Hello Forest Hills Middle School
We are in strange times so we are doing what we can to get by. Work on the math packets for your grade level. If you want more there are ones for other grades also. There is also a menu of math related activities you can try.

What if I struggle with the work? Please be aware that the math packet does not come with additional examples and/or instructions. We suggest that if you run into difficulty with certain concepts and/or problems that you seek out advice from family and friends, previous math tutors, or utilize online resources such as Khan Academy.

Sincerely,

Andrew McKendry
Forest Hills Consolidated School
Jackman, Maine 04945
### Adding and Subtracting Positive and Negative Numbers

Evaluate each expression.

1. \(3 - (-8) = \) __________
2. \((-8) - (-2) = \) __________

3. \((-27) - 24 = \) __________
4. \((-11) - 8 + 1 - (-6) = \) __________

5. \(\left(\frac{3}{2}\right) + \frac{8}{5} = \) __________
6. \((-7) - (-2) - 9 = \) __________

7. \(10 - (-10) - 7 - 5 = \) __________
8. \(\frac{2}{5} - \frac{4}{5} = \) __________

### Adding Positive and Negative Numbers

Find each sum.

9. \((-7) + 9 = \) __________
10. \((-4.7) + 5.7 = \) __________

11. \(2 + \left(-\frac{1}{4}\right) = \) __________
12. \((-5) + (-8) + (-2) + 1 = \) __________
### Multiplying and Dividing Positives and Negatives

Find each quotient.

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>13.</td>
<td>((-5) + (-7.1) = )</td>
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<tr>
<td>14.</td>
<td>(48 \div 6 = )</td>
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<tr>
<td>15.</td>
<td>(-85 \div (-17) = )</td>
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<tr>
<td>16.</td>
<td>(-180 \div (15) = )</td>
</tr>
<tr>
<td>17.</td>
<td>(9 \div (-7) = )</td>
</tr>
<tr>
<td>18.</td>
<td>(6 \div (-5) + 3 = )</td>
</tr>
<tr>
<td>19.</td>
<td>(8 \div (-6) \div (-3) = )</td>
</tr>
<tr>
<td>20.</td>
<td>(-12 \div 12 = )</td>
</tr>
<tr>
<td>21.</td>
<td>(12 \div (-3) = )</td>
</tr>
<tr>
<td>22.</td>
<td>(234 \div (-13) = )</td>
</tr>
</tbody>
</table>
### Find each product.

23. \(-6 (\ + \ 4) = \) __________

24. \(-9 (\ -3) = \) __________

25. \(-3 (\ + \ 6) (\ -6) = \) __________

### VARIABLE AND VERBAL EXPRESSIONS

Write each as an algebraic or verbal expression.

26. \(u \text{ decreased by 17} \)  
   ______________________

27. \(x \text{ increased by 6} \)  
   ______________________

28. \(\text{twice } q \)  
   ______________________

29. \(\frac{x}{2} \)  
   ______________________

30. \(\text{half of 14} \)  
   ______________________

31. \(\text{the product of } x \text{ and 7} \)  
   ______________________

32. \(n \text{ cubed} \)  
   ______________________

33. \(5n \)  
   ______________________

34. \(\text{the quotient of } x \text{ and 8} \)  
   ______________________

35. \(10 \text{ less than 17} \)  
   ______________________
### Evaluating Expressions
Evaluate each using the values given.

<p>| | | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>36.</td>
<td>(p^2 + m);&lt;br&gt;Use (m = 1), and (p = 5)</td>
<td>37.</td>
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<tr>
<td>38.</td>
<td>(z(x + y));&lt;br&gt;Use (x = 6), (y = 8), and (z = 6)</td>
<td>39.</td>
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<tr>
<td>40.</td>
<td>(z - (y + 3 - 1));&lt;br&gt;Use (y = 3), and (z = 7)</td>
<td>41.</td>
</tr>
<tr>
<td></td>
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<tr>
<td>42.</td>
<td>(y^2 - x);&lt;br&gt;Use (x = 7), and (y = 8)</td>
<td>43.</td>
</tr>
<tr>
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<tr>
<td>44.</td>
<td>(y - (z + z^2));&lt;br&gt;Use (y = 10), and (z = 2)</td>
<td>45.</td>
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<tr>
<td>46.</td>
<td>(pm + (n + m)^2);&lt;br&gt;Use (m = 1), (n = 4), and (p = 6)</td>
<td>47.</td>
</tr>
<tr>
<td>48.</td>
<td>( \frac{bc}{4} - (7 - a) ) Use ( a = 4, b = 8, ) and ( c = 5 )</td>
<td>49.</td>
</tr>
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<tr>
<td>50.</td>
<td>( x^3 ÷ 3 - y; ) Use ( x = 3, ) and ( y = 1 )</td>
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</tbody>
</table>

**ORDER OF OPERATIONS**

Evaluate each expression.

<table>
<thead>
<tr>
<th>51.</th>
<th>20 ÷ (4 - (10 - 8)) =</th>
<th>52.</th>
<th>7 + 10 × 5 + 10 =</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>53.</td>
<td>(6 - 4) × 49 ÷ 7 =</td>
<td>54.</td>
<td>( \frac{43 - 1}{4 + 2} + 10 ) =</td>
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<tr>
<td>55.</td>
<td>8 × ( \frac{15}{5} ) - (5 + 9) =</td>
<td>56.</td>
<td>(2 + 6 × 2 + 2 - 4) × 2 =</td>
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<tr>
<td>57.</td>
<td>2 + 7 × 5 =</td>
<td>58.</td>
<td>9 - 32 ÷ 4 =</td>
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<tr>
<td>59.</td>
<td>( \frac{45}{8(5 - 4) - 3} ) =</td>
<td>60.</td>
<td>( \frac{49 × 60}{7} ÷ \frac{2×5}{2} ) =</td>
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</tr>
<tr>
<td>61.</td>
<td>$-6k + 7k =$</td>
<td>62.</td>
<td>$5n + 11n =$</td>
</tr>
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<tr>
<td>63.</td>
<td>$12r + 5 + 3r - 5 =$</td>
<td>64.</td>
<td>$-4x - 10x =$</td>
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<tr>
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<tr>
<td>65.</td>
<td>$-2x + 11 + 6x =$</td>
<td>66.</td>
<td>$n + 4 - 9 - 5n =$</td>
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<tr>
<td>67.</td>
<td>$-3x - 9 + 15x =$</td>
<td>68.</td>
<td>$-16n - 14n =$</td>
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<tr>
<td>69.</td>
<td>$-4 + 7(1 - 3m) =$</td>
<td>70.</td>
<td>$4n - n =$</td>
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<tr>
<td><strong>USING THE DISTRIBUTIVE PROPERTY</strong></td>
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<tr>
<td><strong>Simplify each expression.</strong></td>
<td></td>
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<tr>
<td>71.</td>
<td>$-6(a + 8) =$</td>
<td>72.</td>
<td>$(1 - 7n)5 =$</td>
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<tr>
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<tr>
<td>73.</td>
<td>$-4(-8x - 8) =$</td>
<td>74.</td>
<td>$5(n + 6) =$</td>
</tr>
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<tr>
<td>75.</td>
<td>$3(5 + 5x) =$</td>
<td>76.</td>
<td>$(9m + 10)2 =$</td>
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<tr>
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<tr>
<td>77.</td>
<td>$8(-b - 4) =$</td>
<td>78.</td>
<td>$(-6p + 7)(-4) =$</td>
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<tr>
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<tr>
<td>79.</td>
<td>$-6(7 + x) =$</td>
<td>80.</td>
<td>$-8(1 - 5x) =$</td>
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</tbody>
</table>
**One-Step Equations With Integers**

Solve each equation.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>81.</td>
<td>$-40 = -5p$</td>
<td>82.</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td>83.</td>
<td>$-13m = -377$</td>
<td>84.</td>
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<tr>
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<td></td>
<td></td>
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<tr>
<td>85.</td>
<td>$\frac{x}{15} = 11$</td>
<td>86.</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
<tr>
<td>87.</td>
<td>$\frac{x}{1.2} = -7$</td>
<td>88.</td>
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<tr>
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<tr>
<td>89.</td>
<td>$n + 4.7 = -4.7$</td>
<td>90.</td>
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</table>

**Proportions**

State if each pair of ratios forms a proportion.

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<table>
<thead>
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<tbody>
<tr>
<td>91.</td>
<td>$\frac{4}{3} and \frac{16}{12}$</td>
<td>92.</td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>
Solve each proportion.

<table>
<thead>
<tr>
<th>93. $\frac{10}{k} = \frac{8}{4}$</th>
<th>94. $\frac{m}{10} = \frac{10}{3}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>95. $\frac{8n}{8} = \frac{8}{3}$</td>
<td>96. $\frac{p}{8} = \frac{13}{2}$</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>97. $\frac{v}{12} = \frac{10}{2}$</td>
<td>98. $\frac{6}{a} = \frac{3}{8}$</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>99. $\frac{3}{13} = \frac{v}{3}$</td>
<td>100. $\frac{6}{14} = \frac{5}{n}$</td>
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</tbody>
</table>

Find each unit rate.

101. $\$525$ for 20 hours work

Find each unit price and tell which is the better buy.

102. $\$7.47$ for 3 yards of fabric
    $\$11.29$ for 5 yards of fabric

103. Tyler scored 21 goals in 7 soccer games. At this rate, about how many did he score each game?

104. Georgia drove a total of 252 miles and used 12 gallons of gasoline. What is this rate in miles per gallon?
## Percent Word Problems

Solve each problem

<p>| | |</p>
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<thead>
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<tbody>
<tr>
<td>105.</td>
<td>46 is what percent of 107?</td>
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<td>_______</td>
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<tr>
<td>107.</td>
<td>87% of 41 is what?</td>
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<td>_______</td>
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<tr>
<td>109.</td>
<td>17% of what is 156?</td>
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## Angle Pair Relationships

Name the relationship: complementary, vertical, adjacent, corresponding alternate interior, alternate exterior

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<thead>
<tr>
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<tbody>
<tr>
<td>111.</td>
<td><img src="image1" alt="Diagram" /></td>
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<td>_______</td>
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</table>

## Parallel Lines and Transversals

Identify each pair of angles as corresponding, alternate interior or alternate exterior.

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<tbody>
<tr>
<td>113.</td>
<td><img src="image3" alt="Diagram" /></td>
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</table>
**Angle Pair Relationships**

Find the measure of angle $b$.

$115.$

<table>
<thead>
<tr>
<th>116.</th>
<th>117.</th>
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<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
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</table>

Find the measure of each angle indicated.

$118.$

<table>
<thead>
<tr>
<th>119.</th>
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<tr>
<td><img src="image3" alt="Diagram" /></td>
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</table>

$120.$

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<tr>
<td><img src="image5" alt="Diagram" /></td>
<td><img src="image6" alt="Diagram" /></td>
</tr>
<tr>
<td>Fraction in simplest form</td>
<td>Decimal</td>
</tr>
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<td>--------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>1/10</td>
<td>0.125</td>
</tr>
<tr>
<td></td>
<td>0.25</td>
</tr>
<tr>
<td>3/10</td>
<td></td>
</tr>
<tr>
<td>1/3</td>
<td>0.4</td>
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<tr>
<td></td>
<td>0.625</td>
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<tr>
<td>7/10</td>
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<tr>
<td>7/8</td>
<td>0.90</td>
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<tr>
<td>1/1</td>
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</tbody>
</table>
Pre-Course Test

Estimate the quotient.
1. 59 ÷ 5
2. 78 ÷ 8
3. 101 ÷ 4

4. Your school’s science club is making gift baskets to sell. The club has 350 individually wrapped soaps to put into the gift baskets. The club wants to put 3 soaps in each gift basket. How many gift baskets can the club make?

