Order the integers from least to greatest.

1) -3, 5, 7, -9, 10

$-9, -3, 5, 7, 10$

2) -10, -13, 0, -3, 1

$-13, -10, -3, 0, 1$

3) -1, 3, -5, -11, 10, 12

$-11, -5, -1, 3, 10, 12$

Order the integers from greatest to least.

4) 5, 9, -2, -7, 11

$11, 9, 5, -2, -7$

5) -1, -8, -6, -11, -14

$-1, -6, -8, -11, -14$

6) 20, 40, -30, -50, 100, -250

$100, 40, 20, -30, -50, 250$

List the absolute values of the following sets of integers from least to greatest.

7) {-3, 5, -2, 8, 7}

3 5 2 8 7

$2, 3, 5, 7, 8$

8) {-10, -30, -40, -50, -5)

10 30 40 50 5

$5, 10, 30, 40, 50$

9) {1, -3, 2, -4, 5}

1 3 2 4 5

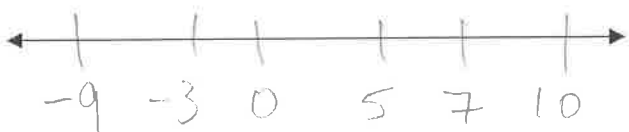$1, 2, 3, 4, 5$

Graph the integers on a number line. ✱ not to scale... approximate

10) -3, 5, 7, -9, 10

-9 -3 0 5 7 10

11) -10, -13, 0, -3, 1

-13 -10 -3 0 1

12) -1, 3, -5, -11, 10, 12

-11 -5 -3 -10 10 12
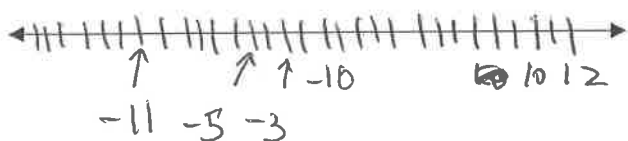
Find the opposite and absolute value.

13) -10

O: 10

AV: $|-10| = 10$

14) 20

O: -20

AV: $|20| = 20$

15) -3

O: 3

AV: $|-3| = 3$

Compare using >, <, or =.

16) $|5| = |-5|$

5   5

17) -7 $\geq$ -5

7   5

18) -7 $=$ $|-7|$

7   7

19) Why is the absolute value of a number always positive?

It is the distance from the given number to 0. Distance cannot be a negative number.

Name _____ Date _____

Extra Practice 1

Lesson 2.1: Using Models to Multiply Integers

1. a) Evaluate.

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

    b) Explain why $(+4) \times (-3)$ has the same value as the expression in part a.

    Adding a number 4 times is the same as multiplying the number by 4.

2. Use coloured tiles to find each product.

    a) $(+4) \times (+3) = 12$ b) $(+6) \times (-7) = -42$

    c) $(-5) \times (+3) = -15$ d) $(-8) \times (-3) = 24$

3. Use a number line to find each product.

    a) $(+8) \times (+2) = 16$ b) $(+3) \times (-4) = -12$

    c) $(-6) \times (+6) = -36$ d) $(-9) \times (-2) = 18$

4. The ice on Mattias's skating pond melted 2 cm every day for 5 days. Use integers to find the change in the depth of the ice after 5 days.

    ice got thinner
    $(5)(-2) = -10$
    total decrease in ice thickness

5. Aliya climbs down a ladder. The rungs on the ladder are 30 cm apart.

    a) Aliya climbs down 2 rungs. Use integers to find her total change in elevation.

    $2(-30) = -60$ cm ← *Rember units.*

    b) How much higher was Aliya before she climbed down 3 rungs?

    negative -3

    -30 because she is going down the ladder so her elevation (distance above the Earth's surface) is decreasing.

    $-3(-30) = 90$ cm
    She was 90 cm higher.

Name _____ Date _____

Extra Practice 5

Lesson 2.5: Order of Operations with Integers

1. Evaluate. State which operation you do first.

   a) $(8 \times 5) - 4 = 36$

   b) $(-4)[(-4) + 9] = -20$

   c) $18 \div [(-7) - 2] = -2$

   d) $(-3) + (-14) \div (-2) = 4$

2. Evaluate. Show all steps.

   a) $4(-8) - 9 = -41$

   b) $(-1) + (-20) \div 5 = -5$

   c) $(-9) + (-4)(-2) = -1$

   d) $(-3)[(-8) - 11] = 57$

3. Evaluate.

   a) $\dfrac{(-5) + (-9)}{2} = -7$

   b) $\dfrac{-12}{(-2)(-3)} = -2$

   c) $\dfrac{24 \div (-6) - 1}{-5} = -1$

   d) $\dfrac{36}{(-5) \times 2 + 4} = -6$

4. Evaluate.

   a) $(-72) \div 9 + 4 \times (-3) = -20$

   b) $5(-2) - 63 \div (-7) = -1$

   ✻ c) $\dfrac{4(-5) + [28 \div (-4)]}{5 \times (-2) + 1} = 3$

   ✻ d) $\dfrac{4 \times (-4) + (-8)}{[10 + (-1)] + [2 \times (-3)]} = -8$

✻ 5. Evaluate each expression. Then insert one pair of square brackets in each expression so it evaluates to -1.

