

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

The volume of the rectangular solid is 594 cubic inches.

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.

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

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.

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.

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.

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.

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

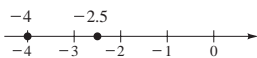
161. $3(-5)$ means the sum of three terms of -5 .

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

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

Mid-Chapter Quiz for Chapter 1

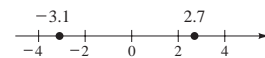
1. $-2.5 > -4$



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

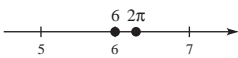


3. $-3.1 < 2.7$



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

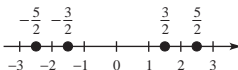
Note: $|\frac{7}{2}| = \frac{7}{2}$ or 3.5, and $|-3.5| = 3.5$.

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

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

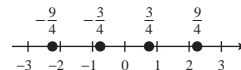
9. The opposite of $-\frac{3}{2}$ is $\frac{3}{2}$; $-(-\frac{3}{2}) = \frac{3}{2}$.

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



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

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



11. $-15 - 12 = -27$

12. $-15 - (-12) = -15 + 12 = -3$

13. $25 + |-75| = 25 + 75 = 100$

14. $-6(10) = -60$

15. $\frac{-45}{-3} = 15$

16. $\frac{-24}{6} = -4$

17. $513,200 + 136,500 + (-97,750) + (-101,500) = 450,450$

The total profit for the year \$450,450.

18. $(8)(4)(4) = 128$

There are 128 cubic feet in a cord of wood.

19. $90 \div 6 = 15$

Each piece of rope is 15 feet long.

20. The statement is false.

Possible changes:

The sum of two integers is *negative*.

The sum of two *positive* integers is positive.

The *product* of two negative integers is positive.

The *quotient* of two negative integers is positive.

Section 1.3 Operations with Rational Numbers

1. By prime factorization, $20 = 2 \cdot 2 \cdot 5$ and $45 = 3 \cdot 3 \cdot 5$. Thus, the greatest common factor is 5.

3. By prime factorization, $28 = 2 \cdot 2 \cdot 7$ and $52 = 2 \cdot 2 \cdot 13$. Thus, the greatest common factor is $2 \cdot 2$, or 4.

5. By prime factorizing, $18 = 2 \cdot 3 \cdot 3$, $84 = 2 \cdot 2 \cdot 3 \cdot 7$, and $90 = 2 \cdot 3 \cdot 3 \cdot 5$. Thus, the greatest common factor is $2 \cdot 3$, or 6.

7. By prime factorization, $240 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$, $300 = 2 \cdot 2 \cdot 3 \cdot 5 \cdot 5$, and $360 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3 \cdot 5$. Thus, the greatest common factor is $2 \cdot 2 \cdot 3 \cdot 5$ or 60.

9. By prime factorizing, $134 = 2 \cdot 67$, $225 = 3 \cdot 3 \cdot 5 \cdot 5$, $315 = 3 \cdot 3 \cdot 5 \cdot 7$, and $945 = 3 \cdot 3 \cdot 3 \cdot 5 \cdot 7$. Because there are no common prime factors, the greatest common factor is 1.

11. $\frac{2}{8} = \frac{(1)(\cancel{2})}{(4)(\cancel{2})} = \frac{1}{4}$

13. $\frac{12}{18} = \frac{2(\cancel{6})}{3(\cancel{6})} = \frac{2}{3}$

15. $\frac{60}{192} = \frac{(5)(\cancel{12})}{(16)(\cancel{12})} = \frac{5}{16}$

Note: This reducing could be done using several steps, such as the following.

$$\frac{60}{192} = \frac{(30)(\cancel{2})}{(96)(\cancel{2})} = \frac{(10)(\cancel{3})}{(32)(\cancel{3})} = \frac{(5)(\cancel{2})}{(16)(\cancel{2})} = \frac{5}{16}$$

17. $\frac{28}{350} = \frac{2(\cancel{14})}{25(\cancel{14})} = \frac{2}{25}$

19. $\frac{1}{5} + \frac{2}{5} = \frac{1+2}{5} = \frac{3}{5}$

21. $\frac{2}{10} + \frac{4}{10} = \frac{2+4}{10} = \frac{6}{10} = \frac{(3)(\cancel{2})}{(5)(\cancel{2})} = \frac{3}{5}$

23. $\frac{7}{15} + \frac{2}{15} = \frac{7+2}{15} = \frac{9}{15} = \frac{(3)(\cancel{3})}{(5)(\cancel{3})} = \frac{3}{5}$