

LESSON 4

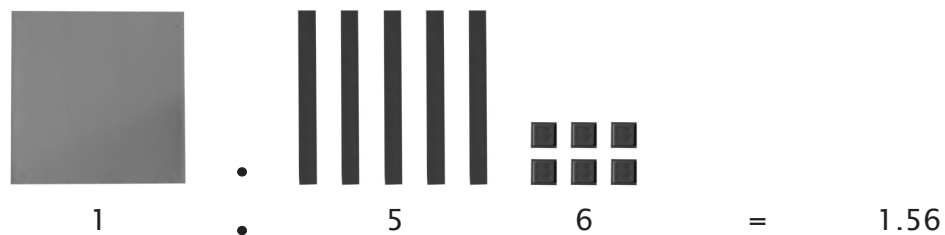
Add Decimal Numbers

In this lesson, you get to meet the pieces that represent the decimals. Turn a red hundred square upside down so the hollow side is showing, and snap the flat green piece (from the algebra/decimal inserts) into the back. Then turn over several blue 10 bars and snap the flat blue pieces (also from the inserts) into their backs. Then take out the little one-half inch red cubes.

The large green square represents one unit. We've increased the size of the unit from the little green cube to this larger size, just as we did when learning fractions. Since the large green square represents one, what do you think the flat blue bars represent? It takes ten of them to make one, so they are each $1/10$ or $.1$. The red cubes represent $1/100$ or $.01$.

In figure 1, we represent 1.56 or $1 \times 1 + 5 \times 1/10 + 6 \times 1/100$ with the decimal inserts.

Figure 1



As we've said before, money is a pure decimal function. If figure 1 represents money with the green unit as one dollar, then $1/10$ of a dollar is one dime and is represented by the blue $1/10$ bars. As shown with the red cubes, $1/100$ of a dollar or $1/10$ of a dime is one penny.

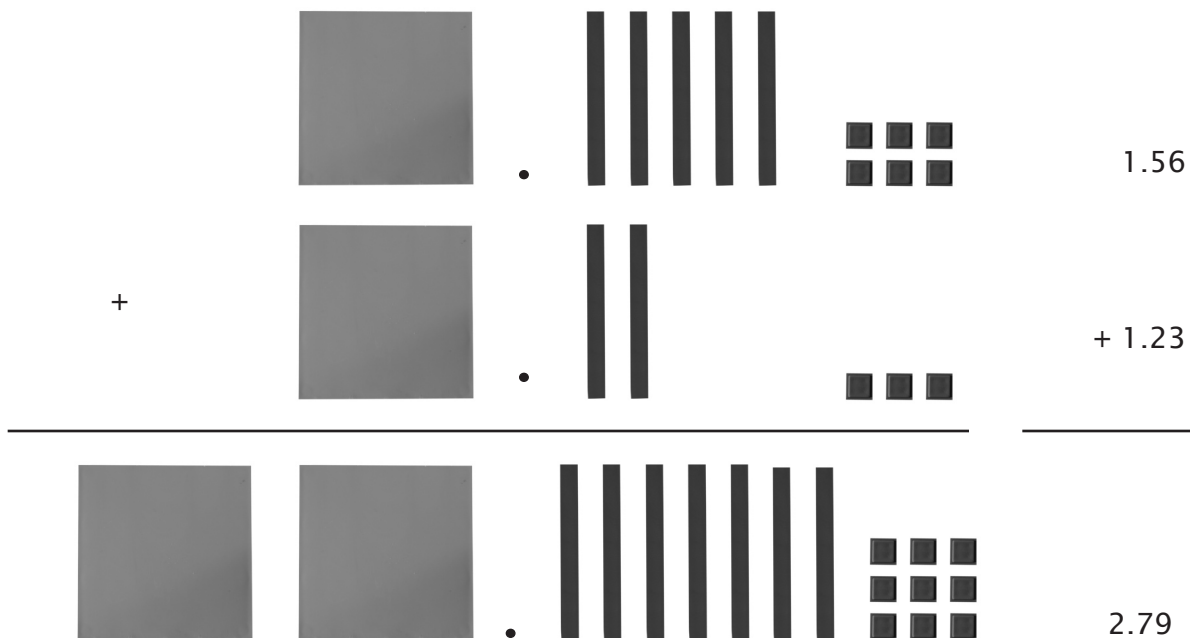


This will help us in adding and subtracting decimals. The key to understanding this is the old adage, “to compare or combine, you must be the same kind.” You can only add dollars to dollars and dimes to dimes and pennies to pennies. So also in decimals, you can only add units to units and tenths to tenths and hundredths to hundredths. The easiest way to distinguish the values and make sure you are combining like values is by writing numbers vertically, so the decimal point in one number is directly above (or below) the decimal point in the other number. Lining up these points ensures you that your place values are also lined up. You may only add or subtract two numbers if they have the same value.