   a) $12 \div (-4) + (-8) = -11$ $\qquad 12 \div [(-4) + (-8)] = -1$

   b) $(-9) + 6 \div 3 = -7$ $\qquad [(-9) + 6] \div 3 = -1$

   c) $5 \div (-5) \times 0 + 1 = 1$ $\qquad 5 \div (-5) \times [0 + 1]$

Master 3.29 **Extra Practice 3**

Lesson 3.3: Multiplying Fractions

1. Multiply. Estimate to check.

a) $\frac{2}{3} \times \frac{6}{9} = \frac{4}{9}$

b) $\frac{3}{4} \times \frac{3}{5} = \frac{3}{10}$

c) $\frac{5}{2} \times \frac{1}{4} = \frac{5}{8}$

d) $\frac{7}{3} \times \frac{5}{3} = \frac{35}{9}$

e) $\frac{12}{8} \times \frac{4}{3} = 2$

f) $\frac{2}{5} \times \frac{1}{2} = \frac{1}{5}$

g) $\frac{6}{7} \times \frac{1}{3} = \frac{2}{7}$

h) $\frac{10}{3} \times \frac{6}{8} = \frac{5}{2}$

2. Daphne replaced light bulbs in her mother's store.
   She had $\frac{3}{4}$ of a box of light bulbs. She used $\frac{1}{3}$ of the bulbs.

   a) What fraction of the box of light bulbs was left?

   Used: $\frac{1}{3}$ of $\frac{3}{4}$ ⟹ $\frac{1}{3} \times \frac{3}{4} = \frac{1}{4}$

   left: original − used = $\frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$

   b) How many light bulbs might be in a full box? Explain.

   The number of bulbs must be divisible by 4 and 3.

3. Estimate each product.

   a) $\frac{7}{2} \times \frac{7}{8}$ about 1   b) $\frac{15}{12} \times \frac{1}{3}$ $\frac{1}{3} \times 1 = \frac{1}{3}$ c) $\frac{32}{5} \times \frac{5}{3}$ about 2

   $\frac{7}{2} \times 1 = \frac{7}{2}$ or $3\frac{1}{2}$ about 1   about 6 $6 \times 2 = 12$

4. The product of two fractions is $\frac{4}{5}$. One fraction is $\frac{2}{3}$.

   What is the other fraction?

   $\left(\frac{2}{3}\right)(x)$ another fraction $= \frac{4}{5}$ Therefore $\frac{4}{5} \div \frac{2}{3} = x$

   $\frac{4}{5} \div \frac{2}{3} = \frac{4}{5} \times \frac{3}{2} = \frac{6}{5}$

5. Multiply. Simplify before multiplying if possible.

   a) $\frac{7}{9} \times \frac{18}{21} = \frac{2}{3}$

   b) $\frac{9}{10} \times \frac{5}{18} = \frac{1}{4}$

   c) $\frac{4}{15} \times \frac{20}{28} = \frac{4}{21}$

   d) $\frac{7}{20} \times \frac{10}{21} = \frac{1}{6}$

Name _____ Date _____

Extra Practice 6

Lesson 3.6: Dividing Fractions

1. Write the reciprocal of each fraction.

   a) $\frac{1}{3} \Rightarrow \frac{3}{1}$ b) $\frac{8}{7} \Rightarrow \frac{7}{8}$ c) $\frac{9}{11} \Rightarrow \frac{11}{9}$ d) $\frac{17}{12} \Rightarrow \frac{12}{17}$
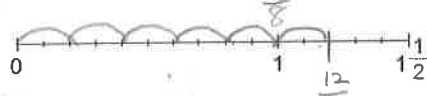
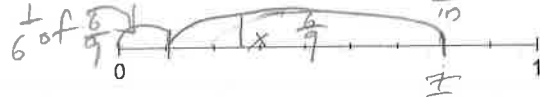2. Use a copy of each number line to illustrate each quotient.

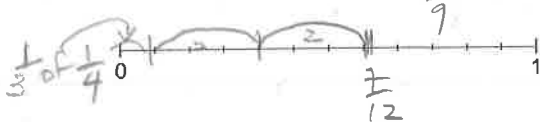   a) $\frac{10}{8} \div \frac{5}{8} = 2$

   b) $\frac{12}{10} \div \left(\frac{1}{5}\right) = 6$

   c) $\frac{7}{9} \div \left(\frac{2}{3}\right) \frac{6}{9} = 1\frac{1}{6}$

   d) $\frac{7}{12} \div \left(\frac{1}{4}\right) \frac{3}{12}$
   $= 2\frac{1}{3}$

3. Use multiplication to find each quotient.

   a) $\frac{7}{5} \div \frac{1}{3}$
   $= \frac{7}{5} \times \frac{3}{1} = \frac{21}{5}$

   b) $\frac{3}{8} \div \frac{2}{5}$
   $\frac{3}{8} \times \frac{5}{2} = \frac{15}{16}$

   c) $\frac{4}{10} \div \frac{5}{7}$
   $\frac{4}{10} \times \frac{7}{5} = \frac{14}{25}$

   d) $\frac{1}{6} \div \frac{1}{7}$
   $\frac{1}{6} \times \frac{7}{1} = \frac{7}{6}$

