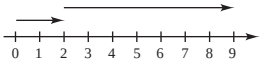
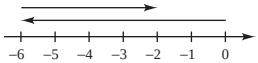
Section 1.2 Operations with Integers

1. $2 + 7 = 9$



3. $-6 + 4 = -2$



5. $-1 + 0 = -1$

7. $14 + (-14) = 0$

9. $(-14) + 13 = -1$

11. $-23 + 4 = -19$

13. $-18 + (-12) = -30$

15. $-32 + 16 = -16$

17. $5 + |-3| = 5 + 3 = 8$

19. $-|-12| + |-16| = -12 + 16 = 4$

21. $-10 + 6 + 34 = 30$

23. $-82 + (-36) + 82 = -36$

25. $32 + (-32) + (-16) = -16$

27. $1200 + 1300 + (-275) = 2225$

29. $1875 + (-3143) + 5826 = 4558$

31. $|-890| + (-|-82|) + 90 = 890 - 82 + 90 = 898$

33. $12 - 9 = 3$

35. $-4 - (-4) = -4 + 4 = 0$

37. $55 - 20 = 35$

39. $43 - 35 = 10$

41. $-71 - 32 = -103$

43. $-10 - (-4) = -10 + 4 = -6$

45. $-210 - 400 = -610$

47. $-942 - (-942) = 0$

49. $|15| - |-7| = 15 - 7 = 8$

51. $23 - |15| = 23 - 15 = 8$

53. $-32 - (-18) = -32 + 18 = -14$

55. $250 + (-300) = -50$

57. $380 - (-120) = 380 + 120 = 500$

59. $-5 - 10 = -15$

Thus, -15 must be added to 10 to obtain -5.

61. $3 \cdot 2 = 2 + 2 + 2 = 6$

63. $5 \times (-3) = (-3) + (-3) + (-3) + (-3) + (-3)$
$= -15$

65. $7 \times 3 = 21$

67. $4(-8) = -32$

69. $(-6)(-12) = 72$

71. $(310)(-3) = -930$

73. $(5)(-3)(-6) = 90$

75. $(-2)(-3)(-5) = -30$

77. $|3(-5)(6)| = |-90| = 90$

79. $|(-3)4| = |-12| = 12$

81.
$$\begin{array}{r} 26 \\ \times\ 13 \\ \hline 78 \\ 260 \\ \hline 338 \end{array}$$

83.
$$\begin{array}{r} 63 \\ \times\ 75 \\ \hline 315 \\ 4410 \\ \hline 4725 \end{array}$$

Thus, $75(-63) = -4725$.

85.
$$\begin{array}{r} 866 \\ \times\ 72 \\ \hline 1732 \\ 60620 \\ \hline 62352 \end{array}$$

Thus, $(-72)(866) = -62{,}352$.

87. $27 \div 9 = 3$

89. $72 \div (-12) = -6$

91. $\frac{8}{0}$ is undefined.

Division by zero is undefined.

93. $\frac{-81}{-3} = 27$

95. $\frac{6}{-1} = -6$

97. $\frac{0}{81} = 0$

99. $-180 \div (-45) = 4$

101.
$$\begin{array}{r} 32 \\ 45\overline{)1440} \\ \underline{135} \\ 90 \\ \underline{90} \end{array}$$

Thus, $1440 \div 45 = 32$.

103.
$$\begin{array}{r} 32 \\ 45\overline{)1440} \\ \underline{135} \\ 90 \\ \underline{90} \end{array}$$

Thus, $1440 \div (-45) = -32$.

105.
$$\begin{array}{r} 110 \\ 25\overline{)2750} \\ \underline{25} \\ 25 \\ \underline{25} \\ 0 \\ \underline{0} \end{array}$$

Thus, $2750 \div 25 = 110$.

107. $5(1650) - 3710 = 8250 - 3710 = 4540$

109. $\frac{44{,}290}{515} = 86$

111. $\frac{169{,}290}{162} = 1045$

113. $(-2)(532)(500) = -532{,}000$

You could multipy $-2(500)$ to obtain -1000; multiplying -1000 by 532 yields the result of $-532{,}000$.

115. 240 is composite; its prime factorization is $2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$.

117. 643 is prime; the divisibility tests yield no factors of 643. By testing the remaining primes less than or equal to $\sqrt{643} \approx 25$, you can conclude that 643 is a prime number.