When using the inserts, it is clear that you can only add the green to the green, the blue to the blue, etc. But when we don't have the inserts for larger numbers, always line up the decimal points. The same skills are used for adding decimals and money as for adding any number. Remember that decimals are pure base 10. You've just learned some new kinds of decimal values.

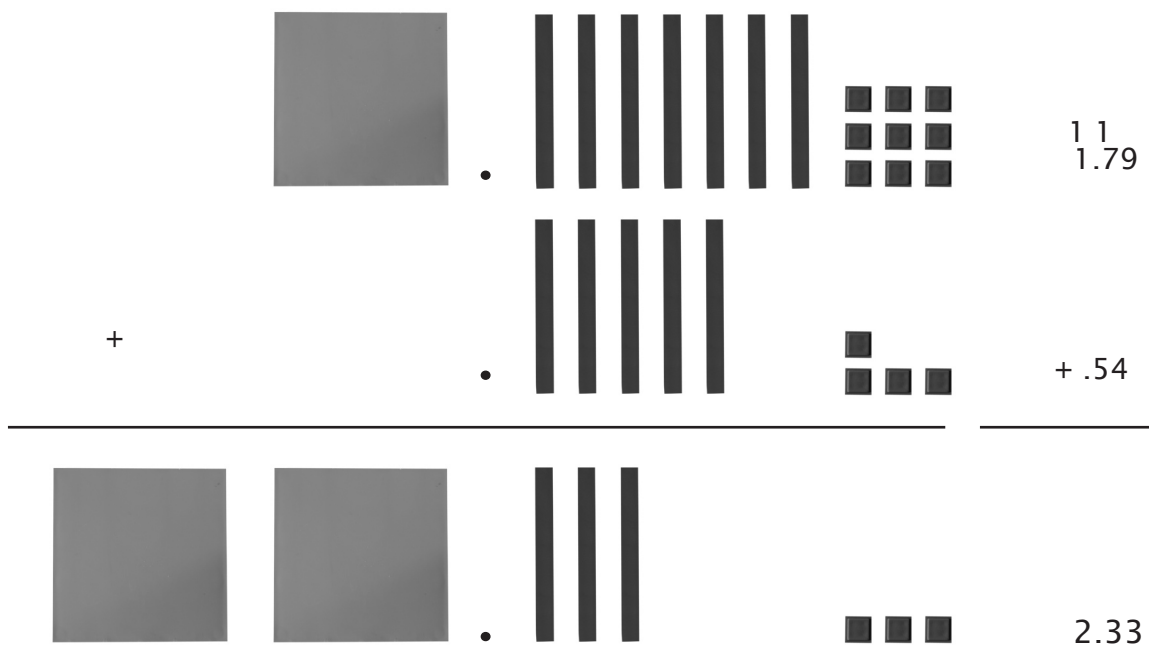
Example 1

Add $1.56 + 1.23$



Example 2

Add $1.79 + .54$



LESSON PRACTICE

4B

Add the decimal numbers. You cannot build these with the manipulatives. Add thousandths just like regular addition, and keep the decimal points lined up.

$$\begin{array}{r} 1. \quad 7.1 \\ + 6.2 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 5.9 \\ + 1.2 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 2.45 \\ + 5.07 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 4.13 \\ + 1.96 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 7.0 \\ + 2.8 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 1.5 \\ + 9.3 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 8.84 \\ + 3.09 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad .437 \\ + .250 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 8.8 \\ + 3.4 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 6.2 \\ + .4 \\ \hline \end{array}$$

LESSON PRACTICE 4B

$$11. \quad \begin{array}{r} 2.70 \\ + 9.41 \\ \hline \end{array}$$

$$12. \quad \begin{array}{r} 5.52 \\ + .60 \\ \hline \end{array}$$

$$13. \quad \begin{array}{r} 3.9 \\ + 4.0 \\ \hline \end{array}$$

$$14. \quad \begin{array}{r} 7.5 \\ + .8 \\ \hline \end{array}$$

$$15. \quad \begin{array}{r} 4.15 \\ + 3.00 \\ \hline \end{array}$$

$$16. \quad \begin{array}{r} .524 \\ + .277 \\ \hline \end{array}$$

17. Andrew bought a shirt for \$12.95 and a pair of pants for \$15.50. How much did Andrew have to pay altogether?

18. Clyde sold .625 gallons of lemonade in the morning. The afternoon was hotter, and he sold 2.125 gallons of lemonade. How many gallons of lemonade did Clyde sell that day?