4. Use common denominators to find each quotient.

   a) $\frac{5}{12} \div \frac{1}{4}$
   $\frac{5}{12} \div \frac{3}{12} = 1\frac{2}{3}$

   b) $\frac{7}{5} \div \frac{4}{10}$
   $\frac{14}{10} \div \frac{4}{10} = 3\frac{1}{2}$

   c) $\frac{2}{3} \div \frac{1}{2}$
   $\frac{4}{6} \div \frac{3}{6} = 1\frac{1}{3}$

   d) $\frac{5}{6} \div \frac{3}{4}$
   $\frac{10}{12} \div \frac{9}{12} = 1\frac{1}{9}$

5. Write three division questions that have $\frac{3}{8}$ as their quotient.

   Possible answers

   $\frac{7}{8} \div \frac{7}{3} = \frac{3}{8}$ $\frac{9}{16} \div \frac{3}{2} = \frac{3}{8}$ $\frac{11}{12} \div \frac{22}{9} = \frac{3}{8}$

Master 3.33   **Extra Practice 7**

Lesson 3.7: Dividing Mixed Numbers

1. Write each mixed number as an improper fraction.

a) $2\frac{2}{7} = \frac{16}{7}$ b) $1\frac{1}{6} = \frac{7}{6}$ c) $3\frac{5}{8} = \frac{29}{8}$ d) $7\frac{3}{5} = \frac{38}{5}$

2. Use common denominators to find each quotient.

a) $1\frac{1}{2} \div \frac{1}{8}$

$\frac{3}{2} \div \frac{1}{8}$

$\frac{12}{8} \div \frac{1}{8} = 12$

b) $2\frac{3}{4} \div 1\frac{1}{16}$

$\frac{11}{4} \div \frac{17}{16}$

$\frac{44}{16} \div \frac{17}{16} = 2\frac{10}{17}$

c) $4\frac{3}{5} \div 1\frac{1}{15}$

$\frac{23}{5} \div \frac{16}{15}$

$\frac{69}{15} \div \frac{16}{15} = 4\frac{5}{16}$

d) $5\frac{1}{2} \div \frac{7}{8}$

$\frac{11}{2} \div \frac{7}{8}$

$\frac{44}{8} \div \frac{7}{8} = 6\frac{2}{7}$

3. Use multiplication to find each quotient.

a) $3\frac{3}{5} \div 1\frac{3}{20}$

$\frac{18}{5} \times \frac{23}{20}$

$= \frac{18}{5} \times \frac{20^{4}}{23} = \frac{72}{23} = 3\frac{3}{23}$

b) $6\frac{1}{4} \div 2\frac{3}{5}$

$\frac{25}{4} \div \frac{13}{5}$

$= \frac{25}{4} \times \frac{5}{13}$

$= \frac{125}{52} = 2\frac{21}{52}$

c) $5\frac{7}{8} \div 2\frac{5}{12}$

$\frac{47}{8} \div \frac{29}{12}$

$\frac{47}{8} \times \frac{12}{29} = \frac{151}{58} = 2\frac{25}{58}$

d) $6\frac{2}{3} \div 7\frac{1}{6}$

$\frac{20}{3} \div \frac{43}{6}$

$\frac{20}{3} \times \frac{6^{2}}{43} = \frac{40}{43}$

4. Divide. Estimate to check.

a) $2\frac{2}{3} \div 1\frac{1}{4}$

$\frac{8}{3} \div \frac{5}{4}$

$= \frac{8}{3} \times \frac{4}{5} = \frac{32}{15} = 2\frac{2}{15}$

b) $3\frac{1}{5} \div 2\frac{3}{4}$

$\frac{16}{5} \div \frac{11}{4}$

$= \frac{16}{5} \times \frac{4}{11} = \frac{64}{55} = 1\frac{9}{55}$

c) $1\frac{5}{8} \div 2\frac{4}{5}$

$\frac{13}{8} \div \frac{14}{5}$

$\frac{13}{8} \times \frac{5}{14} = \frac{65}{112}$

d) $3\frac{1}{3} \div 2\frac{1}{2}$

$\frac{10}{3} \div \frac{5}{2}$

$= \frac{10^{2}}{3} \times \frac{2}{5} = \frac{4}{3} = 1\frac{1}{3}$

5. Which statement has the greatest value? How do you know?

(a) $2\frac{3}{4} \div \frac{1}{3}$ b) $2\frac{3}{4} + \frac{1}{3}$ c) $2\frac{3}{4} \times \frac{1}{3}$

d) $2\frac{3}{4} - \frac{1}{3}$ e) $2\frac{3}{4} \div \frac{3}{1}$ f) $2\frac{3}{4} + \frac{3}{4}$

Long Answer:
Do all the calculations and compare the answers

Short Answer: The answer when a number is divided by something less than 1 is greater than the starting number. Specifically: dividing by $\frac{1}{3}$ is the same as multiplying by 3.

