Chapter 2 - Multiplying and Dividing Fractions
2.1 Introduction to Fractions and Mixed numbers
 2.1 Exercise Set, page 118: 1, 3, 19, 34, 43, 55, 65, 85

2.2 Factors and Prime Factorization
 2.2 Exercise Set, page 129: 4, 9, 17, 25, 55

2.3 Simplest Form of a Fraction
 2.3 Exercise Set, page 137:1, 4, 25, 45, 52, 55

2.4 Fractions and Mixed Numbers
 2.4 Exercise Set, page 148: 1, 11, 27,45, 57, 81, 95

2.3
Memorize

Simplest Form of a Fraction

A fraction is written in **simplest form** or **lowest terms** when the numerator and
the denominator have no common factors other than 1.

reduced to lowest terms

$$\frac{2}{4} = \frac{2}{2 \cdot 2} = \left(\frac{2}{2}\right)\left(\frac{1}{2}\right) = (1)\left(\frac{1}{2}\right) = \boxed{\frac{1}{2}}$$

$$\frac{2+3}{2} = 3 \quad \text{No!}$$

$$\frac{5}{2} = 2\frac{1}{2} \neq 3$$

$$\frac{12}{20} = \frac{4 \cdot 3}{4 \cdot 5} = \frac{4}{4} \cdot \frac{3}{5} = 1 \cdot \frac{3}{5} = \frac{3}{5}$$

$$\frac{2 \cdot 6}{2 \cdot 10} = \frac{2 \cdot 3}{2 \cdot 5} = \boxed{\frac{3}{5}}$$

Memorize

Is $\quad \dfrac{3}{7} = \dfrac{2}{5}$?

$\Longleftrightarrow \quad (3)(5) = (7)(2)$

$\Longleftrightarrow \quad 15 = 14$

equivalent $\quad$ but $15 \neq 14$

$\therefore \quad \dfrac{3}{7} \neq \dfrac{2}{5}$

Therefore

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reason $\qquad \dfrac{3}{7} = \dfrac{2}{5}$

$\Longleftrightarrow \quad \left(\dfrac{3}{7}\right)\left(\dfrac{5}{5}\right) = \left(\dfrac{2}{5}\right)\left(\dfrac{7}{7}\right)$

$\Longleftrightarrow \quad \dfrac{15}{35} = \dfrac{14}{35}$

$\Longleftrightarrow \quad \dfrac{(15)(35)}{35} = \left(\dfrac{14}{35}\right)(35)$

$\Longleftrightarrow \quad 15 = 14$

$\qquad\qquad$ but $15 \neq 14$

Memorize
Definition: a ratio is the comparison of two numbers
by division

Definition: a proportion is the equality of two ratios

$$\frac{a}{b} = \frac{c}{d} \quad \bigg| \quad \frac{2}{b} = \frac{4}{d}$$

$$\frac{a}{b} = \frac{c}{d} \qquad \frac{2}{3} = \frac{4}{6}$$

$$\Longrightarrow ad = bc \qquad \Longrightarrow (3)(4) = (2)(6)$$

$$\Longrightarrow 12 = 12$$

Reduce to lowest terms

6. $\dfrac{315}{225} = \left(\dfrac{5}{5}\right)\left(\dfrac{63}{45}\right) = \dfrac{(9)(7)}{(5)(9)} = \boxed{\dfrac{7}{5}}$