LESSON PRACTICE

4C

Add the decimal numbers.

$$\begin{array}{r} 1. \quad 3.0 \\ + 9.8 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 7.1 \\ + 1.3 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 1.95 \\ + 8.15 \\ \hline \end{array}$$

$$\begin{array}{r} 4. \quad 3.51 \\ + 2.68 \\ \hline \end{array}$$

$$\begin{array}{r} 5. \quad 5.9 \\ + .4 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \quad 4.1 \\ + 3.0 \\ \hline \end{array}$$

$$\begin{array}{r} 7. \quad 2.34 \\ + .71 \\ \hline \end{array}$$

$$\begin{array}{r} 8. \quad .440 \\ + .300 \\ \hline \end{array}$$

$$\begin{array}{r} 9. \quad 6.5 \\ + 5.0 \\ \hline \end{array}$$

$$\begin{array}{r} 10. \quad 2.8 \\ + 5.9 \\ \hline \end{array}$$

LESSON PRACTICE 4C

$$11. \quad \begin{array}{r} 7.48 \\ + 1.93 \\ \hline \end{array}$$

$$12. \quad \begin{array}{r} .162 \\ + 8.000 \\ \hline \end{array}$$

$$13. \quad \begin{array}{r} 8.7 \\ + 8.1 \\ \hline \end{array}$$

$$14. \quad \begin{array}{r} 6.0 \\ + .1 \\ \hline \end{array}$$

$$15. \quad \begin{array}{r} .731 \\ + .402 \\ \hline \end{array}$$

$$16. \quad \begin{array}{r} 1.125 \\ + .112 \\ \hline \end{array}$$

17. Jean bought 4.3 bushels of apples and .5 bushels of pears. How many bushels of fruit did she buy?

18. A meteorologist had a gauge that could measure rainfall to the thousandth of an inch. On Monday his gauge recorded 2.045 inches and on Tuesday it recorded exactly .5 inches. How much rain fell the last two days?

SYSTEMATIC REVIEW

Add the decimal numbers.

$$1. \quad \begin{array}{r} 1.5 \\ + 9.3 \\ \hline \end{array}$$

$$2. \quad \begin{array}{r} 5.9 \\ + 1.6 \\ \hline \end{array}$$

$$3. \quad \begin{array}{r} 6.34 \\ + 2.41 \\ \hline \end{array}$$

$$4. \quad \begin{array}{r} 1.82 \\ + 9.3 \\ \hline \end{array}$$

Rewrite each number without an exponent.

$$5. \quad 2^3 = \underline{\quad}$$

$$6. \quad 6^2 = \underline{\quad}$$

$$7. \quad 10^4 = \underline{\quad}$$

$$8. \quad 7^2 = \underline{\quad}$$

Write in expanded notation.

$$9. \quad 176.21 = \underline{\hspace{10cm}}$$

$$10. \quad .685 = \underline{\hspace{10cm}}$$

$$11. \quad 4.5 = \underline{\hspace{10cm}}$$

Fill in the missing numbers to make equivalent fractions.

12. $\frac{1}{4} = \frac{\quad}{8} = \frac{3}{\quad} = \frac{\quad}{16}$

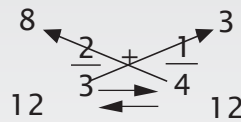
13. $\frac{5}{8} = \frac{\quad}{\quad} = \frac{15}{24} = \frac{\quad}{\quad}$



QUICK REVIEW

Fractions with the same denominator may be added by adding the numerators. The “rule of four” is a four-step process for finding a common denominator for two fractions with different denominators. Once the fractions have a common denominator, it is easy to add the fractions by adding the denominators.

EXAMPLE STEP 1: $3 \times 4 = 12$
 STEP 2: $3 \times 1 = 3$
 STEP 3: $4 \times 3 = 12$
 STEP 4: $4 \times 2 = 8$



$$\frac{8}{12} + \frac{3}{12} = \frac{11}{12}$$

Add. Reduce your answer if possible.