Name _____   Date _____

Extra Practice 8

Lesson 3.8: Solving Problems with Fractions

Solve the following problems.
Estimate to check the reasonableness of your solutions.

1. During a one-hour phone-in talk show, 8 callers made calls that took $3\frac{1}{4}$ min each.

    a) How many minutes were used by the 8 callers?

    $8 @ 3\frac{1}{4} \Rightarrow 8 \times 3\frac{1}{4} = \frac{2\cancel{8}}{1} \times \frac{13}{\cancel{4}} = 26$ 26 minutes

    b) What fraction of the hour was used by these callers?

    $\frac{26 \text{ min}}{60 \text{ min}} = \frac{13}{30}$ Used.

    c) How many minutes were left for other callers?

    26 minutes used. Remaining $60 - 29 = 34$
    ∴ 34 minutes left.

    d) What fraction of the hour was left in the talk show for other callers?

    Remaining $\frac{34 \text{ min}}{60 \text{ min}} = \frac{17}{30}$

2. Ms. Lecky ordered pizza for a party. $1\frac{5}{8}$ of the vegetarian pizza and $\frac{2}{3}$ of the ham and pineapple pizza were not eaten. How much pizza was left?

    $1\frac{5}{8} + \frac{2}{3} = \frac{13^{\times 3}}{8^{\times 3}} + \frac{2^{\times 8}}{3^{\times 8}} = \frac{39}{24} + \frac{16}{24} = \frac{55}{24} = 2\frac{7}{24}$

3. A dressmaker needs $3\frac{3}{8}$ m of fabric to sew one dress.

    How many dresses can the dressmaker make with 28 m of fabric?

    $28 \div 3\frac{3}{8} = \frac{28}{1} \div \frac{27}{8} = \frac{28}{1} \times \frac{8}{27} = \frac{224}{27} = 8\frac{8}{27}$ ∴ 8 dresses can be made

4. A dock is $7\frac{3}{4}$ m high. The portion of the dock above water one day was measured at $2\frac{2}{5}$ m high.
    How much of the dock structure was ~~above~~ below water that day?

    $2\frac{2}{5}$ out of $7\frac{3}{4} \Rightarrow 7\frac{3}{4} - 2\frac{2}{5} = \frac{31}{4} - \frac{12}{5}$

    $\frac{155}{20} - \frac{48}{20} = \frac{107}{20} = 5\frac{7}{20}$

    So $5\frac{7}{20}$ m was below water.

Adding and Subtracting Fractions (A)

Find the value of each expression in lowest terms.

1. $2\frac{5}{6} - \left(4\frac{1}{3} - \frac{3}{2}\right) = 0$

5. $1\frac{1}{5} + \frac{17}{2} - \frac{3}{2} = \frac{41}{5} = 8\frac{1}{5}$

9. $\frac{11}{2} - \left(\frac{2}{7} + \frac{3}{2}\right) = \frac{26}{7} = 3\frac{5}{7}$

2. $\frac{1}{2} + \frac{13}{8} - \frac{11}{12} = \frac{29}{24} = 1\frac{5}{24}$

6. $\frac{17}{6} + \frac{5}{3} - 3\frac{1}{2} = 1$

10. $3\frac{1}{3} + 1\frac{3}{4} - 1\frac{2}{3} = \frac{41}{12} = 3\frac{5}{12}$

3. $\frac{3}{10} - \frac{1}{6} + 3\frac{4}{5} = \frac{59}{15} = 3\frac{14}{15}$

7. $\frac{5}{2} + 1\frac{7}{9} + \frac{1}{3} = \frac{83}{18} = 4\frac{11}{18}$

11. $\frac{4}{3} - \left(1\frac{11}{12} - \frac{5}{4}\right) = \frac{2}{3}$

4. $\frac{3}{4} + \frac{2}{7} - \frac{2}{7} = \frac{3}{4}$

8. $1\frac{11}{12} - \left(1\frac{3}{4} - \frac{1}{8}\right) = \frac{7}{24}$

12. $2\frac{1}{3} - \frac{2}{3} + 1\frac{4}{5} = \frac{52}{15} = 3\frac{7}{15}$

Adding and Subtracting Fractions (B)

Find the value of each expression in lowest terms.