Divide.
5. 322 ÷ 14
6. 247 ÷ 19
7. 154 ÷ 22

Add or subtract.
8. 2.3 + 3.4
9. 5.8 − 2.1
10. 4.2 − 1.9
11. \(\frac{3}{4} − \frac{1}{3}\)
12. \(\frac{3}{8} + \frac{7}{8}\)
13. \(\frac{4}{9} + \frac{5}{6}\)

Estimate the sum or difference to the nearest whole number.
14. 3.17 − 1.8
15. 5.23 + 6.8
16. 8.14 + 7.25

Complete the statement with <, >, or =.
17. 1.007 ____ 1.004
18. 3.052 ____ 3.055
19. 4.61 ____ 0.461
20. 5.750 ____ 5.75
21. 7.34 ____ 7.734
22. 9.976 ____ 9.76

Plot the ordered pair in the coordinate plane.
23. (2, 5)
24. (6, 1)
25. (0, 4)
Pre-Course Test (continued)

Find the area of the rectangle.

26.  
   \[ \text{Area} = 6 \times 4 = 24 \text{ cm}^2 \]

27.  
   \[ \text{Area} = 11 \times 9 = 99 \text{ in}^2 \]

28. Your house is 1030 meters from school. Your friend’s house is 1.5 kilometers from school. Whose house is farther from school?

29. How many vertices does a cube have?

Find the volume of the rectangular prism.

30.  
   \[ \text{Volume} = 7 \times 4 \times 4 = 112 \text{ m}^3 \]

31.  
   \[ \text{Volume} = 5 \times 3 \times 6 = 90 \text{ ft}^3 \]

Tell whether the number is prime or composite.

32. 532
33. 87
34. 41

Multiply or divide.

35. \(16 \times 9\)
36. \(20 \times 17\)
37. \(135 \div 9\)

Simplify the expression.

38. \(15 - 4 \times 3\)
39. \(2 \times (8 + 7)\)
40. \((9 + 9) + 7 \times 2\)

41. The data show a class enrollment over a five-year period. Make a line graph to represent the data.

<table>
<thead>
<tr>
<th>Year</th>
<th>Class Enrollment</th>
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<tbody>
<tr>
<td>1</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
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<tr>
<td>3</td>
<td>23</td>
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<tr>
<td>4</td>
<td>20</td>
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<tr>
<td>5</td>
<td>19</td>
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</tbody>
</table>
Multiple Choice
Fill in the circle next to the correct answer.

1. Which of the following is 3,450,026 in word form? (Lesson 1.1)
   A. Three million, four hundred fifty thousand, twenty-six
   B. Three million, four hundred thousand fifty, twenty-six
   C. Three million, fifty thousand four hundred, twenty-six
   D. Three million, forty-five thousand, twenty-six

2. Which number is the greatest? (Lesson 1.3)
   A. 15,265
   B. 93,216
   C. 320,182
   D. 320,128

3. Which number when rounded to the nearest thousand is 23,000? (Lesson 1.4)
   A. 22,097
   B. 22,499
   C. 23,400
   D. 23,501

4. Simplify 20 + 10 × 19 − 7. (Lesson 2.6)
   A. 140
   B. 203
   C. 360
   D. 563
5. Which is 1,000 less than the product of 3,021 and 79? (Lesson 2.3)
   A  2,100  B  4,100
   C  237,659  D  239,659

6. Which is the difference between the value of the digit 6 in 2,300,628 and in 846,150? (Lesson 1.2)
   A  600  B  5,400
   C  5,522  D  6,000

7. Which is the remainder when 4,885 is divided by 21? (Lesson 2.5)
   A  12  B  13
   C  14  D  15

8. Express \( \frac{8}{11} \div 4 \) in simplest form. (Lesson 4.6)
   A  \( \frac{2}{11} \)  B  \( \frac{8}{44} \)
   C  \( \frac{1}{11} \)  D  \( \frac{4}{11} \)

9. Find the difference: \( \frac{3}{4} - \frac{3}{8} \). (Lesson 3.2)
   A  \( \frac{5}{8} \)  B  \( \frac{3}{8} \)
   C  \( \frac{1}{2} \)  D  \( \frac{1}{4} \)

10. Find the product: \( \frac{3}{4} \times \frac{8}{12} \). (Lesson 4.1)
    A  \( \frac{1}{2} \)  B  \( \frac{2}{3} \)
    C  \( \frac{5}{12} \)  D  \( \frac{11}{16} \)
11. Estimate the sum of $\frac{6}{7}$ and $\frac{3}{5}$. *(Lesson 3.1)*
   - A 0
   - B $\frac{1}{2}$
   - C $1\frac{1}{2}$
   - D 1

12. What is the difference between $3\frac{1}{2}$ and $1\frac{1}{4}$? *(Lesson 3.6)*
   - A $2\frac{1}{4}$
   - B $3\frac{1}{4}$
   - C $4\frac{3}{4}$
   - D $4\frac{1}{2}$

13. Find the area of triangle $ABC$. *(Lesson 6.2)*
   - A $126 \text{ cm}^2$
   - B $98 \text{ cm}^2$
   - C $63 \text{ cm}^2$
   - D $49 \text{ cm}^2$

14. Simplify $4x + 6 - 2x - 1$. *(Lesson 5.2)*
   - A $6x + 7$
   - B $4x + 3$
   - C $8x + 6$
   - D $2x + 5$

15. For what value of $y$ will the inequality $3y + 4 < 8$ be true? *(Lesson 5.3)*
   - A $y = 1$
   - B $y = 2$
   - C $y = 3$
   - D $y = 4$

16. Glass A contains 236 milliliters of milk. Glass B contains 420 milliliters of milk. What is the ratio of the amount of milk in Glass A to that in Glass B? *(Lesson 7.3)*
   - A 89 : 135
   - B 119 : 165
   - C 479 : 660
   - D 59 : 105
Short Answer

Read the questions carefully. Write your answers in the space provided. Show your work.

17. What is the missing number in the box? \(\text{Lesson 1.2}\)

\[87,412 = 80,000 + \square + 400 + 10 + 2\]

18. Order the numbers from greatest to least. \(\text{Lesson 1.3}\)

\[35,928 \quad 164,239 \quad 35,982 \quad 916,236\]

19. Rounding to the nearest thousand, what is the least number that rounds to 32,000? \(\text{Lesson 1.4}\)

20. Find the product of 238 and 4,000. \(\text{Lesson 2.2}\)

21. There are 215 Grade 5 students in Cherrywood school. Each student spends $17 on a dictionary. How much in all do the students spend on the dictionary? \(\text{Lesson 2.7}\)

22. Mr. Hull is buying computer equipment for his company. The equipment costs $45,900. He pays $5,300 for the first payment. He then pays the rest of the amount in equal payments for 14 months. Find the amount he has to pay each month. \(\text{Lesson 2.7}\)
23. Simplify \((2 + 4) \times 7 - 6 + 11\). \((Lesson\ 2.6)\)

24. Express \(38 \div 6\) as a fraction in simplest form. Then rewrite the fraction as a mixed number. \((Lesson\ 3.3)\)

25. Shaun has \(24\frac{1}{2}\) ounces of beads. He has \(3\frac{3}{8}\) ounces of beads less than Tony. Find the weight of Tony’s beads. \((Lesson\ 3.7)\)

26. Express \(24\frac{1}{4} - 15\frac{1}{2}\) as a decimal. \((Lessons\ 3.3\ and\ 3.6)\)
27. Lita jogged $7 \frac{3}{10}$ kilometers on Friday. She jogged $1 \frac{3}{4}$ kilometers more on Saturday. How many kilometers did she jog on both days? Give your answer as a decimal. *(Lesson 3.7)*

28. Multiply $\frac{70}{6}$ by $\frac{18}{4}$. Express the product as a mixed number in simplest form. *(Lesson 4.3)*

29. Jamal runs $1 \frac{2}{5}$ miles a day to train for a race.
   a. If he runs the same distance for 3 days a week, what is the distance he runs in one week?
   b. If he keeps to this training regime for 8 weeks, what is the total distance he will run in 8 weeks? *(Lesson 4.5)*

   a. 
   
   b. 

Mid-Year Review
30. A ball of string $\frac{9}{10}$ meter long is cut into 3 pieces of the same length.
   Find the length of each piece. (Lesson 4.6)

31. 3 batteries cost $5r$ and 8 folders cost $2r$. Jason bought 6 batteries and 4 folders. How much does he pay?
   Give your answer in terms of $r$. (Lesson 5.4)

32. Solve this equation. (Lesson 5.3)
   $4a - 8 = a + 4$

33. The base of the triangle $ABC$ is as given.
   Label its height. (Lesson 6.1)
34. Find the area of triangle $PQR$. (Lesson 6.2)

35. $ABCD$ and $ECFG$ are rectangles. $BC = CF$. What is the total area of the shaded parts of the figure? (Lesson 6.2)

36. The ratio of the masses of flour in two bags is $5 : 7$. The heavier bag contains 1,120 grams of flour. What is the total mass of flour in both bags? (Lesson 7.3)

37. Rachel, Sally, and Fabio share a pie in the ratio $1 : 2 : 4$. What fraction of the pie does Sally get? (Lesson 7.6)
38. The lengths of three sides of a triangle are in the ratio 3 : 4 : 5. The perimeter of the triangle is 156 centimeters. What is the difference in length between the longest and shortest sides? (Lesson 7.6)

39. Look for a pattern in this set of figures. (Lesson 7.6)

<table>
<thead>
<tr>
<th>Figure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td>?</td>
<td>169</td>
</tr>
<tr>
<td>Number of Unit Squares</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td>?</td>
<td>169</td>
</tr>
</tbody>
</table>

a. How many unit squares are in Figure 4?

b. Which figure in this pattern will have 169 small squares?
40. Poles are placed an equal distance apart along a 6-kilometer road. There is a tree in between every two poles. The figure shows the distance between a tree and two poles. Poles are placed at the start and end of the road. How many poles are there? (Lesson 2.4)

41. A whole number when divided by 4 gives a remainder of 3. The same whole number when divided by 6 gives a remainder of 1. The number is between 70 and 85. What is the number? (Lesson 2.5)
42. Sarah earns $525 more than Andrew each month. They each spend $1,250 a month and save the rest. Sarah does not have any savings at first. After 11 months, she has $8,250 in savings. How much does Andrew earn in a year? (Lesson 2.7)

43. Ivan caught a total of $7\frac{2}{5}$ pounds of fish one day. Of the fish caught, $4\frac{5}{8}$ pounds were sea bass and the rest were mackerel. He gave away $1\frac{7}{8}$ pounds of mackerel. How many pounds of mackerel did he have left? Give your answer as a decimal. (Lesson 3.7)
44. There were \(2\frac{4}{5}\) quarts of milk in Container A and some milk in Container B. Lisa poured \(1\frac{2}{5}\) quarts of milk each into Container A and Container B. In the end, the total volume of milk in the two containers was 10 quarts. How many quarts of milk were in Container B at first? Give your answer as a decimal. (Lesson 3.7)

45. Tyrone read a book for his school project. On the first day, he read 40 pages. On the second day, he read \(\frac{1}{4}\) of the remaining pages. After the second day, he still had to read \(\frac{1}{2}\) of the total number of pages to complete the book. How many pages are in the book? (Lesson 4.2)
46. A dealership has $9y$ cars, $12y$ trucks and $18$ vans. (Lesson 5.4)
   a. $4y$ cars, $3y$ trucks and $15$ vans are sold. Find the total number of vehicles remaining in terms of $y$.

   b. If the value of $y$ is 7, are there more trucks or more cars and vans at first?

47. The side of square $JKLM$ is 14 inches. $KP = MP = JP = LP$.
   Find the total area of the shaded parts. (Lesson 6.2)
48. Freddie has 2 times as many comic books as David. The ratio of the number of comic books David has to the number of comic books Gary has is 5 : 3. Freddie has 110 comic books. How many comic books do David and Gary have in total? (*Lesson 7.6*)

49. The ratio of the volume of water in Container A to the volume of water in Container B to the volume of water in Container C is 2 : 3 : 8. Container B contains 900 milliliters of water. (*Lesson 7.6*)

a. What is the volume of water in Container C?

b. Find the total volume of water in the three containers.
End-of-Year Review

Test Prep

Multiple Choice

Shade the circle next to the correct answer.