14. $\frac{1}{4} + \frac{3}{5} = \frac{\quad}{\quad}$

15. $\frac{3}{4} + \frac{1}{6} = \frac{\quad}{\quad}$

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

17. Peter is 75.25 inches tall, but Steve is 1.75 inches taller. How tall is Steve?

18. Mom bought a bag of 12 apples. She discovered that 1/6 of the apples were spoiled. How many apples were spoiled?

How many good apples does Mom have?

SYSTEMATIC REVIEW

Add the decimal numbers.

$$1. \quad \begin{array}{r} 8.6 \\ + 2.4 \\ \hline \end{array}$$

$$2. \quad \begin{array}{r} 3.0 \\ + 4.4 \\ \hline \end{array}$$

$$3. \quad \begin{array}{r} 3.07 \\ + 9.25 \\ \hline \end{array}$$

$$4. \quad \begin{array}{r} 5.00 \\ + 3.24 \\ \hline \end{array}$$

Rewrite each number without an exponent.

$$5. \quad 3^4 = \underline{\quad}$$

$$6. \quad 5^2 = \underline{\quad}$$

$$7. \quad 1^7 = \underline{\quad}$$

$$8. \quad 10^3 = \underline{\quad}$$

Write in exponential notation.

$$9. \quad 43.3 = \underline{\hspace{15em}}$$

$$10. \quad 6.105 = \underline{\hspace{15em}}$$

$$11. \quad 200.34 = \underline{\hspace{15em}}$$

Fill in the missing numbers to make equivalent fractions.

$$12. \quad \frac{1}{2} = \frac{\quad}{4} = \frac{3}{\quad} = \frac{\quad}{8}$$

$$13. \quad \frac{9}{10} = \frac{\quad}{\quad} = \frac{\quad}{30} = \frac{\quad}{\quad}$$

Add. Reduce your answer if possible.

$$14. \quad \frac{1}{9} + \frac{1}{2} = \frac{\quad}{\quad}$$

$$15. \quad \frac{2}{5} + \frac{5}{6} = \frac{\quad}{\quad}$$

$$16. \quad \frac{1}{10} + \frac{2}{3} = \frac{\quad}{\quad}$$

17. Fred spent .5 hours plowing the snow from his parking lot and .25 hours shoveling the snow from his front walk. How many hours did Fred spend in snow removal?
18. Blake bought 9.5 gallons of gasoline for his car and 11.6 gallons for his wife's car. How many gallons of gas did Blake buy altogether?
19. Oscar got $\frac{2}{3}$ of his math problems correct. After checking his work he had another $\frac{1}{5}$ correct. What part of his math problems are now correct?
20. If Oscar (#19) had 30 math problems in all, how many were correct when he finished checking his work?

SYSTEMATIC REVIEW

Add the decimal numbers.

$$1. \quad \begin{array}{r} 5.6 \\ + 4.3 \\ \hline \end{array}$$

$$2. \quad \begin{array}{r} 1.9 \\ + 9.2 \\ \hline \end{array}$$

$$3. \quad \begin{array}{r} 5.13 \\ + 9.50 \\ \hline \end{array}$$

$$4. \quad \begin{array}{r} 4.17 \\ + 1.95 \\ \hline \end{array}$$

Rewrite each number without an exponent.

$$5. \quad 8^2 = \underline{\quad}$$

$$6. \quad 10^0 = \underline{\quad}$$

$$7. \quad 4^3 = \underline{\quad}$$

$$8. \quad 9^2 = \underline{\quad}$$

Write in standard notation.

$$9. \quad 9 \times 10^3 + 5 \times 10^2 + 1 \times \frac{1}{10^1} = \underline{\hspace{2cm}}$$

$$10. \quad 1 \times 10^2 + 5 \times 10^1 + 8 \times 10^0 + 4 \times \frac{1}{10^3} = \underline{\hspace{2cm}}$$

Fill in the missing numbers to make equivalent fractions.

$$11. \quad \frac{1}{3} = \text{---} = \frac{3}{12}$$

$$12. \quad \frac{3}{7} = \text{---} = \frac{\text{---}}{21} = \text{---}$$

Add. Reduce your answer if possible.

$$13. \quad \frac{2}{7} + \frac{1}{8} = \text{---}$$

$$14. \quad \frac{3}{5} + \frac{2}{9} = \text{---}$$

$$15. \quad \frac{3}{4} + \frac{1}{5} = \text{---}$$

16. Bria spent \$2.25 on a gallon of milk and \$1.69 on a loaf of bread. How much did Bria spend in all?
17. John made \$4.00 selling lemonade one day. That evening, he got his allowance of \$2.50. He already had \$8.35 in his savings bank. How much money does John have in all?
18. Dad said that Jeremy must mow $\frac{5}{15}$ of the lawn. How many thirds of the lawn must he mow?
19. At the party, Kelsey ate $\frac{3}{8}$ of a pizza and Riley ate $\frac{1}{3}$. Did they eat a whole pizza?
20. Twenty-seven players tried out for the team, but only $\frac{5}{9}$ of them were chosen. How many were chosen?