1. $4\frac{1}{2} - \left(1\frac{1}{2} - \frac{4}{5}\right) = \frac{19}{5} = 3\frac{4}{5}$

5. $\frac{9}{2} + \frac{3}{8} - \frac{1}{2} = \frac{35}{8} = 4\frac{3}{8}$

9. $1\frac{5}{8} + 4\frac{1}{2} + 3\frac{1}{2} = \frac{77}{8} = 9\frac{5}{8}$

2. $\frac{7}{4} + \frac{5}{3} + 3\frac{5}{6} = \frac{29}{4} = 7\frac{1}{4}$

6. $\frac{13}{2} - \left(\frac{9}{2} + \frac{1}{3}\right) = \frac{5}{3} = 1\frac{2}{3}$

10. $\frac{1}{4} + 1\frac{3}{11} + \frac{8}{11} = \frac{9}{4} = 2\frac{1}{4}$

3. $\frac{7}{3} + \frac{1}{3} - \frac{2}{11} = \frac{82}{33} = 2\frac{16}{33}$

7. $\frac{5}{9} + 1\frac{1}{3} - \frac{1}{3} = \frac{14}{9} = 1\frac{5}{9}$

11. $\frac{13}{2} - \left(\frac{7}{4} - \frac{1}{10}\right) = \frac{97}{20} = 4\frac{17}{20}$

4. $\frac{19}{12} + \frac{19}{3} - 1\frac{3}{4} = \frac{37}{6} = 6\frac{1}{6}$

8. $\frac{13}{10} + \frac{5}{6} + 1\frac{11}{12} = \frac{81}{20} = 4\frac{1}{20}$

12. $\frac{23}{4} - 1\frac{3}{4} + \frac{1}{3} = \frac{13}{3} = 4\frac{1}{3}$

Master 3.35   **Extra Practice 9**

Lesson 3.9: Order of Operations with Fractions

1. Evaluate.

   a) $\frac{5}{6} - \frac{2}{5} \times (\frac{1}{2} + \frac{1}{6}) = \frac{17}{30}$ b) $\frac{5}{6} - \frac{2}{5} \times \frac{1}{2} + \frac{1}{6} = \frac{4}{5}$ c) $(\frac{5}{6} - \frac{2}{5}) \times (\frac{1}{2} + \frac{1}{6}) = \frac{13}{45}$

2. What do you notice about the expressions and answers in question 1? Explain. Same numbers but different answers. The brackets make the answers change.

3. Emma thinks the answer to $1\frac{1}{2} \div \frac{1}{4} \times \frac{2}{3}$ is the same as the answer to $1\frac{1}{2} \div (\frac{1}{4} \times \frac{2}{3})$.
   Is Emma correct? Explain your thinking. No, Emma is incorrect.

   $(\frac{3}{2} \div \frac{1}{4}) \times \frac{2}{3} = (\frac{3}{2} \times \frac{4}{1}) \times \frac{2}{3}$

   $= 6 \times \frac{2}{3} = \frac{6}{1} \times \frac{2}{3} = 4$

   $\frac{3}{2} \div (\frac{1}{4} \times \frac{2}{3}) = \frac{3}{2} \div \frac{1}{6}$

   $= \frac{3}{2} \times \frac{6}{1} = 9$

4. Evaluate. Show all steps.

   a) $\frac{2}{5} \times (\frac{1}{4} + \frac{2}{3}) - \frac{3}{10} = \frac{1}{15}$ b) $\frac{7}{9} - (\frac{1}{3} + \frac{5}{6}) \div 3 = \frac{7}{18}$ c) $4 \div \frac{2}{3} - 3\frac{1}{4} + \frac{7}{12} = 3\frac{1}{3}$

5. Add brackets to the expression $\frac{3}{10} + \frac{1}{5} \div \frac{1}{2} - \frac{1}{3} \times \frac{1}{4}$, to find as many different expressions and solutions, as you can.

   $\frac{3}{10} + \frac{1}{5} \div \frac{1}{2} - \frac{1}{3} \times \frac{1}{4} = \frac{37}{60}$ $(\frac{3}{10} + \frac{1}{5}) \div \frac{1}{2} - \frac{1}{3} \times \frac{1}{4} = \frac{11}{12}$ $\frac{3}{10} + \frac{1}{5} \div (\frac{1}{2} - \frac{1}{3}) \times \frac{1}{4} = \frac{3}{5}$

   $((\frac{3}{10} + \frac{1}{5} \div \frac{1}{2}) - \frac{1}{3}) \times \frac{1}{4} = \frac{11}{120}$ $(\frac{3}{10} + \frac{1}{5}) \div (\frac{1}{2} - \frac{1}{3}) \times \frac{1}{4} = \frac{3}{4}$ $\frac{3}{10} + \frac{1}{5} \div \frac{1}{2} - \frac{1}{3} \times \frac{1}{4}$

Master 5.21 **Extra Practice 1**

Lesson 5.1: Relating Fractions, Decimals and Percents

1. Write each percent as a fraction and as a decimal.
   a) 24.5% b) $2\frac{4}{5}$% c) 73.25% d) $99\frac{3}{4}$%

   $\frac{49}{200}$, 0.245 $\frac{7}{250}$, 0.028 $\frac{293}{400}$, 0.7325 $\frac{399}{400}$, 0.9975

2. Use a hundredths chart to represent 1%.
   Shade the chart to represent each percent. → # squares shaded on the chart
   a) 0.3% 30 b) 0.55% 55 c) 0.04% 4 d) 0.9% 90
   e) 0.335% 33.5 f) 0.5525% 55.25 g) 0.0475% 4.75 h) $\frac{1}{5}$% 0.2
      $33\frac{1}{2}$ $55\frac{1}{4}$ $4\frac{3}{4}$ $\frac{1}{5}$

