= 45$
38.  $-36 + x = -53$   
 $x = -53 - (-36)$   
 $x = -53 + 36$   
 $x = -17$
40. We must find Brian's audio-video store account balance. We must subtract the purchase amount from the original balance.  
 $86 - 585 = -\$499$   
Brian's account balance is  $-\$499$ .
42. We must find the net given the revenue and cost. The formula for net is  $N = R - C$ .  
 $N = R - C$   
 $N = 2,729,673,452 - 387,000,000$   
 $N = \$2,342,673,452$   
  
The net profit for *Avatar* as of 2010 was  $\$2,342,673,452$ .
44. We must find the net given the revenue and cost. The formula for net is  $N = R - C$ .  
 $N = R - C$   
 $N = 250 - 2,675$   
 $N = \$2,425$   
  
The net loss for the computer is  $\$2,425$ .
46. The year 2000 had the greatest net profit. The formula for net is  $N = \text{Income} - \text{Disbursements}$ .  
 $N = \text{Income} - \text{Disbursements}$   
 $N = 484,228,000,000 - 353,396,000,000$   
 $N = \$130,832,000,000$
48. Since we are asked to find the amount of increase, we must calculate a sum.  
  
temperature increase:  $-208 + x = -196$   
 $x = -196 - (-208)$   
 $x = -196 + 208$   
 $x = 12^\circ\text{C}$   
  
From  $-208^\circ\text{C}$  to  $-196^\circ\text{C}$  is a change of  $12^\circ\text{C}$ .
50. Since we are asked to find the rise in temperature, we must calculate a sum.  
  
temperature increase:  $-90 + x = 19$   
 $x = 19 - (-90)$   
 $x = 19 + 90$   
 $x = 109^\circ\text{C}$   
  
From  $-90^\circ\text{C}$  to  $19^\circ\text{C}$  is a change of  $109^\circ\text{C}$ .

52. Find the minimum profit to avoid further closing the business. Write a missing addend equation, then solve.

$$\begin{aligned}-5267 + x &= 2500 \\ x &= 2500 - (-5267) \\ x &= 2500 + 5267 \\ x &= \$7767\end{aligned}$$

Danielle must show a profit of \$7767 to remain in business.

54. Find the minimum profit to achieve the desired net worth. Write a missing addend equation, then solve.

$$\begin{aligned}-45,000 + x &= 15,800 \\ x &= 15,800 - (-45,000) \\ x &= 15,800 + 45,000 \\ x &= \$60,800\end{aligned}$$

The business must show a profit of \$60,800 to achieve the desired net profit.

56. a.

	Fairbanks, AK	St. Cloud, MN	Denver, CO
<b>Expression</b>	$-2 - (-19)$	$12 - (-4)$	$43 - 15$
<b>Difference</b>	17	16	28

- b. Denver, Colorado

### Exercise Set 2.4

2.  $-4 \cdot 11 = -44$       4.  $6 \cdot (-4) = -24$
6.  $(-4) \cdot (-17) = 68$       8.  $-9 \cdot (-18) = 162$
10.  $0 \cdot (-5) = 0$       12.  $-4 \cdot 0 = 0$
14.  $-12 \cdot (-2) = 24$       16.  $(-14)(-31) = 434$
18.  $(-1)(-3)(-6) = 18(-1)$   
 $= -18$
20.  $(-1)(-1)(-8)(-7) = 1(-8)(-7)$   
 $= (-8)(-7)$   
 $= 56$
22.  $(-1)(-1)(-1)(-1)(-94) = 1(-1)(-1)(-94)$   
 $= (-1)(-1)(-94)$   
 $= 1(-94)$   
 $= -94$
24.  $-(-19) = 19$
26.  $-(-(-44))) = -(44) = -44$
28.  $(-2)^2 = (-2)(-2)$   
 $= 4$
30.  $(-5)^3 = (-5)(-5)(-5)$   
 $= 25(-5)$   
 $= -125$
32.  $(-2)^4 = (-2)(-2)(-2)(-2)$   
 $= 4(-2)(-2)$   
 $= -8(-2)$   
 $= 16$
34.  $(-3)^5 = (-3)(-3)(-3)(-3)(-3)$   
 $= 9(-3)(-3)(-3)$   
 $= -27(-3)(-3)$   
 $= 81(-3)$   
 $= -243$
36.  $-11^2 = -(11 \cdot 11)$   
 $= -121$
38.  $-10^4 = -(10 \cdot 10 \cdot 10 \cdot 10)$   
 $= -(100 \cdot 10 \cdot 10)$   
 $= -(1000 \cdot 10)$   
 $= -10,000$
40.  $-1^3 = -(1 \cdot 1 \cdot 1)$   
 $= -(1)$   
 $= -1$
42.  $-2^2 = -(2 \cdot 2)$   
 $= -(4)$   
 $= -4$
44.  $40 \div (-10) = -4$
46.  $-48 \div 8 = -6$
48.  $-100 \div (-20) = 5$
50.  $0 \div (-12) = 0$
52.  $\frac{-96}{8} = -12$