TEST

Add the decimal numbers.

$$1. \quad \begin{array}{r} 6.7 \\ + 5.4 \\ \hline \end{array}$$

$$2. \quad \begin{array}{r} 2.0 \\ + .2 \\ \hline \end{array}$$

$$3. \quad \begin{array}{r} 6.24 \\ + 8.40 \\ \hline \end{array}$$

$$4. \quad \begin{array}{r} 5.28 \\ + 2.05 \\ \hline \end{array}$$

Rewrite each number without an exponent.

$$5. \quad 1^3 = \underline{\quad}$$

$$6. \quad 10^2 = \underline{\quad}$$

$$7. \quad 6^3 = \underline{\quad}$$

$$8. \quad 7^2 = \underline{\quad}$$

Write in standard notation.

$$9. \quad 8 \times 10^3 + 4 \times 10^2 + 2 \times \frac{1}{10^1} = \underline{\hspace{2cm}}$$

$$10. \quad 2 \times 10^2 + 6 \times 10^1 + 9 \times 10^0 + 5 \times \frac{1}{10^3} = \underline{\hspace{2cm}}$$

Fill in the missing numbers to make equivalent fractions.

$$11. \quad \frac{4}{5} = \frac{\quad}{\quad} = \frac{12}{\quad} = \frac{\quad}{20}$$

$$12. \quad \frac{5}{9} = \frac{\quad}{\quad} = \frac{\quad}{27} = \frac{\quad}{\quad}$$

Add. Reduce your answer if possible.

13. $\frac{1}{6} + \frac{2}{9} = \text{---}$

14. $\frac{1}{5} + \frac{7}{10} = \text{---}$

15. $\frac{1}{3} + \frac{3}{8} = \text{---}$

6. Fritha has \$4.75 and Rachel has \$6.29. Do they have enough money to buy a game that costs \$11.00?
17. Gary plans to buy a diamond necklace for his wife. The jeweler showed him the diamonds he wants to use for the necklace. They weighed 1.2 carats, .75 carats, and 1.15 carats. What was the total weight of the three diamonds?
18. Matt must use $\frac{4}{10}$ of his income for rent. How many fifths of his income is that?
19. Tess did $\frac{5}{8}$ of the chores and Dustin did $\frac{1}{6}$ of them. What part of the chores have been done?
20. It rained for $\frac{3}{5}$ of the days in April this year. Since there are 30 days in April, how many days did it rain?

5. dollars; dimes; pennies;
 $\$9.00 + \$.80 + \$.07 = \9.87
6. dollars; dimes; pennies;
 $\$2.00 + \$.00 + \$.08 = \2.08
7. $3^4 = 81$
8. $1^3 = 1$
9. $10^0 = 1$
10. $5^2 = 25$
11. $\frac{9}{10} = \frac{18}{20} = \frac{27}{30} = \frac{36}{40}$
12. $\frac{1}{6} = \frac{2}{12} = \frac{3}{18} = \frac{4}{24}$
13. $\frac{5}{30} + \frac{5}{5} = \frac{1}{6}$
14. $\frac{14}{35} + \frac{7}{7} = \frac{2}{5}$
15. $\frac{20}{40} + \frac{20}{20} = \frac{1}{2}$
16. $\frac{18}{27} + \frac{9}{9} = \frac{2}{3}$
17. $\$6.00 + \$.09 = \$6.09$
18. $100 \div 100 = 1$;
 $1 \times 7 = 7$ cents
19. $\frac{9}{12} = \frac{3}{4}$ of the dishes
20. $20 \div 5 = 4$;
 $4 \times 4 = 16$ questions

Lesson Practice 4A

1. done
2. done
3. 1.53
 $\frac{+1.12}{2.65}$
4. 2.17
 $\frac{+ .31}{2.48}$
5. 1.8
 $\frac{+1.0}{2.8}$