3. Write each fraction as a decimal and as a percent.
   a) $\frac{5}{200}$ 0.025, 2.5% b) $\frac{3}{150}$ 0.02, 2% c) $\frac{12}{500}$ 0.024, 2.4% d) $\frac{9}{300}$ 0.03, 3%
   e) $\frac{16}{400}$ 0.04, 4% f) $\frac{12}{250}$ 0.048, 4.8% g) $\frac{15}{600}$ 0.025, 2.5% h) $\frac{28}{800}$ 0.035, 3.5%

4. Write each percent as a fraction and as a decimal.
   a) 0.7% $\frac{7}{1000}$, 0.007 b) 0.44% $\frac{11}{2500}$, 0.0044 c) 0.15% $\frac{3}{2000}$, 0.0015 d) 0.9% $\frac{9}{1000}$, 0.009
   e) 0.92% f) 0.27% g) 0.55% h) 0.36%

   $\frac{23}{2500}$, 0.0092 $\frac{27}{10000}$, 0.0027 $\frac{11}{2000}$, 0.0055 $\frac{9}{2500}$, 0.0036

5. Write each decimal as a fraction and as a percent.
   a) 0.221 $\frac{221}{1000}$, 22.1% b) 0.003 $\frac{3}{1000}$, 0.3% c) 0.2225 $\frac{89}{400}$, 22.25% d) 0.0095 $\frac{19}{2000}$, 0.95%
   e) 0.016 $\frac{1000}{}$% f) 0.375 g) 0.1875 h) 0.0031

   $\frac{4}{250}$, 1.6% $\frac{3}{8}$, 37.5% $\frac{3}{16}$, 18.75% $\frac{31}{10000}$, 0.31%

6. Elaine scored 19 out of 24 on her science test.
   Addison had 81.25% on the same test.
   Who did better?
   How do you know?

   Elaine: $\frac{19}{24} = 0.791\overline{6} = 79.16\%$

7. During a school tournament, Team A had 10 of its 12 team members present.
   Team B had 13 of its 15 players present.
   Which team had the lesser percent of its team present at the tournament?

   Team A: $\frac{10}{12} = 0.8\overline{3} = 83.\overline{3}\%$ } Team A had
                                                                     a smaller %
   Team B: $\frac{13}{15} = 0.8\overline{6} = 86.\overline{6}\%$ } of players.

(Master 5.22) **Extra Practice 2**

Lesson 5.2: Calculating Percents

1. Write each percent as a decimal.
   Draw a diagram or number line to illustrate each answer.
   a) 275% 2.75 b) 156% 1.56
   c) 320% 3.2 d) 0.25% 0.0025
   e) 0.5% 0.005 f) 0.58% 0.0058

2. Write each fraction as a percent.
   Draw diagrams to illustrate your answers.
   a) $\frac{6}{5}$ 120% b) $\frac{45}{40}$ 112.5%
   c) $\frac{15}{3}$ 500% d) $\frac{9}{6}$ 150%
   e) $\frac{60}{25}$ 240% f) $\frac{9}{2}$ 450%

3. a) Find each percent of the number.
      Draw a diagram to illustrate each answer.
      i) 400% of 240   ii) 40% of 240
      iii) 4% of 240   iv) 0.4% of 240
   b) What patterns do you see in your answers in part a?
   c) Use the patterns in part a to find each percent.
      i) 4000% of 240   ii) 0.04% of 240
      9600 (960×10)   0.096 (0.96÷10)

   i. 400% × 240 = 4 × 240 = 960
   ii. 40% × 240 = 0.4 × 240 = 96
   iii. 4% × 240 = 0.04 × 240 = 9.6
   iv. 0.4% × 240 = 0.004 × 240 = 0.96
   b. Each answer = $\frac{1}{10}$ of the last one. (Divide the last answer by 10.)

4. One hundred sixty students attended Music Night on Thursday night.
   The attendance on Friday night was 120% of the attendance on Thursday night.
   The attendance on Saturday night was 75% of the attendance on Friday night.
   a) How many people attended Music Night on Friday night?
   b) How many people attended on Saturday night?
   c) What was the total attendance for the 3 nights?

   4a) F: 120% × 160 = 1.2 × 160 = $\frac{120}{100}$ × 160 = 192 students
   4b) S: 75% × 192 = 0.75 × 192 = $\frac{75}{100}$ × 192 = 144 students
   4c) Total = 160 + 192 + 144 = 496 students

5. A house was purchased for $450 000.
   Three years later, the house was sold for 124% of its purchase price.
   a) What was the selling price of the house?
   b) Estimate to check your answer.
   c) By how much did the value of the house increase over the three years?

   5a) 124% × 450 000 = $\frac{124}{100}$ × 450000 = $558 000

6. In a 500-word assignment, the teacher noted that 1.2% of the words were incorrectly spelled.
   a) How many words were correctly spelled?
   b) Estimate to check your answer.