54.  $\frac{-91}{-7} = 13$

56.  $-\frac{42}{7} = -6$

58.  $\frac{-27}{0}$  is undefined.

$$\begin{array}{ll} 60. & 7p = 28 \\ & p = 28 \div 7 \\ & p = 4 \end{array} \quad \begin{array}{l} \text{Check: } 7 \cdot 4 = 28 \\ 28 = 28 \end{array}$$

$$\begin{array}{ll} 62. & 5x = -125 \\ & x = -125 \div 5 \\ & x = -25 \end{array} \quad \begin{array}{l} \text{Check: } 5(-25) = -125 \\ -125 = -125 \end{array}$$

$$\begin{array}{ll} 64. & -14g = 42 \\ & g = 42 \div (-14) \\ & g = -3 \end{array} \quad \begin{array}{l} \text{Check: } -14(-3) = 42 \\ 42 = 42 \end{array}$$

$$\begin{array}{ll} 66. & -1c = 12 \\ & c = 12 \div (-1) \\ & c = -12 \end{array} \quad \begin{array}{l} \text{Check: } -1(-12) = 12 \\ 12 = 12 \end{array}$$

$$\begin{array}{ll} 68. & -8n = -32 \\ & n = -32 \div (-8) \\ & n = 4 \end{array} \quad \begin{array}{l} \text{Check: } -8 \cdot 4 = -32 \\ -32 = -32 \end{array}$$

$$\begin{array}{ll} 70. & -25b = 0 \\ & b = 0 \div (-25) \\ & b = 0 \end{array} \quad \begin{array}{l} \text{Check: } -25 \cdot 0 = 0 \\ 0 = 0 \end{array}$$

$$\begin{array}{l} 72. \quad 0b = 28 \\ \quad b = 28 \div 0 \\ \text{no solution} \end{array}$$

$$\begin{array}{ll} 74. & 3(-8)f = 72 \\ & -24f = 72 \\ & f = 72 \div (-24) \\ & f = -3 \end{array} \quad \begin{array}{l} \text{Check: } 3(-8)(-3) = 72 \\ -24(-3) = 72 \\ 72 = 72 \end{array}$$

$$\begin{array}{l} 76. \quad (-9)(-1)(2)w = -90 \\ \quad 9(2)w = -90 \\ \quad 18w = -90 \\ \quad w = -90 \div 18 \\ \quad w = -5 \end{array}$$

$$\begin{array}{l} \text{Check: } (-9)(-1)(2)(-5) = -90 \\ 9(2)(-5) = -90 \\ 18(-5) = -90 \\ -90 = -90 \end{array}$$

78.  $\pm\sqrt{49} = \pm 7$  because  $7^2 = 49$  and  $(-7)^2 = 49$ .

80.  $\pm\sqrt{25} = \pm 5$  because  $5^2 = 25$  and  $(-5)^2 = 25$ .

82. There is no real solution because there is no real number that can be squared to equal  $-121$ .

84.  $\sqrt{36} = 6$ , because  $6^2 = 36$ .

86.  $\sqrt{100} = 10$ , because  $10^2 = 100$ .

88.  $\sqrt{25} = 5$ , because  $5^2 = 25$ .

90. There is no real solution because there is no real number that can be squared to equal  $-144$ .

92.  $-\sqrt{256} = -16$ . We are being asked to find the additive inverse of the positive square root.

94.  $\sqrt{1} = 1$ , because  $1^2 = 1$ .