6. 3.2
 $\frac{+ .4}{3.6}$
7. 1.13
 $\frac{+1.68}{2.81}$
8. 1.67
 $\frac{+ .42}{2.09}$
9. 1.5
 $\frac{+1.2}{2.7}$
10. 2.1
 $\frac{+ .8}{2.9}$
11. 1.16
 $\frac{+1.46}{2.62}$
12. 3.90
 $\frac{+ .02}{3.92}$
13. 2.6
 $\frac{+1.5}{4.1}$
14. 1.8
 $\frac{+1.3}{3.1}$
15. 3.00
 $\frac{+1.62}{4.62}$
16. 4.48
 $\frac{+ .10}{4.58}$
17. \$4.51
 $\frac{+ \$.35}{\$4.86}$

$$\begin{array}{r}
 18. \quad \begin{array}{r} 1 \\ 1.5 \\ +2.72 \\ \hline 4.22 \text{ miles} \end{array}
 \end{array}$$

Lesson Practice 4B

$$\begin{array}{r}
 1. \quad \begin{array}{r} 1 \\ 7.1 \\ + 6.2 \\ \hline 13.3 \end{array}
 \end{array}$$

$$\begin{array}{r}
 2. \quad \begin{array}{r} 1 \\ 5.9 \\ +1.2 \\ \hline 7.1 \end{array}
 \end{array}$$

$$\begin{array}{r}
 3. \quad \begin{array}{r} 1 \\ 2.45 \\ +5.07 \\ \hline 7.52 \end{array}
 \end{array}$$

$$\begin{array}{r}
 4. \quad \begin{array}{r} 1 \\ 4.13 \\ +1.96 \\ \hline 6.09 \end{array}
 \end{array}$$

$$\begin{array}{r}
 5. \quad \begin{array}{r} 7.0 \\ +2.8 \\ \hline 9.8 \end{array}
 \end{array}$$

$$\begin{array}{r}
 6. \quad \begin{array}{r} 1.5 \\ + 9.3 \\ \hline 10.8 \end{array}
 \end{array}$$

$$\begin{array}{r}
 7. \quad \begin{array}{r} 1 \\ 8.84 \\ + 3.09 \\ \hline 11.93 \end{array}
 \end{array}$$

$$\begin{array}{r}
 8. \quad \begin{array}{r} .437 \\ +.250 \\ \hline .687 \end{array}
 \end{array}$$

$$\begin{array}{r}
 9. \quad \begin{array}{r} 1 \\ 8.8 \\ + 3.4 \\ \hline 12.2 \end{array}
 \end{array}$$

$$\begin{array}{r}
 10. \quad \begin{array}{r} 6.2 \\ + .4 \\ \hline 6.6 \end{array}
 \end{array}$$

$$\begin{array}{r}
 11. \quad \begin{array}{r} 1 \\ 2.70 \\ + 9.41 \\ \hline 12.11 \end{array}
 \end{array}$$

$$\begin{array}{r}
 12. \quad \begin{array}{r} 1 \\ 5.52 \\ + .60 \\ \hline 6.12 \end{array}
 \end{array}$$

$$\begin{array}{r}
 13. \quad \begin{array}{r} 3.9 \\ +4.0 \\ \hline 7.9 \end{array}
 \end{array}$$

$$\begin{array}{r}
 14. \quad \begin{array}{r} 1 \\ 7.5 \\ + .8 \\ \hline 8.3 \end{array}
 \end{array}$$

$$\begin{array}{r}
 15. \quad \begin{array}{r} 4.15 \\ +3.00 \\ \hline 7.15 \end{array}
 \end{array}$$

$$\begin{array}{r}
 16. \quad \begin{array}{r} 11 \\ .524 \\ +.277 \\ \hline .801 \end{array}
 \end{array}$$

$$\begin{array}{r}
 17. \quad \begin{array}{r} 1 \\ \$12.95 \\ \$ 15.50 \\ \hline \$28.45 \end{array}
 \end{array}$$

$$\begin{array}{r}
 18. \quad \begin{array}{r} 1 \\ .625 \\ +2.125 \\ \hline 2.750 \text{ gallons} \end{array}
 \end{array}$$

Lesson Practice 4C

$$\begin{array}{r}
 1. \quad \begin{array}{r} 1 \\ 3.0 \\ + 9.8 \\ \hline 12.8 \end{array}
 \end{array}$$

$$\begin{array}{r}
 2. \quad \begin{array}{r} 7.1 \\ +1.3 \\ \hline 8.4 \end{array}
 \end{array}$$