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315/225
                    1.4
315/225
                    7
                    5
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27. $\dfrac{70}{196}$

```
      70                      196              98
      /\                      /\            2|196
   (2)  35                 (2)  98            18
         /\                      /\          16
      (5) (7)                 (2)  49         16
                                   /\         0
                                 (7) (7)      49
                                            2|98
                                              8
                                              18
                                              18
                                              0
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$$70 = 2 \cdot 5 \cdot 7$$

$$196 = 2^2 \cdot 7^2$$
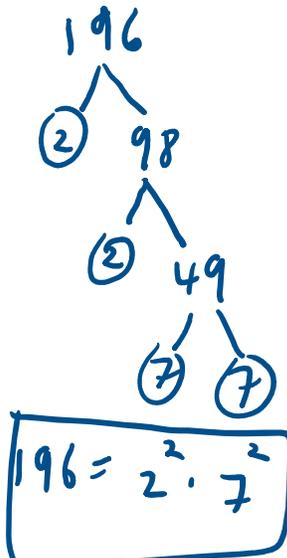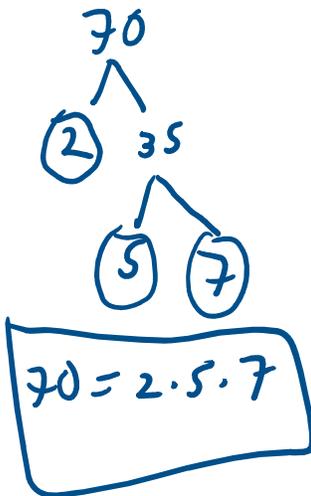
$$\frac{70}{196} = \frac{2 \cdot 5 \cdot 7}{2^2 \cdot 7^2} = \frac{2 \cdot 5 \cdot 7}{2 \cdot 2 \cdot 7 \cdot 7} = \boxed{\frac{5}{14}}$$

2.4
Memorize

10-005N Page 3

Multiplying Fractions

To multiply two fractions, multiply the numerators and multiply the denominators.
If $a, b, c,$ and d represent nonzero whole numbers, we have

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$$

$$\left(\frac{3}{4}\right)\left(\frac{5}{9}\right) = \frac{(3)(5)}{(4)(9)} = \frac{15}{36} = \frac{5}{12}$$

$$\frac{\cancel{(3)}(5)}{(4)\cancel{(3)}(3)} = \boxed{\frac{5}{12}}$$

$$\begin{array}{r} 3.2 \\ \times\ 1.5 \\ \hline 1\ 6\ 0 \\ 3\ 2 \\ \hline 4.8\ 0 \end{array}$$

Your Name MDE 10 quiz 2   write each problem.
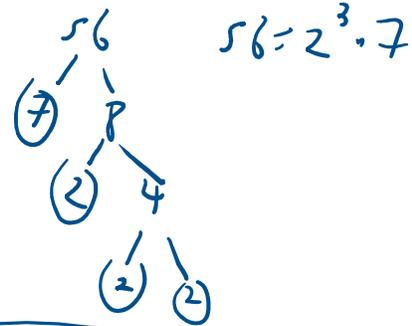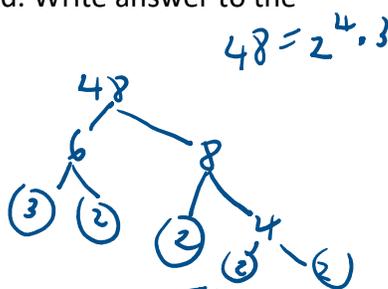Put a box around each answer. Calculator ok.

1.

1.5 mi

3.2 mi

$$\text{Area} = (1.5\ mi)(3.2\ mi)$$
$$= (1.5)(3.2)\ mi^2$$
$$= \boxed{4.80\ mi^2}$$

Find area of rectangular field. Write answer to the
nearest hundredth.

2. Reduce to lowest terms.
$$\frac{48}{56}$$

$48 = 2^4 \cdot 3$

$56 = 2^3 \cdot 7$

$$\frac{48}{56} = \frac{2^4 \cdot 3}{2^3 \cdot 7} = \frac{2 \cdot 3}{7} = \boxed{\frac{6}{7}}$$

or $\frac{48}{56} = \frac{8 \cdot 6}{8 \cdot 7} = \boxed{\frac{6}{7}}$

3. Find the product of $\frac{5}{8}$ and $\frac{32}{3}$. Reduce answer to lowest terms.

3. Find the product of $\frac{5}{8}$ and $\frac{32}{3}$. Reduce answer to lowest terms.

$$\left(\frac{5}{8}\right)\left(\frac{32}{3}\right) = \frac{(5)(4)(8)}{(8)(3)} = \boxed{\frac{20}{3}}$$

4. True or False? Why? $\frac{9}{8} = \frac{10}{9}$

$$(9)(9) = 81$$
$$(8)(10) = 80$$
$$81 \neq 80$$
$$\therefore \frac{9}{8} \neq \frac{10}{9}$$

or compare decimals

9/8=1.125
10/9=1.1111

$$1.125 \neq 1.1111$$