1. In 130.426, the digit 2 is in the ________ place. (Lesson 8.1)
   A) tens  
   B) tenths
   C) hundredths  
   D) thousandths

2. Use front-end estimation with adjustment to estimate 6,189 - 3,674. (Lesson 1.4)
   A) 1,000  
   B) 2,000
   C) 3,000  
   D) 4,000

3. Simplify 48 ÷ 8 + 13 × 3. (Lesson 2.6)
   A) 45  
   B) 54
   C) 57  
   D) 75

4. Express 10 \frac{1}{4} - 4 \frac{1}{2} as a decimal. (Lesson 3.3)
   A) 6.25  
   B) 5.75
   C) 5.43  
   D) 5.34

5. Express 9.062 as a mixed number in simplest form. (Lesson 8.3)
   A) \frac{962}{100}  
   B) \frac{931}{50}
   C) \frac{62}{1000}  
   D) \frac{931}{500}

6. What is the product of 96 and 13? (Lesson 2.3)
   A) 900  
   B) 960
   C) 1,170  
   D) 1,248
7. Divide 84 by 400. \(\text{(Lesson 9.4)}\)
   \[\begin{array}{ll}
   \text{A} & 0.21 \\
   \text{B} & 0.84 \\
   \text{C} & 2.1 \\
   \text{D} & 8.4 \\
   \end{array}\]

8. Simplify \(16p + 5 - 3p - 2\). \(\text{(Lesson 5.2)}\)
   \[\begin{array}{ll}
   \text{A} & 19p + 7 \\
   \text{B} & 19p - 3 \\
   \text{C} & 13p + 3 \\
   \text{D} & 13p - 3 \\
   \end{array}\]

9. For what value of \(y\) will the inequality \(4y - 8 > 10\) be true? \(\text{(Lesson 5.3)}\)
   \[\begin{array}{ll}
   \text{A} & 2 \\
   \text{B} & 3 \\
   \text{C} & 4 \\
   \text{D} & 5 \\
   \end{array}\]

10. What percent of the figure is shaded? \(\text{(Lesson 10.1)}\)
    \[\text{A} \ 25\% \quad \text{B} \ 35\% \quad \text{C} \ 40\% \quad \text{D} \ 50\% \]

11. The price of a cell phone is $500. Kathleen pays 8% sales tax on the price of the cell phone. How much sales tax does she pay? \(\text{(Lesson 10.4)}\)
    \[\begin{array}{ll}
   \text{A} & $400 \\
   \text{B} & $50 \\
   \text{C} & $40 \\
   \text{D} & $8 \\
   \end{array}\]

12. \(\overrightarrow{AB}\) and \(\overrightarrow{CD}\) are lines. Find the measure of \(\angle a\). \(\text{(Lesson 12.1)}\)
    \[\begin{array}{ll}
   \text{A} & 180^\circ \\
   \text{B} & 105^\circ \\
   \text{C} & 75^\circ \\
   \text{D} & 57^\circ \\
   \end{array}\]
13. The sides of triangle $ABC$ are in whole inches. $AB = 5$ inches and $BC = 11$ inches. Which of these is a possible length for $AC$? (Lesson 13.4)
   \(\text{A}\) 3 inches  \(\text{B}\) 6 inches  
   \(\text{C}\) 12 inches  \(\text{D}\) 16 inches

14. In the trapezoid $PQRS$, $PS \parallel QR$. Find the measure of $\angle SPR$. (Lesson 13.5)
   \(\text{A}\) 98°  
   \(\text{B}\) 72°  
   \(\text{C}\) 52°  
   \(\text{D}\) 26°

15. How many 1-centimeter cubes can be put into the box? (Lesson 15.5)
   \(\text{A}\) 38  
   \(\text{B}\) 1,200  
   \(\text{C}\) 1,260  
   \(\text{D}\) 1,620

16. Which of these nets can form a triangular pyramid? (Lesson 14.1)
   \(\text{A}\)  
   \(\text{B}\)  
   \(\text{C}\)  
   \(\text{D}\)
Short Answer

Read the questions carefully. Write your answers in the spaces provided. Show your work.

17. The ratio of the volume of water in bucket A to the volume of water in bucket B is 3 : 5. The total volume of water in the two buckets is 56 liters. What is the volume of water in bucket B? (Lesson 7.3)


18. Write 12 ones and 3 tenths 2 hundredths 5 thousandths in expanded form. (Lesson 8.1)


19. What is the missing number in the equation? (Lesson 9.4)

\[
9.42 = 9,420 \div \Box
\]


20. Order the decimals from least to greatest. (Lesson 8.2)

11.05, 11.00, 11.10, 11.009


21. \(\frac{3}{8}\) of the regular price of a digital watch is $21. The price of the digital watch after discount is $21. Find the dollar amount of the discount. (Lesson 10.4)
Use the data in the bar graph to answer questions 22 and 23.

**Favorite Sports of Students**

<table>
<thead>
<tr>
<th>Sport</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tennis</td>
<td>12</td>
</tr>
<tr>
<td>Basketball</td>
<td>28</td>
</tr>
<tr>
<td>Volleyball</td>
<td>12</td>
</tr>
</tbody>
</table>

**Key**
- Girls
- Boys

22. For which sport is the difference between the number of boys and girls the greatest? *(Lesson 11.1)*

23. How many more boys than girls prefer tennis? *(Lesson 11.1)*
Use the data in the graph to answer questions 24 and 25.

Conversion Between Gallons and Quarts

<table>
<thead>
<tr>
<th>Measurement in Quarts</th>
<th>y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
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<tr>
<td>4</td>
<td>10</td>
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<tr>
<td>5</td>
<td>12</td>
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<tr>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>7</td>
<td>16</td>
</tr>
</tbody>
</table>

24. Mrs. Richards buys 8 quarts of milk in 4 days. How many gallons of milk does she buy? (Lesson 11.2)

25. What is the equation of the graph? (Lesson 11.2)

26. Mrs. Mani has 1 orange, 1 apple, 1 peach and 1 apricot. She has 3 different flavored yogurt bars. She packs one fruit and one yogurt bar into a lunch box. Find the number of combinations she can pack in one box. (Lesson 11.3)
27. A box contains 6 red pens, 4 blue pens, 8 green pens, and some black pens. Leslie picks a pen and returns it to the box each time. The outcomes are recorded in the table.

<table>
<thead>
<tr>
<th>Number of Times a Red Pen is Picked</th>
<th>Number of Times a Blue Pen is Picked</th>
<th>Number of Times a Green Pen is Picked</th>
<th>Number of Times a Black Pen is Picked</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>5</td>
<td>14</td>
<td>3</td>
</tr>
</tbody>
</table>

a. What is the experimental probability of drawing a green pen? (Lesson 11.4)

b. If the theoretical probability of drawing a black pen is \( \frac{1}{10} \), how many black pens are in the box? (Lesson 11.4)

28. \( AB, CD \) and \( EF \) are lines. Find the measures of \( \angle x \) and \( \angle y \). (Lessons 12.1 and 12.3)

\[ m\angle x = \quad \]

\[ m\angle y = \quad \]

29. In triangle \( DEF \), \( DF = EF \). Find the measures of \( \angle a \) and \( \angle b \). (Lessons 13.2 and 13.3)

\[ m\angle a = \quad \]

\[ m\angle b = \quad \]
30. $ABCD$ is a parallelogram and $ADE$ is an equilateral triangle. Identify all
the angles that have the same measure as $\angle f$. (Lessons 13.3 and 13.5)

31. Brian has $50. He buys 10 similar books and has $x$ dollars left.
What is the cost of each book? (Lesson 5.4)

32. A solid figure has 2 flat surfaces, 1 curved surface, no edges and
no vertices. Name this solid figure. (Lesson 14.2)

33. How many unit cubes are used to build the solid? (Lesson 15.1)
34. \(ABCD\) is a parallelogram. Find the measure of \(\angle DAC\). (Lesson 13.5)

35. The net of a square prism is as given. Use the net to find the surface area of the prism. (Lesson 15.3)

36. Express \(3\frac{1}{5} + 2\frac{1}{20}\) as a decimal. (Lesson 3.5)

37. \(\overrightarrow{JL}\) is a line. Find the measure of \(\angle MKN\). (Lesson 12.1)
Extended Response
Solve. Show your work.

38. There are 450 seats in a theater. 48% of the seats are occupied. How many seats are not occupied?

39. The area of a plot of land is 2,496 square meters. A small part of the land is fenced. The ratio of the area of the plot of land to the area that is not fenced is 48 : 31. What is the area of the land that is not fenced?
40. Harry buys a sofa set that costs $2,000. He pays for it by installments at an interest rate of 5% per year. What is the total amount he has to pay at the end of one year?

41. Mrs. Jacobs buys 20 kilograms of rice at $0.84 per kilogram. She buys 700 grams of shrimp at $1.02 per 100 grams. How much does she spend in total?
42. A fish tank measures 40 centimeters by 25 centimeters by 24 centimeters. It is filled with water from a tap. The fish tank is $\frac{5}{8}$ full in 6 minutes. Find the volume of water that flows from the tap each minute.

43. Mrs. Jackson has $90. She spends $\frac{1}{4}$ of her money on food, $\frac{1}{2}$ of the remainder on clothes and saves the rest. How much does she save?
44. Team A has 42 members. Team B has 18 more members than team A. What percent of the members from team B must be transferred to team A so that team A has as many members as team B?

45. An equal amount of water is poured into two empty tanks, P and Q. Tank P is then \(\frac{1}{2}\)-filled. What fraction of tank Q is filled with water?
46. There is some water in a tank. Water is then poured into the tank until the volume of water is 8 times as much as the initial volume of water in the tank. When another 16.75 liters of water is added, the total volume of water in the tank becomes 20.35 liters. How much water is in the tank at first? Give your answer in liters.
Dear Parent/Guardians,

This packet is meant to provide your child with a review of the material your child learned in their current math course. Your child is expected to return this completed packet to his/her math teacher on the first day of school. Please have your child pace themselves; it is to no ones benefit to wait until the last day of summer to start the packet. As your child completes the packet, have them do the following:

- Show all work, on a separate sheet if needed.
- Do not use a calculator.

Name: ______________________

Date: ______________________
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. Find the sum: 3.4 + 6.005</td>
<td></td>
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<tr>
<td></td>
<td>[1]</td>
<td></td>
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<tr>
<td>2. Find the difference: 27.77 − 18.09</td>
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<td>[2]</td>
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<tr>
<td>3. Find the product: 23.7 × 13.67</td>
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<td>[3]</td>
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<tr>
<td>4. Find the quotient: 9.744 ÷ 0.87</td>
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<td></td>
<td>[4]</td>
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<tr>
<td></td>
<td>Find the greatest common factor of the pair of numbers.</td>
<td></td>
</tr>
<tr>
<td>5. 8, 28</td>
<td></td>
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<tr>
<td></td>
<td>[5]</td>
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<tr>
<td>6. 36, 42</td>
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<tr>
<td></td>
<td>[6]</td>
<td></td>
</tr>
<tr>
<td>7. 54, 81</td>
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<tr>
<td></td>
<td>[7]</td>
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</tr>
</tbody>
</table>
Find the greatest common factor of the pair of numbers.

8. 50, 150

[8] ____________________________

Find the least common multiple of the pair of numbers.

9. 6, 7

[9] ____________________________

10. 10, 15

[10] ____________________________

11. 24, 38


12. 12, 36

[12] ____________________________
Find the least common denominator of the pair of fractions.

13. \( \frac{1}{2}, \frac{7}{10} \)  

[13] _________________________

14. \( \frac{5}{8}, \frac{6}{7} \)  

[14] _________________________

15. \( \frac{5}{9}, \frac{7}{12} \)  

[15] _________________________

16. \( \frac{11}{20}, \frac{15}{32} \)  

[16] _________________________

Find the reciprocal of the number.

17. 12  

[17] _________________________
Find the reciprocal of the number.