96. We must find Michael's total debt. He has three accounts with a  $-\$100$  balance. This is a total of  $3(-100) = -\$300$ .  
He has two accounts with a  $-\$258$  balance. This is a total of  $2(-258) = -\$516$ .  
Michael's total debt is  $-300 + (-516) = -\$816$ .

98. We must multiply the depth by the three times the company drilled.  $3(-450) = -1350$  ft. The oil company found oil at  $-1350$  ft.

100. Since he agreed to equal monthly payments, we must take the total and divide it by the number of months. Since 6 years equals 72 months, the total must be divided by 72.

$$25, \quad 200 \div 72 = \$350$$

Each payment should be  $\$350$ .

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### Exercise Set 2.5

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$$\begin{array}{l} 2. \quad -8 \div 2 + 4 = -4 + 4 \\ \quad \quad \quad = 0 \end{array}$$

$$\begin{array}{l} 4. \quad 15 - 5 \cdot 4 = 15 - 20 \\ \quad \quad \quad = 15 + (-20) \\ \quad \quad \quad = -5 \end{array}$$

6.  $2 + 16 \div 4 - 9 = 2 + 4 - 9$   
 $= 6 - 9$   
 $= -3$
8.  $-30 \div 2 \cdot (-3) + 21 = -15 \cdot (-3) + 21$   
 $= 45 + 21$   
 $= 66$
10.  $(-3)^2 - 8 = 9 - 8$   
 $= 1$
12.  $5 - (-5)^2 + 13 = 5 - 25 + 13$   
 $= 5 + (-25) + 13$   
 $= -20 + 13$   
 $= -7$
14.  $-14 - (-3)^2 \cdot 4 + 5 = -14 - 9 \cdot 4 + 5$   
 $= -14 - 36 + 5$   
 $= -14 + (-36) + 5$   
 $= -50 + 5$   
 $= -45$
16.  $-2 - (5 - 2^2) = -2 - (5 - 4)$   
 $= -2 - 1$   
 $= -2 + (-1)$   
 $= -3$
18.  $-2 - (5 - 2)^2 = -2 - (3)^2$   
 $= -2 - 9$   
 $= -2 + (-9)$   
 $= -11$
20.  $\sqrt{16 + 9} = \sqrt{25} = 5$
22.  $\sqrt{16} + \sqrt{9} = 4 + 3 = 7$
24.  $-2^4 = -(2 \cdot 2 \cdot 2 \cdot 2) = -16$
26.  $(-2)^5 = (-2)(-2)(-2)(-2)(-2) = -32$
28.  $-(-2)^3 = -[(-2)(-2)(-2)]$   
 $= -(-8)$   
 $= 8$
30.  $[-(-2)]^3 = [2]^3$   
 $= 8$
32.  $4^3 - 3(-2) = 64 - 3(-2)$   
 $= 64 + 6$   
 $= 70$
34.  $2 - (-5)(-4)^2 = 2 - (-5)(16)$   
 $= 2 - (-80)$   
 $= 2 + 80$   
 $= 82$
36.  $|21 \div (-3) + 12| = |-7 + 12|$   
 $= |5|$   
 $= 5$
38.  $-|-16 - (-3)(-7)| = -|-16 - 21|$   
 $= -|-37|$   
 $= -37$
40.  $-4|3^2 + (-5)(6)| = -4|9 + (-5)(6)|$   
 $= -4|9 + (-30)|$   
 $= -4|-21|$   
 $= -4 \cdot 21$   
 $= -84$
42.  $5[4 + 3(-2 + 1)] - (-4)^2$   
 $= 5[4 + 3(-1)] - (-4)^2$   
 $= 5[4 - 3] - (-4)^2$   
 $= 5[1] - (-4)^2$   
 $= 5 - 16$   
 $= 5 + (-16)$   
 $= -11$
44.  $25 - 6^2 + (-52) \div \sqrt{169} = 25 - 36 + (-52) \div 13$   
 $= 25 + (-36) + (-4)$   
 $= -11 + (-4)$   
 $= -15$
46.  $-5\sqrt{36} + 40 \div (-5) \cdot 2 - 14$   
 $= -5 \cdot 6 + 40 \div (-5) \cdot 2 - 14$   
 $= -30 + (-8) \cdot 2 - 14$   
 $= -30 + (-16) - 14$   
 $= -46 + (-14)$   
 $= -60$
48.  $(-2)^3 + 3\sqrt{25} - 18 \div 3 = -8 + 3 \cdot 5 - 18 \div 3$   
 $= -8 + 15 - 6$   
 $= 7 - 6$   
 $= 1$

