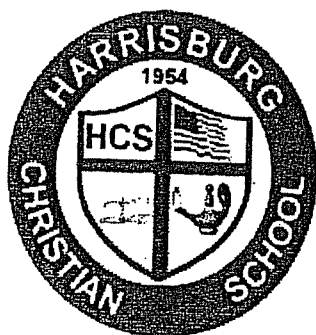


Harrisburg
Christian
School

Mathematics Review

for students entering

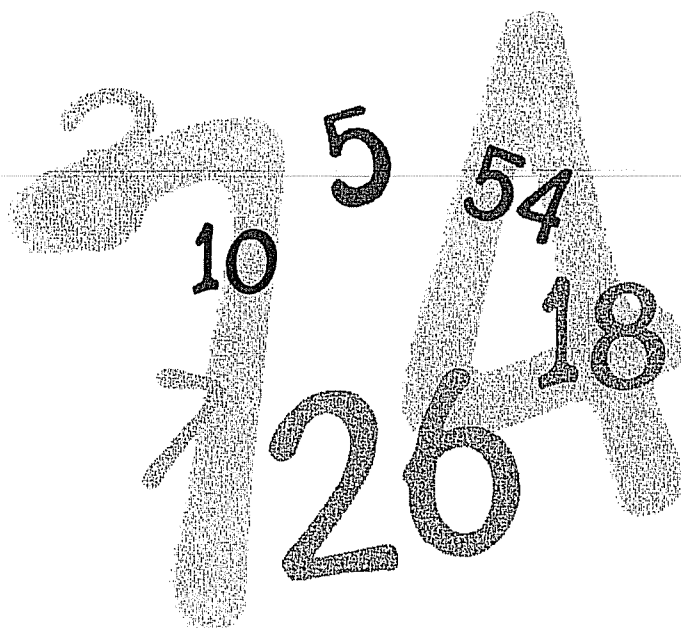
Pre-Algebra



MATH INSTRUCTIONS

This year's math portion of the summer packet has several new features:

- ✓ There are fewer problems than in previous years.
- ✓ An answer key will be posted on the web by mid-July. An email will be sent home to remind students of its availability.
- ✓ Students will be asked to correct their own work, showing their corrections clearly by using a red writing utensil.
- ✓ The math work will be collected at the beginning of the new school year, and will be recorded as a homework grade.
- ✓ The students will take an assessment on the material reviewed during the summer, in order to determine their strengths and weaknesses in preparation for the new school year.
- ✓ We will still have tutoring opportunities over the summer, on July 28 and August 16, 9AM to 11AM.



Working with Integers

Addition:

1. When the signs are the same, add and keep the same sign.
2. When the signs are different, find the difference between the two numbers, and use the sign of the "greater-looking" one.

Subtraction:

Add the opposite (Change to addition instead of subtracting, and change the sign of the second number. Then follow the addition rules)

Multiplication and Division:

1. If the signs are the same, the answer is positive.
 2. If the signs are different, the answer is negative.
-

Find the answers:

1. $3 + 8$

2. $9 + -14$

3. $-17 + -17$

4. $-2 + 10$

5. $8 + 2$

6. $5 + -10$

7. $-12 + 12$

8. $-4 + 20$

1. $-2 - -4$

2. $-5 - 1$

3. $8 - -7$

4. $2 - -2$

5. $-23 - 8$

6. $-13 - -19$

7. $8 - -15$

8. $-11 - 2$

1. -7×3

2. -8×-3

3. $64 \div -8$

4. $-42 \div -14$

Adding and Subtracting Decimals

To add or subtract decimal numbers, first line up the decimal points, then add or subtract.

$$5.25 + 1.7 \Rightarrow \begin{array}{r} 5.25 \\ \underline{1.7} \\ 6.95 \end{array}$$

In subtraction, be careful to add zeros as necessary so that you have the same number of decimal places. Then you can borrow.

$$6.4 - 3.271 \Rightarrow \begin{array}{r} 6.400 \\ \underline{3.271} \\ 3.129 \end{array}$$

Put in column form and add or subtract:

1. $6.9 + 7.3 + 3.2 =$

2. $5.04 + 7.8 + 16.25 =$

3. $3.98 + 7.4 + 6.19 =$

4. $20.5 + 3.89 + 16.21 =$

5. $45.097 - 7.895 =$

6. $5.6 - 4.2 =$

7. $6.09 - 3.896 =$

8. $3.21 - 1.068 =$

9. $7.54 - 6.3 =$

Multiplying Decimals

To multiply decimal numbers, first multiply the numbers, then count the number of decimal places in both numbers together. Put the decimal point in your answer so that you have that number of places after the decimal.

$$\begin{array}{r} 0.2 \\ \times 0.8 \\ \hline 1.6 \end{array}$$

← 2 decimal places
← 2 decimal places

Find each product:

1.

$$\begin{array}{r} 1.89 \\ \times .7 \\ \hline \end{array}$$

2.

$$\begin{array}{r} 6.95 \\ \times .8 \\ \hline \end{array}$$

3.

$$\begin{array}{r} .654 \\ \times 3.2 \\ \hline \end{array}$$

4.

$$\begin{array}{r} 9.05 \\ \times 8.9 \\ \hline \end{array}$$

5.

$$\begin{array}{r} .106 \\ \times .04 \\ \hline \end{array}$$

6.

$$\begin{array}{r} .07 \\ \times .09 \\ \hline \end{array}$$

Dividing Decimals

To divide decimal numbers, first move any decimal point in the divisor to the right as many places as necessary to make it a whole number. Then move the decimal point in the dividend the same number of places to the right. If necessary, add zeros to the dividend. Line up the decimal point in the quotient above the decimal point in the dividend.

Example: $0.7 \overline{)0.42}$

Step 1: $\underline{7} \overline{)4.2}$

Step 2: $\begin{array}{r} \underline{.6} \\ 7 \overline{)4.2} \end{array}$

Example: $0.02 \overline{)0.3}$

Step 1: $\underline{0.2} \overline{)30}$

Step 2: $\begin{array}{r} \underline{15} \\ 2 \overline{)30} \end{array}$

Find each quotient: (remember to add zeros as necessary until you have no remainder)

1.

$$0.08 \overline{)0.4}$$

2.

$$0.4 \overline{)0.08}$$

3.

$$9 \overline{)60.3}$$

4.

$$2.3 \overline{)1329.4}$$

5.

$$6.1 \overline{)3.5441}$$

6.

$$5 \overline{)44}$$

Subtracting Mixed Numbers with Renaming

$$\begin{array}{r} 4\frac{1}{5} \\ -2\frac{4}{5} \\ \hline \end{array}$$

You cannot subtract the fractions because $\frac{4}{5}$ is greater than $\frac{1}{5}$.
You need to rename $4\frac{1}{5}$ to get more fifths.

$$\begin{array}{r} 4\frac{1}{5} = 3\frac{6}{5} \\ -2\frac{4}{5} = 2\frac{4}{5} \\ \hline \end{array}$$

Rename $4\frac{1}{5}$:

$$\begin{array}{r} 4\frac{1}{5} = 3 + 1 + \frac{1}{5} \\ \quad \quad \downarrow \quad \downarrow \quad \downarrow \\ = 3 + \frac{5}{5} + \frac{1}{5} \\ = 3\frac{6}{5} \end{array}$$

$$\begin{array}{r} 4\frac{1}{5} = 3\frac{6}{5} \\ -2\frac{4}{5} = 2\frac{4}{5} \\ \hline 1\frac{2}{5} \end{array}$$

Subtract the fractions to get $\frac{2}{5}$.

Subtract the whole numbers to get 1.

1.
$$\begin{array}{r} 15\frac{7}{9} \\ -6\frac{2}{3} \\ \hline \end{array}$$

2.
$$\begin{array}{r} 1\frac{5}{8} \\ -1\frac{1}{4} \\ \hline \end{array}$$

3.
$$\begin{array}{r} 12\frac{7}{10} \\ -6\frac{1}{5} \\ \hline \end{array}$$

4.
$$\begin{array}{r} 12\frac{3}{10} \\ -5\frac{3}{5} \\ \hline \end{array}$$

5.
$$\begin{array}{r} 1 \\ -\frac{3}{5} \\ \hline \end{array}$$

Multiplying Fractions and Mixed Numbers

To multiply fractions and mixed numbers:

Step 1: Write any mixed numbers as improper fractions.