119. 3911 is prime; the divisibility tests yield no factors of 3911. By testing the remaining primes less than or equal to $\sqrt{3911} \approx 63$, you can conclude that 3911 is a prime number.

121. 8324 is composite; its prime factorization is $2 \cdot 2 \cdot 2081$.

123. 1321 is prime; the divisibility tests yield no factors of 1321. By testing the remaining primes less than or equal to $\sqrt{1321} \approx 36$, you can conclude that 1321 is a prime number.

125. $12 = 2 \cdot 2 \cdot 3$

127. $210 = 2 \cdot 3 \cdot 5 \cdot 7$

129. $192 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

131. $525 = 3 \cdot 5 \cdot 5 \cdot 7$

133. $2535 = 3 \cdot 5 \cdot 13 \cdot 13$

135. $-10 + 22 = 12$

The temperature at noon was 12° F.

137. $362{,}000 - (-650{,}000) = 362{,}000 + 650{,}000 = 1{,}012{,}000$

Your profit during the second six months was \$1,012,000.

139. (a) The increase was approximately \$180 million.

(b) The increase from 1996 to 1997 was approximately \$30 million more than the increase from 1995 to 1996.

141. $\left(\frac{8000}{1000}\right)(-3) = 8(-3) = -24°$

The temperature would decrease by approximately 24°.

143. $(50)(12)(10) = 6000$

You will have deposited a total of \$6000.

145. $(160)(360) = 57{,}600$

The area of the football field is 57,600 square feet.

147. $195 \div 3 = 65$

The average speed of the train is 65 miles per hour.

149. $(9)(6)(11) = 594$

The volume of the rectangular solid is 594 cubic inches.

151. (a) $3 + 2 = 5$

(b) To add two integers with like signs, add their absolute values and attach the common sign to the result.

(c) On these two plays, the team gained 3 yards and then 2 yards for a total of a gain of five yards.

153. The only even prime number is 2. There are no other even prime numbers because every other even number is divisible by itself, by 1, and by 2; all other even numbers are composites because they have more than two factors.

155. To find prime factors of 1997, you need to search among prime numbers less than or equal to $\sqrt{1997} \approx 44.6$. Since 1997 is not divisible by any prime number less than 45, it follows that 1997 is prime.

157. To add two negative numbers, add their absolute values and attach the negative sign.

159. If the factors of a product include an odd number of negative factors, the result will be negative.

161. $3(-5)$ means the sum of three terms of -5.

$3(-5) = (-5) + (-5) + (-5)$

163. An even integer has a factor of 2 so the product of this integer and any other integer will also have a factor of 2. Therefore, the product is even.

The product of two odd integers is odd.

165. If an integer n is divided by 2 and the quotient is an even integer, then n must have a factor of 4.

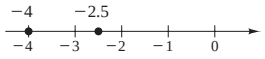
167. The only perfect number less than 25 is 6.

The abundant numbers less than 25 are 12, 18, 20, and 24.

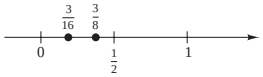
The first perfect number greater than 25 is 28.

Mid-Chapter Quiz for Chapter 1

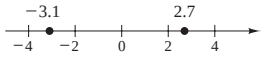
1. $-2.5 > -4$



2. $\frac{3}{16} < \frac{3}{8}$

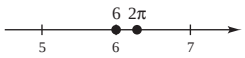


3. $-3.1 < 2.7$



4. $2\pi > 6$

Note: $2\pi \approx 6.28$



5. $-|-0.75| = -0.75$

Note: $|-0.75| = 0.75$

6. $|25.2| = 25.2$

7. $|\frac{7}{2}| = |-3.5|$

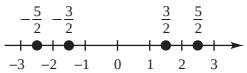
Note: $|\frac{7}{2}| = \frac{7}{2}$ or 3.5, and $|-3.5| = 3.5$.

8. $|\frac{3}{4}| > -|0.75|$

Note: $|\frac{3}{4}| = \frac{3}{4}$ or 0.75, and $-|0.75| = -0.75$, $0.75 > -0.75$.

9. The opposite of $-\frac{3}{2}$ is $\frac{3}{2}$; $-\left(-\frac{3}{2}\right) = \frac{3}{2}$.

The opposite of $\frac{5}{2}$ is $-\frac{5}{2}$.



10. The opposite of $-\frac{3}{4}$ is $\frac{3}{4}$; $-\left(-\frac{3}{4}\right) = \frac{3}{4}$.

The opposite of $\frac{9}{4}$ is $-\frac{9}{4}$.