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>18.</td>
<td>(\frac{3}{16})</td>
<td>[18]</td>
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<tr>
<td>19.</td>
<td>(\frac{9}{5})</td>
<td>[19]</td>
</tr>
<tr>
<td>20.</td>
<td>(2\frac{1}{3})</td>
<td>[20]</td>
</tr>
<tr>
<td>21.</td>
<td>Subtract (\frac{3}{4} - \frac{1}{4}). Write the answer in simplest form.</td>
<td>[21]</td>
</tr>
<tr>
<td>22.</td>
<td>Add (\frac{1}{2} + \frac{1}{8}). Write the answer in simplest form.</td>
<td>[22]</td>
</tr>
</tbody>
</table>
23. Add \( \frac{6}{7} + \frac{5}{9} \). Write the answer in simplest form.

\[ 23 \]

24. Subtract \( 11\frac{1}{4} - 2\frac{5}{8} \). Write the answer in simplest form.

\[ 24 \]

25. Multiply \( \frac{1}{2} \times \frac{6}{11} \). Write the answer in simplest form.

\[ 25 \]

26. Divide \( \frac{7}{11} \div \frac{3}{5} \). Write the answer in simplest form.

\[ 26 \]

27. Divide \( \frac{4}{15} \div \frac{8}{3} \). Write the answer in simplest form.

\[ 27 \]

28. Multiply \( \frac{4}{8} \times \frac{2}{3} \). Write the answer in simplest form.

\[ 28 \]
Write the percent as a decimal and as a fraction in simplest form.

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<table>
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<tr>
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<tbody>
<tr>
<td>29.</td>
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<tbody>
<tr>
<td>30.</td>
<td>26%</td>
</tr>
<tr>
<td>[30]</td>
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<tbody>
<tr>
<td>31.</td>
<td>48%</td>
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<td>[31]</td>
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<tbody>
<tr>
<td>32.</td>
<td>84%</td>
</tr>
<tr>
<td>[32]</td>
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</tbody>
</table>

Write the decimal as a percent and as a fraction in simplest form.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>33.</td>
<td>0.08</td>
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<tr>
<td>[33]</td>
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<tbody>
<tr>
<td>34.</td>
<td>0.15</td>
</tr>
<tr>
<td>[34]</td>
<td></td>
</tr>
</tbody>
</table>
Write the decimal as a percent and as a fraction in simplest form.

35. $0.47$

[35] __________________________ 

36. $0.027$

[36] __________________________ 

Write the fraction as a decimal and as a percent.

37. $\frac{9}{10}$

[37] __________________________ 

38. $\frac{4}{5}$

[38] __________________________ 

39. $\frac{7}{8}$

[39] __________________________
Write the fraction as a decimal and as a percent.

40. \( \frac{11}{20} \)  

[40] __________________________

Compare the two numbers. Write the answer using <, >, or =.

41. 138 and 198  

[41] __________________________

42. 781 and 718  

[42] __________________________

43. 8.4 and 8.2  

[43] __________________________

44. -7.88 and -4.88  

[44] __________________________

45. \( \frac{5}{12} \) and \( \frac{3}{4} \)  

[45] __________________________
Compare the two numbers. Write the answer using $<$, $>$, or $=$.

46. $\frac{3}{6}$ and $\frac{4}{8}$

[46] ______________________

47. $\frac{5}{3}$ and $1\frac{1}{2}$

[47] ______________________

48. $16\frac{2}{3}$ and $16\frac{7}{8}$

[48] ______________________

Write the numbers in order from least to greatest.

49. 0.19, 0.9, 0.49, 0.4

[49] ______________________

50. $-6.5$, $-5.4$, 6.4, $-6$

[50] _______________________
Write the numbers in order from least to greatest.

51. \[
\frac{5}{8}, \frac{4}{7}, \frac{3}{5}, \frac{1}{2}
\]

[51] ______________

52. \[
\frac{9}{7}, \frac{6}{4}, \frac{5}{4}, \frac{6}{13}
\]

[52] ______________

53. \[
\frac{5}{9}, \frac{3}{4}, \frac{13}{11}, \frac{7}{5}
\]

[53] ______________

54. \[
-16\frac{1}{4}, -15\frac{1}{9}, -16\frac{1}{8}, -15\frac{2}{3}
\]

[54] ______________

Find the perimeter.

55. a triangle with sides of length 18 feet, 27 feet, and 32 feet

[55] ______________
Find the perimeter.

56. a square with sides of length 4.7 centimeters

[56] __________________________

Find the area.

57. a square with sides of length 13 yards

[57] __________________________

58. a rectangle with length 7.7 kilometers and width 4.5 kilometers

[58] __________________________

Find the volume.

59. a cube with sides of length 19 meters

[59] __________________________

60. a rectangular prism with length 5.9 inches, width 8.6 inches, and height 1.2 inches

[60] __________________________
61. The list below shows the distribution of gold medals for the 1998 Winter Olympics. Choose an appropriate graph to display the data.

<table>
<thead>
<tr>
<th>Country</th>
<th>Medals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>12</td>
</tr>
<tr>
<td>Norway</td>
<td>10</td>
</tr>
<tr>
<td>Russia</td>
<td>9</td>
</tr>
<tr>
<td>Canada</td>
<td>6</td>
</tr>
<tr>
<td>United States</td>
<td>6</td>
</tr>
<tr>
<td>Japan</td>
<td>5</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5</td>
</tr>
<tr>
<td>Austria</td>
<td>3</td>
</tr>
<tr>
<td>South Korea</td>
<td>3</td>
</tr>
<tr>
<td>Finland</td>
<td>2</td>
</tr>
<tr>
<td>France</td>
<td>2</td>
</tr>
<tr>
<td>Italy</td>
<td>2</td>
</tr>
<tr>
<td>Switzerland</td>
<td>2</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>1</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1</td>
</tr>
</tbody>
</table>

62. Find the mean, median, and mode(s) of the data set.

62. 1, 3, 3, 3, 4, 5, 6, 7, 7, 9

63. 17, 22, 36, 47, 51, 58, 65, 80, 85, 89

64. 5, 23, 12, 5, 9, 18, 12, 4, 10, 21
ANSWER KEY

[1] 9.405
[2] 9.68
[3] 323.979
[4] 11.2
[5] 4
[6] 6
[7] 27
[8] 50
[9] 42
[10] 30
[12] 36
[13] 10
[14] 56
[15] 36
[16] 160
[17] $\frac{1}{12}$
[18] $\frac{16}{3}$
[19] $\frac{5}{9}$
[20] $\frac{3}{7}$
[21] $\frac{1}{2}$
[22] $\frac{5}{8}$
[23] $\frac{89}{63}$
[24] $\frac{69}{8}$
[25] $\frac{3}{11}$
[26] $\frac{35}{33}$
[27] $\frac{1}{10}$
[28] $\frac{11}{4}$
[29] $0.07, \frac{7}{100}$
[30] $0.26, \frac{13}{50}$
[31] $0.48, \frac{12}{25}$
[32] $0.84, \frac{21}{25}$
[33] $\frac{8\%}{25}$

[34] $\frac{1.5\%}{3}{\frac{20}{1}}$

[35] $47\% \cdot \frac{47}{100}$

[36] $2.7\% \cdot \frac{27}{1000}$

[37] $0.9, 90\%$

[38] $0.8, 80\%$

[39] $0.875, 87.5\%$

[40] $0.55, 55\%$

[41] $138 < 198$

[42] $781 > 718$

[43] $8.4 > 8.2$

[44] $-7.88 < -4.88$

[45] $\frac{5}{12} < \frac{3}{4}$

[46] $\frac{\frac{3}{6}}{4} = \frac{8}{8}$

[47] $\frac{5}{\frac{1}{2}} > \frac{\frac{1}{2}}{2}$

[48] $\frac{16\frac{2}{3}}{16\frac{7}{8}} < \frac{\frac{2}{3}}{16\frac{7}{8}}$

[49] $0.19, 0.4, 0.49, 0.9$

[50] $-6.5, -6, -5.4, 6.4$

[51] $\frac{1}{2}, \frac{4}{7}, \frac{3}{5}, \frac{5}{8}$

[52] $\frac{6}{13}, \frac{5}{4}, \frac{9}{7}, \frac{6}{4}$

[53] $\frac{13}{11}, \frac{7}{5}, \frac{13}{9}, \frac{13}{4}$

[54] $-16\frac{1}{4}, -16\frac{1}{8}, -16\frac{2}{3}, -15\frac{1}{9}$

[55] 77 ft

[56] 18.8 cm

[57] 169 yd²

[58] 34.65 km²

[59] 6859 m³

[60] 60,888 in³

[61] bar graph or circle graph

[62] 4.8, 4.5, 3

[63] 55, 54.5, no mode

[64] 11.9, 11, 5 and 12
CHAPTER

1  The Real Number System

Lesson 1.1  Representing Rational Numbers on the Number Line

Order the numbers from least to greatest. Use the < symbol. Graph each number on a horizontal number line.

1. \[ \frac{10}{3}, \frac{1}{2}, 0.4, 0.9 \]
2. \[ 0.23, \frac{1}{4}, \frac{5}{3} \]

Compare. Write <, >, or =.

3. 2.12 \[\boxed{<}\] 2.31
4. 0.37 \[\boxed{=}\] 0.317

Round each number.

5. 2,549 to the nearest ten. ______
6. 23.17 to 1 decimal place. ______

Round 7,363.923

7. to the nearest hundredth. ______
8. to the nearest whole number. ______

Find the square and cube of each number.

9. 7
10. 10

Find the square root of each number.

11. 36
12. 81
Write each number in \( \frac{m}{n} \) form where \( m \) and \( n \) are integers.

**Example**

a) \(-2 \frac{6}{7}\)

\[-2 \frac{6}{7} = \frac{2 \cdot 7 + 6}{7} = \frac{20}{7}\]

b) 19

\[19 = \frac{19}{1}\]

Whole numbers have 1 in the denominator.

**Complete.**

22. \( \frac{3}{4} \)

\[3 \frac{4}{6} = \frac{6}{6} + \frac{4}{6} = \frac{10}{6} = \frac{5}{3} = \]

23. \(-17\)

\[-17 = \frac{-1}{1} \quad \text{or} \quad -1\]

Write each number in \( \frac{m}{n} \) form where \( m \) and \( n \) are integers.

24. \(-\frac{15}{10}\)

25. \(\frac{12}{18}\)

26. \(-4 \frac{2}{3}\)

27. \(1 \frac{9}{21}\)
Write each decimal in $\frac{m}{n}$ form where $m$ and $n$ are integers with $n \neq 0$.

**Example**

a) 0.6

\[
0.6 = \frac{6}{10}
\]

6 is in the tenths place. Use 10 as the denominator.

\[
= \frac{3}{5}
\]

Simplify.

b) -0.25

\[
-0.25 = -\frac{25}{100}
\]

5 is in the hundredths place. Use 100 as the denominator.

\[
= -\frac{1}{4}
\]

Simplify.

**Complete.**

28. 7.5

\[
\phantom{0.6} = \boxed{7} \frac{1}{1}
\]

Write the integer, ________. Write 0.5 as ________.

\[
= \boxed{\frac{7.5}{1}}
\]

Write as an improper fraction.

**Write each decimal in $\frac{m}{n}$ form where $m$ and $n$ are integers with $n \neq 0$.**

29. -0.375

30. 3.6

31. -9.36

32. 3.625

33. 3.21

34. -1.045
Using long division, write each rational number as a repeating decimal. Use bar notation to indicate the repeating digits.

Example

\[
\begin{array}{c|c}
\hline
5 & 0.\overline{45} \\
11 & 0.4545 \\
\hline
11 | 5.0000 & \\
44 & 0.45 \\
\hline
60 & 0.45 \\
55 & 0.45 \\
44 & 0.45 \\
55 & 0.45 \\
\hline
50 & 0.45 \\
60 & 0.45 \\
5 & 0.45 \\
\hline
\end{array}
\]

So, \( \frac{5}{11} = 0.4545... = 0.\overline{45} \).

9. \( \frac{2}{9} \)

10. \( \frac{30}{22} \)

Using long division, write each rational number as a repeating decimal with 3 decimal places. Identify the pattern of repeating digits using bar notation.

11. \( \frac{13}{6} \)

12. \( \frac{34}{33} \)
Add two negative integers.