   6a) Correct = 100 − 1.2% = 98.8%
   98.8% × 500 = 0.988 × 500 = $\frac{988}{1000}$ × $\frac{500}{1}$ = $\frac{988}{2}$ = 494 words

5b) 124% is about 120%
10% of $450 000 = $45 000
12 × 10% = 120% ⟹ 12 × $45000
12 × $45000 = $540 000 so answer is reasonable

5c) Increase = New − Original
= 558 000 − 450 000 = $108 000

6b) 1% of 500 is 5
so about 5 incorrect words

Name _____ Date _____

Extra Practice 3

Lesson 5.3: Solving Percent Problems

1. Find the number in each case.
   a) 30% of a number is 12.
   b) 2% of a number is 9.
   c) 150% of a number is 60.
   d) 55% of a number is 11.

a) $\frac{30}{100} = \frac{12}{x}$ $\frac{30x}{30} = \frac{12 \cdot 100}{30}$ $x = 40$

b) $\frac{2}{100} = \frac{9}{x}$ c) $\frac{150}{100} = \frac{60}{x}$ d) $\frac{55}{100} = \frac{11}{x}$

2. Find the whole amount in each case.
   a) 8% is 72 cm.
   b) 0.6% is 18 g.
   c) 120% is 24 m.
   d) 32% is 64 mL.

a) $\frac{8}{100} = \frac{72}{x}$ $\frac{8x}{8} = \frac{72 \cdot 100}{8}$ $x = 900$ cm

b) $\frac{0.6}{100} = \frac{18}{x} = \frac{6}{1000}$ $\frac{6x}{6} = \frac{(18)(1000)}{6}$ $x = 3000$ g

c) $\frac{120}{100} = \frac{24}{x}$

d) $\frac{32}{100} = \frac{64}{x}$

3. Write each increase as a percent.
   a) The price of gasoline increased from 93.9¢ to 99.9¢. → a) increase is 6¢
   b) The price of a car increased from $32 000 to $36 000. → b) increase is $4000
   c) The price of a loaf of bread increased from $1.99 to $2.49. → c) increase is $0.50

6.4%
12.5%
25.1%

4. Write each decrease as a percent.
   a) The number of employees decreased from 6800 to 5200. → a) decrease is $1600
   b) The area of a park decreased from 840 ha to 672 ha. → b) decrease is 168
   c) The price of a computer decreased from $1500 to $1200. → c) decrease is $300

23.5%
20%
20%

5. A printing machine produces labels.
   Four percent of the labels produced are defective.
   Suppose 372 labels were defective.
   How many labels are not defective?

5) 4% defective → $\frac{4}{100} = \frac{372}{x}$ ← total labels

$\frac{4x}{4} = \frac{(100)(372)}{4} = 9300$

Not defective = 9300 − 372
= 8928 labels

6. A field goal kicker was successful 75% of the time.
   He made 51 field goals.
   How many kicks did he make in total?

$\frac{75}{100} = \frac{51}{x}$ $75x = 100(51)$ → $\frac{75x}{75} = \frac{100(51)}{75} = \frac{204}{3} = 68$ kicks

7. Lesley and Enid left their waitress a 15% tip.
   The tip was $10.25.
   What was their total bill, not including the tip?

$\frac{15}{100} = \frac{10.25}{x}$ $15x = (100)(10.25)$ $\frac{15x}{15} = \frac{1025}{15}$ $x = \frac{205}{3} = \$68.33$

8. Marcus collects baseball cards. At the end of 2005, he had 250 cards.
   His collection increased by 12% in 2006, and by 15% in 2007.
   a) How many baseball cards did Marcus have at the end of 2007?
   b) Is your answer to part a the same as a 27% increase in the number of cards Marcus had at the
      end of 2005? Why or why not?

End of 2007: 15% of 280

$\frac{3}{5} \times \frac{280}{1} = 42$

8 a) End of 2006: 12% of 250

$= \frac{126}{100} \times \frac{250}{1}$

$= 30$

280 + 42 = 322

250 + 30 = 280

b) 27% of 250 $= \frac{27}{100} \times 250 = \frac{27}{2100} \times \frac{250}{1} = 67.5$

250 + 67.5 = 317.50 cards

Master 6.21   **Extra Practice 2**

Lesson 6.2: Solving Equations Using Algebra

1. Solve each equation. Verify the solution.
   a) $4x = 32$
   b) $-35 = -5x$
   c) $-48 = 8x$ $x = -6$
   d) $9x = 54$ $x = 6$

   a) $\frac{4x}{4} = \frac{32^8}{4}$ $x = 8$

   b) $\frac{-35}{-5} = \frac{-5x}{-5}$
   $7 = x$

2. Solve each equation. Verify the solution.
   a) $-8a + 11 = 27$
   b) $12b + 21 = 93$ $b = 6$
   c) $-42 = 5c - 27$ $c = -3$
   d) $6f - 15 = -45$ $f = -5$

   $2a)\ -8a + 11 = 27$
   $-11 \quad -11$
   $\frac{-8a}{-8} = \frac{16}{-8}$
   $a = -2$

3. Solve each equation. Verify the solution.
   a) $2x - 7 = 9$ $x = 8$
   b) $-4x + 6 = -14$ $x = 5$
   c) $6x - 7 = -19$ $x = -2$
   d) $-7x - 8 = 13$ $x = -3$