$$\begin{aligned}
 50. \quad & -28 \div 4 + |-3(-2)(-5)| - 2^5 \\
 & = -28 \div 4 + |6(-5)| - 2^5 \\
 & = -28 \div 4 + |-30| - 2^5 \\
 & = -28 \div 4 + 30 - 2^5 \\
 & = -28 \div 4 + 30 - 32 \\
 & = -7 + 30 - 32 \\
 & = 23 + (-32) \\
 & = -9
 \end{aligned}$$

$$\begin{aligned}
 52. \quad & 39 \div 3 + (24 - 30) - 5^2 + [-21 - (-13)] \\
 & = 39 \div 3 + (-6) - 5^2 + [-21 + 13] \\
 & = 39 \div 3 + (-6) - 5^2 + [-8] \\
 & = 39 \div 3 + (-6) - 25 + [-8] \\
 & = 13 + (-6) - 25 + [-8] \\
 & = 7 + (-25) + [-8] \\
 & = -18 + [-8] \\
 & = -26
 \end{aligned}$$

$$\begin{aligned}
 54. \quad & (5 - 7)^2 \div (-2) - (-3) \div 3 \\
 & = (-2)^2 \div (-2) - (-3) \div 3 \\
 & = 4 \div (-2) - (-3) \div 3 \\
 & = -2 - (-1) \\
 & = -2 + 1 \\
 & = -1
 \end{aligned}$$

$$\begin{aligned}
 56. \quad & -3\sqrt{49} + |16 \div (-8)| - (28 - 40) \div (-3) \\
 & = -3\sqrt{49} + |-2| - (-12) \div (-3) \\
 & = -3 \cdot 7 + 2 - (-12) \div (-3) \\
 & = -21 + 2 - 4 \\
 & = -19 + (-4) \\
 & = -23
 \end{aligned}$$

$$\begin{aligned}
 58. \quad & \{12[-2 - (-5)] - 40\} \div [\sqrt{25 - 9}] \\
 & = \{12[-2 + 5] - 40\} \div (\sqrt{16}) \\
 & = \{12 \cdot 3 - 40\} \div (4) \\
 & = \{36 - 40\} \div (4) \\
 & = \{-4\} \div (4) \\
 & = -1
 \end{aligned}$$

$$\begin{aligned}
 60. \quad & [19(-2) - (-18)] \div \{15 - 5[2 - (-1)]\} \\
 & = [-38 + 18] \div \{15 - 5[2 + 1]\} \\
 & = -20 \div \{15 - 5 \cdot 3\} \\
 & = -20 \div \{15 - 15\} \\
 & = -20 \div 0 \\
 & \text{undefined}
 \end{aligned}$$

$$\begin{aligned}
 62. \quad & 4\sqrt{16 \cdot 9} - \{(-4)^3 + 2[18 \div (-2) + (4 - (-2))]\} \\
 & = 4\sqrt{144} - \{(-4)^3 + 2[18 \div (-2) + (4 + 2)]\} \\
 & = 4\sqrt{144} - \{(-4)^3 + 2[18 \div (-2) + 6]\} \\
 & = 4\sqrt{144} - \{(-4)^3 + 2[-9 + 6]\} \\
 & = 4\sqrt{144} - \{(-4)^3 + 2(-3)\} \\
 & = 4 \cdot 12 - \{-64 + 2(-3)\} \\
 & = 48 - \{-64 + (-6)\} \\
 & = 48 - (-70) \\
 & = 48 + 70 \\
 & = 118
 \end{aligned}$$

$$\begin{aligned}
 64. \quad & -3\{14 - 2|20 - 7(4)|\} + [(3)(-9) - (-21)]^2 \\
 & = -3\{14 - 2|20 - 28|\} + [-27 + 21]^2 \\
 & = -3\{14 - 2|-8|\} + [-6]^2 \\
 & = -3\{14 - 2 \cdot 8\} + [-6]^2 \\
 & = -3\{14 - 16\} + [-6]^2 \\
 & = -3(-2) + [-6]^2 \\
 & = -3(-2) + 36 \\
 & = 6 + 36 \\
 & = 42
 \end{aligned}$$

$$\begin{aligned}
 66. \quad & 5^3 - [19 + 4\sqrt{16 - 25}] + |41 - 50|^2 \\
 & = 5^3 - [19 + 4\sqrt{-9}] + |-9|^2
 \end{aligned}$$