Example

\(-3 + (-5)\)

**Method 1**
Use a number line to model the sum of two negative integers.

\[-3 + (-5) = -8\]

Start at \(-3\). Then continue by adding \(-5\), a jump of 5 to the left to reach \(-8\).

**Method 2**
Use absolute values to find the sum of two negative integers.

\[|-5| = 3\]
\[|\text{-}5| = 5\]
\[|\text{-}3\text{ } + \text{ }|\text{-}5\text{ }| = 3 + 5\]
\[= 8\]

Add the absolute values.

Simplify.

\[-3 + (-5) = -8\]

Use the common sign, a negative sign, for the sum.

Complete.

21. \(-2 + (-1)\)

**Method 1**
Use a number line to model the sum of two negative integers.

\[-2 + (-1) = \text{ }\]

Start at \(-2\). Then continue by adding \(-1\), a jump of 1 to the left to reach \(-3\).

\[-2 + (-1) = \text{ }\]
Add two integers with different signs.

**Example**

\[-10 + 4\]

**Method 1**
Use a number line to model the sum of integers with different signs.

\[
\begin{array}{c}
\text{Start at 0 and move 10 to the left of 0. Then add 4, a jump of 4 to the right.} \\
-10 \quad -9 \quad -8 \quad -7 \quad -6 \quad -5 \quad -4 \quad -3 \quad -2 \quad -1 \quad 0
\end{array}
\]

\[
\begin{array}{c}
10 \text{ units} \\
4 \text{ units} \\
-10 + 4 = -6
\end{array}
\]

OR

\[
\begin{array}{c}
\text{Start at } -10. \text{ Then add 4, a jump of 4 to the right.}
\end{array}
\]

\[
\begin{array}{c}
-10 \quad -9 \quad -8 \quad -7 \quad -6 \quad -5 \quad -4 \quad -3 \quad -2 \quad -1 \quad 0
\end{array}
\]

\[
\begin{array}{c}
4 \text{ units} \\
-10 + 4 = -6
\end{array}
\]

\[-10 + 4 = -6\]

**Method 2**
Use absolute values to find the sum of integers with different signs.

\[
|\text{-10}| = 10 \quad \text{Write the absolute value of each integer.}
\]

\[
|4| = 4
\]

\[
|\text{-10}| - |4| = 10 - 4 \quad \text{Subtract the lesser absolute value from the greater one.}
\]

\[
= 6 \quad \text{Simplify.}
\]

\[-10 + 4 = -6 \quad \text{Use a negative sign, because -10 has a greater absolute value.}\]

**Complete.**

28. \(-14 + 8\)

\[
\begin{array}{c}
|\text{-14}| = \underline{14} \quad |8| = \underline{8} \quad \text{Write the absolute value of each integer.}
\end{array}
\]

\[
\begin{array}{c}
|\text{-14}| - |8| = \underline{14} - \underline{8} \quad \text{Subtract the lesser absolute value from the greater one.}
\end{array}
\]

\[
\begin{array}{c}
= \underline{6} \quad \text{Simplify.}
\end{array}
\]

\[
\begin{array}{c}
-14 + 8 = \underline{2} \quad \text{Use a negative sign, because } \underline{-14} \text{ has a greater absolute value.}
\end{array}
\]
Lesson 2.2 Subtracting Integers

Subtract positive integers.

**Example**

\[
12 - 15
\]

\[
12 - 15 = 12 + (-15) \quad \text{Rewrite subtraction as adding the opposite.}
\]

Using absolute values,

\[
| -15 | - | 12 | = 15 - 12 = 3 \quad \text{Subtract the absolute values, because the addends have different signs.}
\]

\[
12 - 15 = 12 + (-15) = -3 \quad \text{Simplify.}
\]

Use a negative sign, because \(-15\) has a greater absolute value.

**Complete.**

1. A submarine is 250 feet below sea level. It descended 180 feet. How many feet below sea level is the submarine now?

\[
-250 - 180 = -250 + \boxed{} \quad \text{Rewrite subtraction as adding the opposite.}
\]

Using absolute values,

\[
| -250 | + | \boxed{} | = 250 + \boxed{} \quad \text{Add the absolute values, because the addends have the same sign.}
\]

\[
= \boxed{} \quad \text{Simplify.}
\]

\[
-250 - 180 = -250 + (\boxed{}) = \boxed{} \quad \text{Use the common sign, a \boxed{} sign, for the sum.}
\]

The submarine is \(\boxed{}\) feet below sea level now.

**Evaluate each expression.**

2. \(18 - 32\)  
3. \(15 - 27\)
Solve.

4. The lowest temperature recorded in a particular state in January was $-5^\circ C$. In February, the lowest temperature recorded was $16^\circ C$ lower than the lowest temperature recorded in January. What was the lowest temperature recorded in February?

Subtract negative integers.

**Example**

a) $23 - (-6)$

\[
23 - (-6) = 23 + 6 = 29
\]

Rewrite subtraction as adding the opposite.

Add.

b) $-12 - (-28)$

\[
-12 - (-28) = -12 + 28
\]

Rewrite subtraction as adding the opposite.

Using absolute values,

\[
|-28| - |-12| = 28 - 12 = 16
\]

Subtract the absolute values.

Simplify.

\[
-12 - (-28) = -12 + 28 = 16
\]

Use a positive sign, because $-28$ has a greater absolute value.

**Complete.**

5. $22 - (-9)$

\[
22 - (-9) = 22 + \underline{____}\]

Rewrite subtraction as adding the opposite.

\[
= \underline{____} \quad \text{Add.}
\]
Lesson 2.3 Multiplying and Dividing Integers

Evaluate each product.

Example

a) \(-3 \cdot 5\)
\[-3 \cdot 5 = 15\]
Product of two integers with different signs is negative.

b) \(-2 \cdot (-6)\)
\[-2 \cdot (-6) = 12\]
Product of two integers with the same sign is positive.

1. \(7 \cdot (-9)\)
2. \(4 \cdot (-7)\)

3. \(-4 \cdot (-7)\)
4. \(-5 \cdot (-5)\)

Evaluate each product.

Example

\(3 \cdot (-5) \cdot (-6)\)

Method 1
\[3 \cdot (-5) \cdot (-6) = (-15) \cdot (-6) = 90\]
Product of two integers with different signs is negative.
Product of two integers with the same sign is positive.

Method 2
\[3 \cdot (-5) \cdot (-6) = 3 \cdot (30) = 90\]
Product of two integers with the same sign is positive.
Product of two integers with the same sign is positive.

5. \(3 \cdot (-5) \cdot (-4)\)
6. \(5 \cdot (-7) \cdot (-2)\)
Evaluate each quotient.

**Example**

a) \( -27 \div (-3) \)
\[-27 \div (-3) = 9 \]
Divide. Quotient of two integers with the same sign is positive.

b) \(-84 \div 7\)
\[-84 \div 7 = -12 \]
Divide. Quotient of two integers with different signs is negative.

c) \( 66 \div (-6) \)
\[66 \div (-6) = -11 \]
Divide. Quotient of two integers with different signs is negative.

10. \(-40 \div (-5)\)

11. \(-36 \div 9\)

12. \(32 \div (-8)\)

13. \(-49 \div (-7)\)

Solve.

14. In 200 seconds, a raindrop fell 5,000 feet to the ground. Find its change in height per second.

15. Find the change in height per second of a skydiver who falls 648 meters in 12 seconds.
Lesson 2.4  Operations with Integers

Apply the order of operations with integers.

Example

a) \(-5 - 30 ÷ 5 - 15\)
   \(-5 - 30 ÷ 5 - 15\)  \(= -5 ÷ 6 - 15\)
   \(= -5 ÷ (-6) ÷ (-15)\)
   \(= -5 ÷ (-15) ÷ (-6)\)
   \(= -20 ÷ (-6)\)
   \(= -26\)

b) \(-4 + (8 - 10) \cdot (-5)\)
   \(-4 + (8 - 10) \cdot (-5)\)
   \(= -4 ÷ (-2) ÷ (-5)\)
   \(= -4 ÷ 10\)
   \(= 6\)

Divide.
Rewrite subtraction as adding the opposite.
Use commutative property of addition.
Add.

Simplify within the parentheses.
Multiply.
Add.

Complete.

1. \(20 + 6 - 2 \cdot 4 = 20 + 6 - \underline{\hspace{1cm}}\)
   \(= \underline{\hspace{1cm}} + \underline{\hspace{1cm}}\)  Multiply.
   Rewrite subtraction as adding the opposite.
   Add.

2. \((-15 - 25) ÷ 8 - 12 = \underline{\hspace{1cm}} + 8 - 12\)
   \(= \underline{\hspace{1cm}} - 12\)  Subtract within the parentheses.
   Divide.
   Subtract.

3. \(-11 - (5 + 2) ÷ 3 = -11 - \underline{\hspace{1cm}} + 3\)
   \(= -11 + \underline{\hspace{1cm}} + 3\)  Add within the parentheses.
   Rewrite subtraction as adding the opposite.
   Add.
   Add.

Evaluate each expression.

4. \(-7 - 28 ÷ 4 - 13\)

5. \(-3 + (6 - 9) \cdot (-4)\)

6. \((-35 - 5) ÷ 8 - 17\)

7. \(-13 - (4 + 4) \cdot 2\)
Lesson 3.2 Subtracting Algebraic Terms

Simplify the algebraic expression with decimal coefficients by subtracting.

Example

\[ 1.6y - 0.4y \]

From the bar model,

\[ 1.6y - 0.4y = 1.2y \]

The difference is represented by the shaded part that remain.

Complete.

1. \( 0.8b - 0.3b \)

\[ \_ \_ \_ \_ \_ \_ \]

\[ 0.8b - 0.3b = \_ \_ \_ \_ \_ \_ \]

Simplify each expression with decimal coefficients.

2. \( 1.3a - 0.5a \)

3. \( 4.7g - 0.6g \)

4. \( 0.9h - 0.5h \)

5. \( 1.8p - 1.3p \)
Lesson 3.3 Simplifying Algebraic Expressions

Simplify the algebraic expression with more than two terms and involving decimal coefficients.

Example

$$0.5p + 0.9p + 2$$

From the bar model,

$$0.5p + 0.9p + 2$$

$$= 1.4p + 2$$

Complete to simplify each expression.

1. $$1.3x + 3x + 4$$
   $$= \underline{1.3x} + \underline{3x} + 4$$

2. $$1.7y - 0.8y - 3$$
   $$= \underline{1.7y} - \underline{0.8y} - 3$$

Simplify each expression with one variable.

3. $$3.4f - 1.3f + 5$$
4. $$0.6g + 1.9g - 2$$

Simplify the algebraic expression with more than two terms and involving fractional coefficients.

Example

$$\frac{3}{4}x + \frac{1}{8}x + 3 - 2$$

$$= \frac{6}{8}x + \frac{1}{8}x + 3 - 2$$

The LCD of $$\frac{3}{4}$$ and $$\frac{1}{8}$$ is 8. Rewrite the coefficients as fractions with denominator 8.

$$= \frac{7}{8}x + 1$$
Lesson 3.4 Expanding Algebraic Expressions

Expand the algebraic expression with fractional factors.

Example

\[ \frac{1}{3}(6x + 12) \]

**Method 1**
Use a bar model.

\[ \begin{array}{c}
\text{Bar Model} \\
6x + 12 \\
\hline
2x & 4 & 2x & 4 \\
\hline
\frac{1}{3}(6x + 12)
\end{array} \]

From the bar model,

\[ \frac{1}{3}(6x + 12) = \frac{2}{3}x + 4 \]

**Method 2**
Use the distributive property.

\[ \frac{1}{3}(6x + 12) = \frac{1}{3}(6x) + \frac{1}{3}(12) \]

Use the distributive property.

\[ = \frac{2}{3}x + 4 \]

Complete.