   $3a)\ 2x - 7 = 9$
   $+7 \ +7$
   $\frac{2x}{2} = \frac{16}{2}$
   $x = 8$

4. Solve each equation. Verify the solution.
   a) $2a + 3 = 4$ $a = \frac{1}{2}$
   b) $15 = 10 + 2b$ $b = \frac{5}{2}$
   c) $3 = 5c - 6$ $c = \frac{9}{5}$
   d) $9f - 7 = 1$ $f = \frac{8}{9}$

   $4a)\ 2a + 3 = 4$
   $-3 \ -3$
   $\frac{2a}{2} = \frac{1}{2}$
   $a = \frac{1}{2}$

5. Write an equation you can use to answer each question. Solve the equation. Verify the solution.
   a) Five more than two times a number is 17. What is the number? x
   b) Six less than five times a number is 29. What is the number? x

   $5a)\ 5 + 2x = 17$
   $-5 \qquad -5$
   $\frac{2x}{2} = \frac{12}{2}$
   $x = 6$

   b) $5x - 6 = 29$
   $+6 \ +6$
   $\frac{5x}{5} = \frac{35}{5}$
   $x = 7$

6. The Grade 8 students had a graduation dinner. They paid a flat rate of $125 for the use of the hall, plus $13 for each student who attended. The total cost of the dinner was $944. How many students attended the dinner?
   a) Write an equation you could use to solve the problem.
   b) Solve the equation. Verify the solution.

   $125 + 13x = 944$
   $-125 \qquad -125$
   $\frac{13x}{13} = \frac{819}{13}$
   $x = 63$

7. Use this information:
   Ice rental: $150   Skate rental: $3
   a) Write a problem that can be solved using an equation.
   b) Write the equation, then solve the problem.

   The grade 8 class wants to rent the ice rink for a skating party. How many students attended if the

total cost of the party is $330?

Master 6.22   **Extra Practice 3**

Lesson 6.3: Solving Equations Involving Fractions

1. Solve each equation. Verify the solution.

    a) $\dfrac{t}{4} = 7$ $t = 28$ b) $\dfrac{a}{3} = 9$ $a = 27$

    c) $\dfrac{b}{7} = 11$ $b = 77$ d) $\dfrac{c}{6} = 12$ $c = 72$

Handwritten: 1a) $\dfrac{4}{1}\left(\dfrac{t}{4}\right) = (7)4$ b) $\dfrac{3}{1}\left(\dfrac{a}{3}\right) = (9)3$

         $t = 28$ $a = 27$

2. Solve each equation. Verify the solution.

    a) $\dfrac{d}{5} = -8$ $d = -40$ b) $\dfrac{f}{-6} = 10$ $f = -60$

    c) $\dfrac{k}{-2} = -11$ $k = 22$ d) $\dfrac{q}{3} = -12$, $q = -36$

Handwritten: 2a) $\dfrac{5}{1}\left(\dfrac{d}{5}\right) = (-8)5$ b) $\dfrac{-6}{1}\left(\dfrac{f}{-6}\right) = (10)-6$

       $d = -40$ $f = -60$

3. One-quarter of the chicken pieces in the dish are wings. There are 7 wings.
   How many chicken pieces are in the dish?
   a) Write an equation you can use to solve the problem.
   b) Solve the equation.
   c) Verify the solution.

Handwritten: a) $\dfrac{1}{4}$ of $P \Rightarrow \dfrac{1}{4} \times \dfrac{P}{1} = \dfrac{P}{4}$

    b) $\dfrac{4}{1}\left(\dfrac{P}{4}\right) = (7)4$ $P = 28$

    c) $\dfrac{28}{4} = 7$ ✓

4. Solve each equation. Verify the solution.

    a) $\dfrac{n}{3} - 2 = 10$ $n = 36$ b) $4 - \dfrac{p}{5} = 13$ $p = -45$

    c) $\dfrac{t}{-9} + 8 = -5$ $t = 117$ d) $-17 + \dfrac{n}{-3} = 9$ $n = -24$

Handwritten: 4a) $\dfrac{n}{3} - 2 = 10$

           $+2 \quad +2$

    $\dfrac{3}{1}\left(\dfrac{n}{3}\right) = (12)3$

         $n = 36$

5. For each sentence, write an equation.
   Solve the equation to find the number.
   a) A number divided by −4 is 7.
   b) Add 4 to a number divided by −3 and the sum is −2.
   c) Subtract a number divided by 6 from 1 and the difference is 5.

Handwritten: $\dfrac{-4}{1}\left(\dfrac{x}{-4}\right) = (7)-4$ $x = -28$ 5b)

Left margin: $y = 18$ $a = -24$

6. Check this student's work. Rewrite a correct and complete algebraic solution if necessary.

$$\dfrac{t}{-6} - 24 = -6$$

✓ $\dfrac{t}{-6} - 24 + 24 = -6 + 24$

Handwritten: $\dfrac{-6}{1}\left(\dfrac{t}{-6}\right)(18) -6 \Rightarrow$ should be $t = -108$

    $t = -3$ ← incorrect