Because  $\sqrt{-9}$  has no real solution, this problem cannot be simplified further.

$$\begin{aligned}
 68. \quad & \frac{34 - 5(2)}{7 + (9 - 4)} = \frac{34 - 10}{7 + 5} \\
 & = \frac{24}{12} \\
 & = 2
 \end{aligned}$$

$$\begin{aligned}
 70. \quad & \frac{20 + 12(-3)}{3^2 - 1} = \frac{20 + 12(-3)}{9 - 1} \\
 & = \frac{20 + (-36)}{9 - 1} \\
 & = \frac{-16}{8} \\
 & = -2
 \end{aligned}$$

$$\begin{aligned}
 72. \quad \frac{2^4 + 3(7+19)}{8^2 - (2 \cdot 8 + 1)} &= \frac{2^4 + 3 \cdot 26}{8^2 - (16 + 1)} \\
 &= \frac{2^4 + 3 \cdot 26}{8^2 - 17} \\
 &= \frac{16 + 3 \cdot 26}{64 - 17} \\
 &= \frac{16 + 78}{64 - 17} \\
 &= \frac{94}{47} \\
 &= 2
 \end{aligned}$$

$$\begin{aligned}
 74. \quad \frac{(-2)^3 + 5(7-15)}{4 \cdot 11 - 2(5-9)^2} &= \frac{(-2)^3 + 5(-8)}{4 \cdot 11 - 2(-4)^2} \\
 &= \frac{-8 + 5(-8)}{4 \cdot 11 - 2 \cdot 16} \\
 &= \frac{-8 + (-40)}{44 - 32} \\
 &= \frac{-48}{12} \\
 &= -4
 \end{aligned}$$

76.  $-(-3)^2$  means to find the additive inverse of the square of  $-3$ , which is  $-(-3)(-3) = -9$ .  $[(-3)]^2$  means to square the additive inverse of  $3$ , which is  $[(-3)]^2 = (-3)(-3) = 9$ .

78. It involves a division by 0.

80. Mistake: Multiplication was performed before the division.

$$\begin{aligned}
 \text{Correct: } 24 \div 2 \cdot 3 + 5 &= 12 \cdot 3 + 5 \\
 &= 36 + 5 \\
 &= 41
 \end{aligned}$$

82. Mistake:  $(-2)^5 = -32$  not  $32$ .

$$\begin{aligned}
 \text{Correct: } 19 - (-2)^5 &= 19 - (-32) \\
 &= 19 + 32 \\
 &= 51
 \end{aligned}$$

84. Mistake: When 0 is divided by a number other than 0, the quotient is 0, not undefined.

$$\begin{aligned}
 \text{Correct: } \frac{3^2 - (25 - 4^2)}{2(-7)} &= \frac{3^2 - (25 - 16)}{2(-7)} \\
 &= \frac{3^2 - 9}{2(-7)} \\
 &= \frac{9 - 9}{2(-7)} \\
 &= \frac{0}{-14} \\
 &= 0
 \end{aligned}$$

86. Mistake:  $16(-2) = -32$  not  $32$ .

$$\begin{aligned}
 \text{Correct: } -2[16(3-5) + 7] &= -2[16(-2) + 7] \\
 &= -2[-32 + 7] \\
 &= -2[-25] \\
 &= 50
 \end{aligned}$$

88. mean :  $-4^\circ\text{F}$ ; median:  $-1$ ; no mode

## Exercise Set 2.6

2. **Understand:** We must calculate a net amount. To calculate the net we need total revenue and total cost. The formula for net is  $N = R - C$ . Mario's total revenue is the amount that he sold the furniture for, which was given to be \$8600. His total cost is the sum of all the money he spent for the furniture.