1. \[ \frac{1}{2}(4x + 6) \]

**Method 1**
Use a bar model.

\[ \begin{array}{c}
\text{Bar Model} \\
4x + 6 \\
\hline
2x & 3 & 2x & 3 \\
\hline
\frac{1}{2}(4x + 6)
\end{array} \]

From the bar model,

\[ \frac{1}{2}(4x + 6) = \frac{2}{2}x + \frac{3}{2} \]

**Method 2**
Use the distributive property.

\[ \frac{1}{2}(4x + 6) = \frac{1}{2}(4x) + \frac{1}{2}(6) \]

\[ = 2x + 3 \]

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Expand algebraic expressions with negative factors.

Example

a) \(-2\left(\frac{1}{4}a + \frac{1}{8}\right)\)

\[ -2\left(\frac{1}{4}a + \frac{1}{8}\right) = -2 \left(\frac{1}{4}a\right) + (-2)\left(\frac{1}{8}\right) \]

Use the distributive property.

\[ = \frac{-1}{2}a + \frac{-1}{4} \]

Multiply.

\[ = \frac{-1}{2}a - \frac{1}{4} \]

Rewrite the expression.

b) \(-\frac{1}{3}(-2x + 6y)\)

\[ -\frac{1}{3}(-2x + 6y) = -\frac{1}{3}(-2x) + \left(-\frac{1}{3}\right)(6y) \]

Use the distributive property.

\[ = \frac{2}{3}x + \frac{-2}{3}y \]

Multiply.

\[ = \frac{2}{3}x - 2y \]

Rewrite the expression.

c) \(-(2.5m - 3.6)\)

\[ -(2.5m - 3.6) = -1(2.5m) + (-1)(-3.6) \]

Rewrite the expression.

\[ = -2.5m + 3.6 \]

Use the distributive property.

Multiply.
Complete.

10. \(-3(-5a - 6)\)
    \[= -3(-5a + (-6))\]
    \[= -3(-5a) + (-3)(-6)\]
    \[= \underline{} + \underline{}\]

11. \(-\frac{1}{4}(4y + 7)\)
    \[= -\frac{1}{4}(\underline{} + \underline{})\]
    \[= \underline{} + \underline{}\]

Expand each expression with negative factors.

12. \(-3\left(2x + \frac{1}{3}\right)\)
13. \(-5\left(\frac{3}{10}a - 2\right)\)

14. \(-\frac{1}{2}\left(-4x + \frac{1}{3}\right)\)
15. \(-0.6(-7x - 9)\)

Expand and simplify the algebraic expression.

**Example**

\[3(a + 2b) - 4b\]

\[3(a + 2b) - 4b = 3(a) + 3(2b) - 4b\]  Use the distributive property.

\[= 3a + 6b - 4b\]  Multiply.

\[= 3a + 2b\]  Simplify.

Complete.

16. \(4(2d + 3f) + 6d = 4(2d) + 4(\underline{} + \underline{})\)  Use the distributive property.
    \[= \underline{} + \underline{} + \underline{}\]  Multiply.
    \[= \underline{} + \underline{} + \underline{}\]  Group like terms.
    \[= \underline{} + \underline{}\]  Simplify.
Lesson 4.2  Solving Algebraic Equations

Solve the algebraic equation with variables on the same side of the equation.

**Example**

\[2x - 3 = 5\]

\[2x - 3 + 3 = 5 + 3\]  \hspace{1cm} \text{Add 3 to both sides.}

\[2x = 8\]  \hspace{1cm} \text{Simplify.}

\[2x \div 2 = 8 \div 2\]  \hspace{1cm} \text{Divide both sides by 2.}

\[x = 4\]  \hspace{1cm} \text{Simplify.}

\[x = \underline{4}\] gives the solution of the equation \(2x - 3 = 5\).

Check: Substitute the value of \(x = 4\) into the original equation.

\[2x - 3 = 2 \cdot 4 - 3\]

\[= 5\]

When \(x = \underline{4}\), the equation \(2x - 3 = 5\) is \underline{true}.

\[x = \underline{4}\] gives the solution.

**Complete.**

1. \(6 + 8x = 24\)

\[6 + 8x = 24\]

\[6 + 8x - \underline{\hspace{1cm}} = 24 - \underline{\hspace{1cm}}\]  \hspace{1cm} \text{Subtract } \underline{\hspace{1cm}} \text{ from both sides.}

\[8x = \underline{\hspace{1cm}}\]  \hspace{1cm} \text{Simplify.}

\[8x \div \underline{\hspace{1cm}} = \underline{\hspace{1cm}} \div \underline{\hspace{1cm}}\]  \hspace{1cm} \text{Divide both sides by } \underline{\hspace{1cm}}.

\[x = \underline{\hspace{1cm}}\]  \hspace{1cm} \text{Simplify.}

\[x = \underline{\hspace{1cm}}\] gives the solution of the equation \(6 + 8x = 24\).

Check: Substitute the value of \(x = \underline{\hspace{1cm}}\) into the original equation.

\[6 + 8x = 6 + 8 \cdot \underline{\hspace{1cm}} = \underline{\hspace{1cm}}\]

When \(x = \underline{\hspace{1cm}}\), the equation \(6 + 8x = 24\) is \underline{\hspace{1cm}}.

\[x = \underline{\hspace{1cm}}\] gives the solution.
Solve each equation with variables on the same side.

2. \(4 - 12x = 20\)

3. \(-5y - 5 = 10\)

Solve the algebraic equation with variables on the same side of the equation.

**Example**

\[\frac{2}{5}x + \frac{1}{2} = 2\]

**Method 1**
Solve by balancing the equation.

\[\frac{2}{5}x + \frac{1}{2} = 2\]

\[\frac{2}{5}x + \frac{1}{2} - \frac{1}{2} = 2 - \frac{1}{2}\]

Subtract \(\frac{1}{2}\) from both sides.

\[\frac{2}{5}x = \frac{3}{2}\]

Simplify.

\[\frac{5}{2} \cdot \left(\frac{2}{5}x\right) = \frac{5}{2} \cdot \left(\frac{3}{2}\right)\]

Multiply both sides by \(\frac{5}{2}\), which is the reciprocal of the coefficient \(\frac{2}{5}\).

\[x = \frac{15}{4}\]

Simplify.
Lesson 4.4 Solving Algebraic Inequalities

Solve the inequality using addition and subtraction. Then graph the solution set on a number line.

Example

\[ 0.4x - 6 + 0.6x > 10 \]
\[ 0.4x - 6 + 0.6x > 10 \]
\[ x - 6 > 10 \]
\[ x - 6 + 6 > 10 + 6 \]
\[ x > 16 \]

The solution set is \( x > 16 \) and it can be represented on a number line as follows:

Check your answer by substituting a number greater than 16 into the original inequality.

Complete. Then graph the solution set on a number line.

1. \( 1.9x + 2 + 0.1x \leq 5 \)

\[ 1.9x + 2 + 0.1x \leq 5 \]
\[ \underline{\quad} + 2 \leq 5 \]
\[ \underline{\quad} + 2 - \underline{\quad} \leq 5 - \underline{\quad} \]
\[ \underline{\quad} \leq \underline{\quad} \]
\[ \underline{\quad} \leq \underline{\quad} \]
\[ x \leq \underline{\quad} \]

Solve each inequality using addition and subtraction. Then graph the solution set on a number line.

2. \( 0.3m + 1 + 0.7m \geq 4 \)

3. \( 1.4y - 2 + 1.6y < 1 \)
Inequalities

Graph the inequalities.

1. \( z \leq 4 \times 2 \)

2. \( s > 12 \div 3 \)

3. \( 3 \times 3 < t \)

4. \( 84 \div 6 \geq n \)

5. \( e < 3 \times 20 \)

6. \( q \leq 240 \div 5 \)

7. \( 11 \times 11 \geq f \)

8. \( d > 217 \div 7 \)

9. \( u > 9 \times 65 \)

10. \( 2,046 \div 33 \geq i \)
CHAPTER

5 Direct and Inverse Proportion

Lesson 5.1 Understanding Direct Proportion

Tell whether each ratio is in simplest form. Then write two ratios that are equivalent to the given ratio.

1. 2 : 3
2. 6 : 9
3. 9 : 16
4. 10 : 25
5. 24 : 40
6. 36 : 16
7. 12 : 32
8. 30 : 18

Tell whether \( y \) is directly proportional to \( x \). If so, find the constant of proportionality.

Example

\[
\begin{array}{|c|c|c|c|}
\hline
x & 1 & 2 & 3 \\
\hline
y & 2 & 4 & 6 \\
\hline
\end{array}
\]

For each pair of values \( x \) and \( y \):

\[
\frac{2}{1} = 2 \quad \frac{4}{2} = 2 \quad \frac{6}{3} = 2
\]

Is \( y \) proportional to \( x \)? Yes

If yes, what is the constant of proportionality? 2
Tell whether \( y \) is directly proportional to \( x \). If so, find the constant of proportionality.

9. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

Is \( y \) proportional to \( x \)?

If yes, what is the constant of proportionality?

10. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>2</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

Is \( y \) proportional to \( x \)?

If yes, what is the constant of proportionality?

11. 

<table>
<thead>
<tr>
<th>( x )</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>8</td>
<td>16</td>
<td>24</td>
</tr>
</tbody>
</table>

Is \( y \) proportional to \( x \)?

If yes, what is the constant of proportionality?
Lesson 5.2 Representing Direct Proportion Graphically

Tell whether each graph represents a direct proportion. If so, find the constant of proportionality. Then write a direct proportion equation.

Example

Is the graph a straight line that passes through the origin? Yes

So, does the graph represent a direct proportion? Yes

Because the graph passes through \((1, 2)\), the constant of proportionality is \(2\).

The direct proportion equation is \(y = 2x\).

Complete.

1. Is the graph a straight line that passes through the origin? 

So, does the graph represent a direct proportion? 

Because the graph passes through the point \((____, ____),\) the constant of proportionality is 

The direct proportion equation is ____.
Tell whether each graph represents a direct proportion. If so, find the constant of proportionality. Then write a direct proportion equation.

2. 

3. 

4. 

5.
In each table, \( y \) is directly proportional to \( x \). Complete the table.

**Example**

<table>
<thead>
<tr>
<th>( x )</th>
<th>2</th>
<th>a) ___</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>10</td>
<td>15</td>
<td>b) ___</td>
</tr>
</tbody>
</table>

a) \[
\frac{10}{2} = \frac{15}{x}
\]
\[
x \cdot 10 = 2 \cdot 15
\]
\[
10x = 30
\]
\[
\frac{10x}{10} = \frac{30}{10}
\]
\[
x = 3
\]

b) \[
\frac{10}{2} = \frac{y}{5}
\]
\[
5 \cdot 10 = 2 \cdot y
\]
\[
50 = 2y
\]
\[
\frac{50}{2} = \frac{2y}{2}
\]
\[
25 = y
\]

Since \( y \) is directly proportional to \( x \), you can use proportional reasoning to solve for the unknown values.

**Complete.**

5. | \( x \) | 4   | a) ___ | 10  |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>( y )</td>
<td>12</td>
<td>18</td>
<td>b) ___</td>
</tr>
</tbody>
</table>

a) \[
\frac{12}{4} = \frac{\Box}{x}
\]
\[
x \cdot 12 = 4 \cdot ___
\]
\[
12x = ___
\]
\[
___ = ___
\]
\[
x = ___
\]

b) \[
\frac{12}{4} = \frac{\Box}{10}
\]
\[
12 \cdot ___ = ___ \cdot 4
\]
\[
___ = 4y
\]
\[
___ = ___
\]
\[
___ = y
\]
Complete.

20. In the diagram, \( \angle ABC = 90^\circ \). Find the value of \( x \).

\[
\begin{align*}
m\angle ABD + m\angle DBC &= \underline{\hspace{2cm}} & \text{Comp. \( \angle s \)} \\
x^\circ + 28^\circ &= \underline{\hspace{2cm}} \\
x^\circ + 28^\circ - \underline{\hspace{2cm}} &= \underline{\hspace{2cm}} - \underline{\hspace{2cm}} \\
x &= \underline{\hspace{2cm}}
\end{align*}
\]

Find the value of the unknowns in each of the diagrams.