**Plan:** Calculate total cost, then subtract the cost from the total revenue to get the net.

**Execute:** total cost = cost for four pieces of furniture + cost for three pieces of furniture

$$\text{cost} = 4(1200) + 3(1500)$$

$$\text{cost} = 4800 + 4500$$

$$\text{cost} = \$9300$$

Now replace  $R$  with 8600 and  $C$  with 9300 in

$N = R - C$  to get the net.

$$N = R - C$$

$$N = 8600 - 9300$$

$$N = -\$700$$

**Answer:** Mario's net is  $-\$700$ , which is a loss of \$700.



**Check:** Reverse the process. The net added to cost should produce the revenue.

$$\begin{aligned}-700 + 9300 &= 8600 \\ 8600 &= 8600\end{aligned}$$

Subtracting the costs for the three pieces of furniture from the total cost should produce the cost for four pieces of furniture.

$$\begin{aligned}9300 - 3(1500) &= 4(1200) \\ 9300 - 4500 &= 4800 \\ 4800 &= 4800\end{aligned}$$

4. **Understand:** We must calculate a net amount. To calculate the net we need total revenue and total cost. The formula for net is  $N = R - C$ . Malvin's total revenue is the amount that he is offered for the car, which is \$20,000. His total cost is the sum of all the money he spent on the car.

**Plan:** Calculate total cost, then subtract the cost from the total revenue to get the net.

**Execute:** cost = amount down + total of all payments + restoration Costs + maintenance costs

$$\begin{aligned}\text{cost} &= 800 + 24(18) + 2500 + 3000 \\ \text{cost} &= 800 + 432 + 2500 + 3000 \\ \text{cost} &= 6732\end{aligned}$$

Now replace  $R$  with 34,000 and  $C$  with 6732 in

$N = R - C$  to get the net.

$$\begin{aligned}N &= R - C \\ N &= 34,000 - 6732 \\ N &= \$27,268\end{aligned}$$

**Answer:** Malvin's net would be \$27,268, which is a profit of \$27,268.

**Check:** Reverse the process. The net added to cost should produce the revenue.

$$\begin{aligned}27,268 + 6732 &= 34,000 \\ 34,000 &= 34,000\end{aligned}$$

Subtracting the maintenance costs and total of all payments from the total cost should produce the down payment.

$$\begin{aligned}6732 - 432 - 2500 - 3000 &= 800 \\ 800 &= 800\end{aligned}$$

Dividing the total of all the payments by 24 should produce the amount of each payment.

$$\begin{aligned}432 \div 24 &= 18 \\ 18 &= 18\end{aligned}$$

6. **Understand:** We must calculate a net amount. To calculate the net we need total revenue and total cost. The formula for net is  $N = R - C$ . Scott's total revenue is the amount that he sold the house for, which is \$194,000. His total cost is the sum of all the money he spent on the house.

**Plan:** Calculate total cost, then subtract the cost from the total revenue to get the net.

**Execute:** cost = loan payoff + repairs + closing costs

$$\begin{aligned}\text{cost} &= 162,324 + 15,475 + 3750 \\ \text{cost} &= 181,549\end{aligned}$$

Now replace  $R$  with 94,200 and  $C$  with 89,473 in  $N = R - C$  to get the net.

$$\begin{aligned}N &= R - C \\ N &= 194,000 - 181,549 \\ N &= \$12,451\end{aligned}$$

**Answer:** Scott's net is \$12,451, which is a profit.

**Check:** Reverse the process. The net added to cost should produce the revenue.

$$\begin{aligned}12,451 + 181,549 &= 194,000 \\ 194,000 &= 194,000\end{aligned}$$

8. **Understand:** We must calculate a net amount. To calculate the net we need total revenue and total cost. The formula for net is  $N = R - C$ . Maria's total revenue is the amount that she sold the stock for. Her total cost is the sum of the amounts for the share purchases.

**Plan:** Calculate total cost and revenue, then subtract the cost from the total revenue to get the net.

**Execute:** cost = (number of shares purchased)(amount per share)

$$\begin{aligned}\text{cost} &= (50)(36) \\ \text{cost} &= \$1800\end{aligned}$$

revenue = (number of shares sold)(amount per share)

$$\text{revenue} = (30)(42) + (50 - 30)(30)$$

$$\text{revenue} = 1260 + (20)(30)$$

$$\text{revenue} = 1260 + 600$$

$$\text{revenue} = \$1860$$

Now replace  $R$  with 1860 and  $C$  with 1800 in

$N = R - C$  to get the net.

$$N = R - C$$

$$N = 1860 - 1800$$

$$N = \$60$$

**Answer:** Maria's net is \$60, which is a profit of \$60.

**Check:** Reverse the process. The net added to cost should produce the revenue.

$$60 + 1800 = 1860$$

$$1860 = 1860$$

Subtracting the cost of one stock trade from the revenue produce the cost of the second stock trade.

$$1860 - 1260 = 600$$

$$600 = 600$$

Dividing the cost by the number of shares purchased should produce the amount paid per share.

$$1800 \div 50 = 36$$

$$36 = 36$$

10. **Understand:** We must calculate voltage given resistance and current. The formula that relates voltage, current, and resistance is  $V = ir$ .

**Plan:** Replace  $i$  with  $-12$  and  $r$  with 100 in  $V = ir$ .

**Execute:**  $V = ir$

$$V = (-12)(100)$$

$$V = -1200 \text{ volts}$$

**Answer:** The voltage is  $-1200$  volts.

**Check:** Reverse the process. Voltage divided by current should produce the resistance.

$$-1200 \div -12 = 100$$

$$100 = 100$$

12. **Understand:** We must calculate current given voltage and resistance. We use the formula  $V = ir$ .

**Plan:** Substitute  $-240$  for  $V$  and  $30$  for  $r$ , then solve.

**Execute:**  $V = ir$

$$-240 = i \cdot 30$$

$$-240 \div 30 = i$$

$$-8 = i$$

**Answer:** The current is  $-8$  A.

**Check:** Reverse the process.  $-8 \cdot 30 = -240$

$$-240 = -240$$

14. **Understand:** We must calculate resistance given voltage and current. The formula that relates voltage, current, and resistance is  $V = ir$ .

**Plan:** Replace  $V$  with  $-60$  and  $i$  with  $-10$  in  $V = ir$ , then solve.

**Execute:**  $V = ir$

$$-60 = -10 \cdot r$$

$$(-60) \div (-10) = r$$

$$6 = r$$

**Answer:** The resistor is incorrect. It is  $6\Omega$  not  $12\Omega$ .

16. **Understand:** To find average rate we must consider the total distance of the trip and the total time. The formula that relates distance, rate, and time is  $d = rt$ .

**Plan:** Replace  $r$  with  $-7$  and  $t$  with 29 in  $d = rt$ , then solve for  $r$ .

**Execute:**  $d = rt$

$$d = -7 \cdot 29$$

$$d = -203 \text{ ft.}$$

**Answer:** The submarine will be at a depth of  $-203$  feet after 29 sec.

**Check:** Reverse the process. Multiplying the average rate by the time should produce the distance.  $-7 \cdot 29 = -203$

$$-203 = -203$$

18. **Understand:** We must find the distance, given the average rate and time. The formula that relates distance, rate and time is  $d = rt$ .

**Plan:** Replace  $r$  with 20 and  $t$  with 4, then solve for  $d$ .

**Execute:**  $d = rt$

$$d = (20)(4)$$

$$d = 80 \text{ mi.}$$

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**Answer:** The ship travels 80 mi.

**Check:** Reverse the process. Verify that the ship traveling at 20 mph for 4 hr. will cover 80 mi.

$$(20)(4) = 80$$

$$80 = 80$$

20. **Understand:** To find average speed we must consider the total distance of the trip and the total time. The trip was broken into three parts. We were given the distances for all three parts. We were also given a departure time and arrival time, but there were 2 stops we must take into account for a total of 1 hour. The formula that relates distance, rate, and time is  $d = rt$ .

**Plan:** Find the total distance of the trip and total time of the trip, then use the formula  $d = rt$  to solve for  $r$ .

**Execute:** total distance:  $152 + 145 + 135 = 432$  mi.

Total time: from 7 A.M. to 2 P.M. is 7 hours.  
However, Corrine stopped for a total of 1 hour.  
So the actual travel time was 6 hours.

Because we now have the total distance of 432 mi. and total time of 6 hr., we can use  $d = rt$ .

$$d = rt$$

$$432 = r \cdot 6$$

$$432 \div 6 = r$$

$$72 = r$$

**Answer:** Her average speed was 72 mph.

**Check:** Reverse the process. Verify that traveling at 72 mph for 6 hr. Corinne would cover 432 mi.  $(72)(6) = 432$

$$432 = 432$$

**Puzzle Problem:** 1 step, the boat rises with the tide