21. In the diagram, \( \angle XYZ = 90^\circ \). Find the value of \( a \).

\[
\begin{align*}
\angle \text{a}^\circ &\quad \text{45}\degree
\end{align*}
\]

22. In the diagram, \( \angle PQR = 90^\circ \). Find the value of \( y \).

\[
\begin{align*}
\angle 68\degree &\quad \text{y}^\circ
\end{align*}
\]

23. In the diagram, \( \angle EFG = 90^\circ \). Find the value of \( x \).

\[
\begin{align*}
\angle 13\degree &\quad \text{x}^\circ
\end{align*}
\]
Lesson 6.2 Angles that Share a Vertex

Use algebra to solve problems involving angles at a point.

Example

Find the value of $x$ in each diagram.

The sum of the measures of angles at a point is $360^\circ$.

\[
\begin{align*}
m \angle AOC + m \angle COB + m \angle BOA &= 360^\circ \\
3x^\circ + 130^\circ + 80^\circ &= 360^\circ \\
3x^\circ + 210^\circ &= 360^\circ \\
3x^\circ + 210^\circ - 210^\circ &= 360^\circ - 210^\circ \\
5x &= 150 \\
3x &= 150 \\
3 &= \frac{150}{3} \\
x &= 50
\end{align*}
\]

Complete.

1. \[
m \angle COA + m \angle AOB + m \angle BOC = \quad \angle s \text{ at a point}
\]
\[
5x^\circ + \underline{\quad} + \underline{\quad} = \underline{\quad}
\]
\[
\underline{\quad} = \underline{\quad}
\]
\[
\underline{\quad} = \underline{\quad}
\]
\[
x = \underline{\quad}
\]

Find the value of $x$ in each diagram.

2. \[
m \angle COP + m \angle POQ + m \angle QOR = \quad \angle s \text{ at a point}
\]
\[
3x^\circ + 110^\circ + 130^\circ = \underline{\quad}
\]
\[
\underline{\quad} = \underline{\quad}
\]
\[
x = \underline{\quad}
\]
Lesson 8.2 Finding Volume and Surface Area of Cylinders

Find the volume of a cylinder given its radius and height.

Example

Find the volume of a cylinder with a diameter of 4 centimeters and a height of 7 centimeters. Use 3.14 as an approximation for π. Round your answer to the nearest tenth.

Radius = Diameter ÷ 2
= 4 ÷ 2
= 2 cm

Volume of cylinder = πr²h
≈ 3.14 × 2 × 2 × 7
= 87.92
≈ 87.9 cm³

Use the formula for volume.
Substitute for π, r, and h.
Multiply.
Round to the nearest tenth.

The volume of the cylinder is about 87.9 cubic centimeters.

Complete.

1. Find the volume of a cylinder with a diameter of 6 inches and a height of 3.2 inches. Use 3.14 as an approximation for π. Round your answer to the nearest tenth.

Radius = Diameter ÷ 2
= 6 ÷ 2
= 3 in.

Volume of cylinder = πr²h
≈ 3.14 × 3 × 3 × 3.2
= 28.744
≈ 28.7 cm³

Use the formula for volume.
Substitute for π, r, and h.
Multiply.
Round to the nearest tenth.

The volume of the cylinder is about 28.7 cubic inches.

Use the given dimensions to find the volume of each cylinder. Use 3.14 as an approximation for π. Round your answer to the nearest tenth.

2. Radius = 3 in., Height = 8.5 in.

3. Diameter = 9 cm, Height = 11 cm
Find the height of a cylinder given its volume and radius.

Example

An oil barrel is shaped like a cylinder. The volume of the cylinder is 2,310 cubic inches. The radius is 7 inches. What is the height of the oil barrel? Use 3.14 as an approximation for \( \pi \). Round your answer to the nearest inch.

Volume of cylinder = \( \pi r^2 h \)

\[
2,310 \approx 3.14 \cdot 7 \cdot 7 \cdot h
\]

\[
2,310 = 153.86h
\]

\[
\frac{2,310}{153.86} = \frac{153.86h}{153.86}
\]

Divide both sides by 153.86.

\[
15 = h
\]

Simplify.

The height of the oil barrel is about 15 inches.

Complete.

4. The volume of a cylindrical vase is 113 cubic inches. The radius is 2 inches. What is the height of the vase? Use 3.14 as an approximation for \( \pi \). Round your answer to the nearest inch.

Volume of cylinder = \( \pi r^2 h \)

\[
113 \approx 3.14 \cdot 2 \cdot 2 \cdot h
\]

\[
113 = 12.56h
\]

\[
\frac{113}{12.56} = \frac{12.56h}{12.56}
\]

Divide both sides by 12.56.

\[
9 = h
\]

Simplify.

The height of the vase is about 9 inches.

Solve.

5. A cylindrical metal bar has a volume of 636 cubic inches. The radius of the metal bar is 3 inches. What is the height of the metal bar? Use 3.14 as an approximation for \( \pi \). Round your answer to the nearest inch.
Find the surface area of a cylinder.

Example

A cylinder has a radius of 8 inches and a height of 14 inches. What is the surface area of the cylinder to the nearest tenth? Use 3.14 as an approximation for \( \pi \).

Surface area of cylinder
\[
= 2\pi r^2 + 2\pi rh
\]
\[
= 2 \cdot 3.14 \cdot 8 \cdot 8 + 2 \cdot 3.14 \cdot 8 \cdot 14
\]
\[
= 401.92 + 703.36
\]
\[
= 1,105.28
\]
\[
= 1,105.3 \text{ in}^2
\]

Use the formula. Substitute for \( \pi, r, \) and \( h \). Multiply. Add. Round to the nearest tenth.

The surface area of the cylinder is about \( 1,105.3 \) square inches.

Complete.

6. A cylinder has a height of 9 feet and a radius of 3 feet. Find the surface area of the cylinder. Use 3.14 as an approximation for \( \pi \). Round your answer to the nearest tenth.

Surface area of cylinder
\[
= 2\pi r^2 + 2\pi rh
\]
\[
= 2 \cdot 3.14 \cdot \underline{3} \cdot \underline{3} + 2 \cdot 3.14 \cdot \underline{3} \cdot \underline{9}
\]
\[
= \underline{56.52} + \underline{56.52}
\]
\[
= \underline{113.04}
\]
\[
= \underline{113.04} \text{ ft}^2
\]

Use the formula. Substitute for \( \pi, r, \) and \( h \). Multiply. Add. Round to the nearest tenth.

The surface area of the cylinder is about \( \underline{113.04} \) square feet.

Solve.

7. A cylinder has a radius of 1.5 inches and a height of 3 inches. Find the surface area of the cylinder. Use 3.14 as an approximation for \( \pi \). Round your answer to the nearest tenth.
Find the radius of a cylinder given its surface area and height.

Example

Find the radius of a cylinder if the area of its curved surface is $56\pi$ square centimeters and its height is 8 centimeters.

Area of curved surface $= 2\pi rh$

$56\pi = 2\pi r \cdot 8$

Substitute the surface area and height.

$56\pi = 2 \cdot 8 \cdot \pi r$

Multiply 2 by 8.

$56\pi = 16\pi r$

Simplify.

$\frac{56\pi}{16\pi} = \frac{16\pi}{16\pi}$

Divide both sides by $16\pi$.

$3.5 = r$

Simplify.

The radius is $3.5$ centimeters.

Complete.

8. The area of the curved surface of a cylindrical glass is $128\pi$ square centimeters and its height is 16 centimeters. What is the diameter of the glass?

Area of curved surface $= 2\pi rh$

Use a formula for the area of the curved surface.

$\underline{128\pi} = 2\pi r \cdot \underline{16}$

Substitute the surface area and height.

$128\pi = 2 \cdot \underline{16} \cdot \pi r$

Multiply 2 by \underline{16}.

$\underline{16\pi} = \underline{16\pi} r$

Simplify.

$\underline{16\pi} = \underline{16\pi}$

Divide both sides by \underline{16\pi}.

$\underline{1} = r$

Simplify.

The diameter is $\underline{32}$ centimeters.

Solve.

9. The area of the curved surface of a cylindrical vase is $80\pi$ square inches and its height is 8 inches. What is the radius of the vase?
Lesson 8.3 Finding Volume and Surface Area of Pyramids and Cones

Find the volume of a pyramid.

Example

What is the volume of the square pyramid?

Volume of pyramid \( \frac{1}{3}Bh \) Use the formula.

\[ \frac{1}{3} \cdot (5 \cdot 5) \cdot 9 \quad B = 5 \cdot 5 \]

\[ = 75 \text{ cm}^3 \quad \text{Multiply.} \]

The volume of the square pyramid is \( 75 \) cubic centimeters.

Complete.

1. A rectangular pyramid has a height of 8 feet. The width of its base is 3 feet and the length of the base is 6 feet. What is the volume of the pyramid?

Volume of pyramid \( \frac{1}{3}Bh \) Use the formula.

\[ \frac{1}{3} \cdot (\text{ } \cdot \text{ }) \cdot 8 \quad B = (\text{ } \cdot \text{ }) \]

The volume of the pyramid is \( \text{ } \) cubic feet.

Solve.

2. The base of a pyramid is a right triangle. The triangle has a base of 3 inches and a height of 4 inches. The pyramid has a height of 6 inches. What is the volume of the pyramid?

3. The following pyramid has a base area of 27 square centimeters and a height of 12 centimeters. What is its volume?
CHAPTER

9

Statistics

Lesson 9.1 Interpreting Quartile and Interquartile Range

Find the mean of each set of data. Round your answer to 2 decimal places if it is not exact.

1. 2, 21, 9, 26, 23

2. 31, 35, 29, 43, 37, 33, 41

3. 1.7, 39.5, 29.2, 41.4

4. 0.17, 1.13, 2.96, 3.05, 5.49, 4.68

Find the median of each set of numbers.

5. 42, 30, 28, 15, 36, 32

6. 129, 122.1, 156.3, 112.8, 126.2, 149.6

7. 7, 2, 1, 4, 6, 8, 3, 5, 6, 4

8. 1,021, 1,201, 1,102, 1,012, 1,210, 1,120, 120, 112

Summarize each of the following data sets in a frequency table and draw a dot plot.

9. The data shows the total number of goals in 20 soccer matches.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>3</th>
<th>2</th>
<th>5</th>
<th>1</th>
<th>4</th>
<th>1</th>
<th>3</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>8</td>
<td>2</td>
</tr>
</tbody>
</table>

10. The data shows the number of absentees in a class over 20 days.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>3</th>
<th>1</th>
<th>0</th>
<th>2</th>
<th>1</th>
<th>1</th>
<th>0</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Find the range of a set of data.

Example

The heights, in inches, of 10 students are 60, 63, 62, 65, 64, 66, 66, 63, and 65.
Find the range of the heights.

The tallest height is 66 inches.
The shortest height is 60 inches.
Range = The tallest height – The shortest height

\[= 66 - 60\]

\[= 6 \text{ in.}\]

The range is 6 inches.

Complete.

11. The weights, in pounds, of 10 sacks of flour are 84, 92, 85, 91, 93, 88, 86, 86, 85, and 94. Find the range of the weights.

The heaviest weight is _______ pounds.

The lightest weight is _______ pounds.

Range = The heaviest weight – The lightest weight

\[= _______ - _______\]

\[= _______ \text{ lb}\]

The range is _______ pounds.

Find the range of each set of data values.

12. The time intervals, in minutes, between two buses on the same route is 53, 28, 23, 37, 45, 29, 31, and 35. Find the range of the time intervals.

13. The number of cars entering a parking lot each day for a week is 125, 131, 108, 145, 129, 135, and 130. Find the range of the number of cars.
Find the quartiles of a set of data.

**Example**

The data below shows the time intervals, in minutes, between two consecutive trains on the same route. Find the first, second, and third quartiles of the time intervals.

\[
\begin{array}{cccc}
43 & 27 & 22 & 35 \\
29 & 33 & 39 & 30 \\
\end{array}
\]

22, 27, 29, 30, 33, 35, 39, 43

**Q₂** is the median of the data:

\[Q₂ = \frac{30 + 33}{2} = 31.5\]

**Q₁** is the median of the lower half of the data:

\[Q₁ = \frac{27 + 29}{2} = 28\]

**Q₃** is the median of the upper half of the data:

\[Q₃ = \frac{35 + 39}{2} = 37\]

**Complete.**

14. The average hourly wages, in dollars, among different professions are listed below.

\[
\begin{array}{cccccc}
18 & 10 & 40 & 23 & 55 \\
61 & 45 & 28 & 19 & 25 \\
\end{array}
\]

Arrange the hourly wages in ascending order:

10, 18, ________, ________, ________, ________, ________

________, ________

**Q₂** is the median of the data:

\[Q₂ = \frac{25 + 28}{2} = ________\]

**Q₁** is the median of the lower half of the data:

\[Q₁ = ________\]

**Q₃** is the median of the upper half of the data:

\[Q₃ = ________\]
Lesson 9.5 Making Inferences About Populations

Use an inference to estimate a population mean.

Example

A population of 80 senior citizens was randomly sampled to find the number of movies that 10 senior citizens watched in a year. The data are:

13  20  19  23  18  28  21  26  29  25

a) Calculate the sample mean and use it to approximate the population mean.

\[
\text{Sample mean} = \frac{13 + 20 + 19 + 23 + 18 + 28 + 21 + 26 + 29 + 25}{10} = 22.2
\]

The population mean is estimated to be 22.2

b) Calculate the mean absolute deviation (MAD) of the sample.

<table>
<thead>
<tr>
<th>Data Item</th>
<th>Mean</th>
<th>Distance of Data from the Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>22.2</td>
<td>9.2</td>
</tr>
<tr>
<td>20</td>
<td>22.2</td>
<td>2.2</td>
</tr>
<tr>
<td>19</td>
<td>22.2</td>
<td>3.2</td>
</tr>
<tr>
<td>23</td>
<td>22.2</td>
<td>0.8</td>
</tr>
<tr>
<td>18</td>
<td>22.2</td>
<td>4.2</td>
</tr>
<tr>
<td>28</td>
<td>22.2</td>
<td>5.8</td>
</tr>
<tr>
<td>21</td>
<td>22.2</td>
<td>1.2</td>
</tr>
<tr>
<td>26</td>
<td>22.2</td>
<td>3.8</td>
</tr>
<tr>
<td>29</td>
<td>22.2</td>
<td>6.8</td>
</tr>
<tr>
<td>25</td>
<td>22.2</td>
<td>2.8</td>
</tr>
</tbody>
</table>

\[
\text{Sum of the distances} = 9.2 + 2.2 + 3.2 + 0.8 + 4.2 + 5.8 + 1.2 + 3.8 + 6.8 + 2.8
\]

\[
\text{MAD} = \frac{40}{10} = 4
\]

c) Draw a dot plot for the sample data set and plot the mean.

[Dot plot diagram]

Number of Movies Watched in a Year

mean

22.2
d) Using MAD to mean ratio and the dot plot, describe informally how varied the number of movies watched are.

The dot plot shows that the number of movies watched in a year is distributed over a wide range of 16 movies. The ratio of the MAD to the mean confirms this observation:

\[
\text{MAD to mean ratio} = \frac{4}{22.2} \\
\approx 0.18 \\
= 18\%
\]

The MAD is about 18% of the value of the mean. So the data are fairly well spread out.

Solve.

1. The table shows a random sample of the height of young plants, in centimeters, planted in a garden.

| 34 | 25 | 26 | 27 | 26 | 32 | 34 | 30 | 32 | 30 |

a) Calculate the sample mean and use it to estimate the population mean.

b) Calculate the MAD of the sample.

c) Draw a dot plot for the sample heights and the mean height.

d) Using the MAD to mean ratio and the dot plot, describe informally how varied the plants' heights are.
CHAPTER 10

Probability

Lesson 10.1  Defining Outcomes, Events, and Sample Space

Solve.

1. A letter is selected from the letters in the word ACCOMMODATION. List all the possible types of outcomes.

2. Twelve number cards are placed face down. One card is randomly drawn.

\[
\begin{array}{ccccccccccc}
10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 & 19 & 20 & 21 \\
\end{array}
\]

   a) List all the outcomes in the sample space.
   
   b) If you draw numbers with 1 as the first digit, what are the possible outcomes?
   
   c) If $A$ is the event that the selected card is less than 16, what are all the outcomes favorable to event $A$?
   
   d) If $B$ is the event that the selected card is a prime number, what are all the outcomes favorable to event $B$?

3. You select a name at random from the list below.

\[
\begin{array}{cccc}
Aaron & Elsie & Daniel & Charlene \\
Bruce & Fred & Helen & George \\
\end{array}
\]

   a) $W$ is the event that the selected name has at least two vowels. List the outcomes favorable to event $W$.
   
   b) $X$ is the event that the selected name has 5 letters. List the outcomes favorable to event $X$. 


c) $Y$ is the event that the selected name contains the letter d. What outcomes are favorable to event $Y$?

4. A student is selected at random from the tables below.

<table>
<thead>
<tr>
<th>Name of Student</th>
<th>Wear Glasses? (Yes or No)</th>
<th>Favorite Sport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irene</td>
<td>No</td>
<td>Tennis</td>
</tr>
<tr>
<td>Jackie</td>
<td>Yes</td>
<td>Cycling</td>
</tr>
<tr>
<td>Katherine</td>
<td>No</td>
<td>Swimming</td>
</tr>
<tr>
<td>Lawrence</td>
<td>No</td>
<td>Tennis</td>
</tr>
<tr>
<td>Marcia</td>
<td>No</td>
<td>Cycling</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of Student</th>
<th>Wear Glasses? (Yes or No)</th>
<th>Favorite Sport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nathan</td>
<td>Yes</td>
<td>Swimming</td>
</tr>
<tr>
<td>Oscar</td>
<td>Yes</td>
<td>Tennis</td>
</tr>
<tr>
<td>Pam</td>
<td>No</td>
<td>Cycling</td>
</tr>
<tr>
<td>Richie</td>
<td>Yes</td>
<td>Swimming</td>
</tr>
<tr>
<td>Stephano</td>
<td>No</td>
<td>Tennis</td>
</tr>
</tbody>
</table>

a) $C$ is the event that the selected student does not wear glasses. List the outcomes favorable to event $C$.

b) $D$ is the event that the selected student's favorite sport is swimming. List all the possible outcomes of event $D$.

c) $E$ is the event that the selected student does not wear glasses and whose favorite sport is not swimming. How many outcomes are favorable to event $E$?

5. You toss three coins and record the outcomes. One possible outcome is HHT. HHT means heads appears first, followed by heads, and lastly tails. List all the possible outcomes of the sample space.

6. The 4 numeric tiles $\begin{array}{c} 3 \ 4 \ 7 \ 7 \end{array}$ are placed face down. You pick 4 tiles to form a 4-digit number. $G$ is the event of forming a 4-digit number greater than 4,000. How many outcomes are favorable to event $G$?
Lesson 10.2 Finding Probability of Events

Find the probability of an event when flipping a fair coin.

**Example**

A fair coin is tossed. It is impossible for the coin to land on its edge.

a) What is the probability that the coin will land on tails?
   
   Since it is a fair coin, the chances of landing on heads or tails are equal.
   
   The probability of the coin landing on tails is \( \frac{1}{2} \).

b) What is the probability that the coin will land on heads or tails?
   
   Since the coin has to land on either heads or tails, the probability is 1.

c) What is the probability that the coin will land on neither heads nor tails?

   Such an event is impossible. So, the probability is 0.

**Complete.**

1. A fair number die with faces numbered 7 to 12 is rolled.

   a) Find the probability of getting an 11.

   There are ______ outcomes when you roll a number die. All the outcomes are equally likely. So, the probability of getting an 11 is _______.

   b) Find the probability of getting a 6.

   It is impossible to get a 6 when you roll this die. Such an event is impossible. So, the probability of getting a 6 is _______.

**Solve.**

2. A fair numbered die with faces numbered 4 to 9 is rolled.

   a) Find the probability of the die landing on a 7.

   b) Find the probability of the die landing on a 9.

   c) Find the probability of the die landing on a 3.
Use a relative frequency as an experimental probability to make a prediction.

Example

A bag contains 5 chips of different colors: red, yellow, green, blue, and orange. A chip is randomly drawn from the bag and returned once its color is recorded. This process is repeated 200 times. The table shows the results of the event.

<table>
<thead>
<tr>
<th>Color</th>
<th>Observed Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>43</td>
</tr>
<tr>
<td>Yellow</td>
<td>36</td>
</tr>
<tr>
<td>Green</td>
<td>40</td>
</tr>
<tr>
<td>Blue</td>
<td>39</td>
</tr>
<tr>
<td>Orange</td>
<td>42</td>
</tr>
</tbody>
</table>

(a) Find the relative frequency for each color. Write each relative frequency as a decimal.

Relative frequency for each color:

\[ \frac{43}{200} = 0.215 \]
Find the relative frequency of selecting a red chip.

\[ \frac{36}{200} = 0.18 \]
Find the relative frequency of selecting a yellow chip.

\[ \frac{40}{200} = 0.2 \]
Find the relative frequency of selecting a green chip.

\[ \frac{39}{200} = 0.195 \]
Find the relative frequency of selecting a blue chip.

\[ \frac{42}{200} = 0.21 \]
Find the relative frequency of selecting an orange chip.

(b) If you randomly draw a chip from the bag, which color is most likely to be selected? Explain your answer.

A red chip is most likely to be drawn because the red chip has the greatest relative frequency, 0.215. This means that the experimental probability of drawing a red chip is 0.215, or 21.5%.

(c) What is the experimental probability that the next ball drawn from the bag will not be a red ball?

The event of drawing a red chip and not drawing a red chip are complementary events. The experimental probability that a red chip is drawn is 0.215.

\[ 1 - 0.215 = 0.785 \]

The experimental probability of drawing other than a red chip is \( \frac{0.785}{1} \).
Complete.

6. The cards in a deck have four different letters printed on it: A, B, C, and D. A card is randomly drawn and returned back to the deck once its letter is noted. The process is repeated 100 times. The results are shown in the table.

<table>
<thead>
<tr>
<th>Color</th>
<th>Observed Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>15</td>
</tr>
<tr>
<td>B</td>
<td>25</td>
</tr>
<tr>
<td>C</td>
<td>50</td>
</tr>
<tr>
<td>D</td>
<td>10</td>
</tr>
</tbody>
</table>

a) Find the relative frequency for each letter. Write each relative frequency as a decimal.

Relative frequency for each letter:

\[
\frac{15}{100} = \frac{\text{Find relative frequency of drawing a card with letter A.}}{100}
\]

\[
\frac{25}{100} = \frac{\text{Find relative frequency of drawing a card with letter B}}{100}
\]

\[
\frac{50}{100} = \frac{\text{Find relative frequency of drawing a card with letter C}}{100}
\]

\[
\frac{10}{100} = \frac{\text{Find relative frequency of drawing a card with letter D.}}{100}
\]

b) If you draw a card from the deck. What letter is most likely to be drawn? A card with letter ________ is mostly likely to be drawn because the card has the greatest relative frequency, ________. This means that the probability of drawing a card with letter ________ is ________ or ________.
c) What is the experimental probability that the next card drawn from the bag will not be a card with letter C?

The event of drawing a card with letter C and not drawing a card with letter C are complementary events. The experimental probability that a card with letter C is drawn is \( \frac{18}{100} \).

\[ 1 - \frac{18}{100} = \frac{82}{100} \]

The experimental probability of drawing other than a card with letter C is \( \frac{82}{100} \).

**Solve.**

7. A bag contains marbles of different colors: red, green, blue, and yellow. A marble is randomly drawn from the bag and returned once its color is noted. This process is repeated 100 times. The number of times each color was drawn from the bag was recorded.

<table>
<thead>
<tr>
<th>Color</th>
<th>Observed Frequency</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Yellow</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

a) Find the relative frequency for each color. Write each relative frequency as a decimal in the table.

b) If you randomly draw a marble from the bag, what color is most likely to be drawn?

c) What is the experimental probability that the next marble drawn from the bag will not be a blue marble?