Step 2: Multiply the numerators.

Step 3: Multiply the denominators.

Step 4: Write the answer in simplest form.

Multiply: $\frac{4}{9} \cdot \frac{3}{8}$

$$\frac{4}{9} \cdot \frac{3}{8} = \frac{4 \cdot 3}{9 \cdot 8}$$

$$= \frac{12}{72}$$

$$= \frac{1}{6}$$

Divide numerator
and denominator
by 12, the GCM.

Multiply: $6\frac{1}{4} \cdot \left(-1\frac{4}{5}\right)$

$$6\frac{1}{4} \cdot \left(-1\frac{4}{5}\right) = \frac{25}{4} \cdot \left(\frac{-9}{5}\right)$$

$$= \frac{25 \cdot (-9)}{4 \cdot 5}$$

$$= \frac{-225}{20}$$

$$= -11\frac{1}{4}$$

Remember,
positive times
negative equals
negative.

Multiply. Write each answer in simplest form.

1. $\frac{2}{7} \cdot \frac{7}{8}$

2. $2\frac{5}{8} \cdot \frac{2}{3}$

3. $5\frac{1}{5} \cdot \left(-1\frac{2}{3}\right)$

4. $4\frac{1}{2} \cdot 1\frac{1}{9}$

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

Dividing Fractions and Mixed Numbers

Dividing fractions and mixed numbers is very much like multiplying fractions and mixed numbers. Just follow these steps:

Step 1: Write any mixed numbers as improper fractions.

Step 2: Invert the divisor.

Step 3: Multiply and write the quotient in simplest form.

Divide: $1\frac{1}{8} \div \frac{1}{3}$

Step 1: $1\frac{1}{8} \div \frac{1}{3} = \frac{9}{8} \div \frac{1}{3}$

Step 2: $\frac{9}{8} \div \frac{1}{3} = \frac{9}{8} \cdot \frac{3}{1}$

Step 3: $\frac{9}{8} \cdot \frac{3}{1} = \frac{27}{8} = 3\frac{3}{8}$

Divide: $1\frac{1}{4} \div 3\frac{1}{3}$

Step 1: $1\frac{1}{4} \div 3\frac{1}{3} = \frac{5}{4} \div \frac{10}{3}$

Step 2: $\frac{5}{4} \div \frac{10}{3} = \frac{5}{4} \cdot \frac{3}{10}$

Step 3: $\frac{5}{4} \cdot \frac{3}{10} = \frac{15}{40} = \frac{3}{8}$

Divide. Write each answer in simplest form.

1. $\frac{7}{8} \div \frac{1}{3}$

2. $\frac{5}{12} \div \frac{1}{2}$

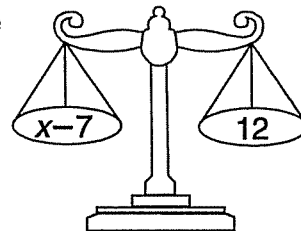
3. $4\frac{1}{3} \div 1\frac{1}{9}$

4. $2\frac{1}{3} \div 1\frac{3}{4}$

5. $5\frac{5}{8} \div 2\frac{1}{2}$

Solving Equations by Adding or Subtracting

Solving an equation is like balancing a scale. If you add the same weight to both sides of a balanced scale, the scale will remain balanced. You can use this same idea to solve an equation.



Think of the equation $x - 7 = 12$ as a balanced scale. The equal sign keeps the balance.

$$-7 + 7 = 0$$

$$x - 7 = 12$$

$$x - 7 + 7 = 12 + 7 \quad \text{Add 7 to both sides.}$$

$$x + 0 = 19 \quad \text{Combine like terms.}$$

$$x = 19$$

When you solve an equation, the idea is to get the variable by itself. What you do to one side of the equation, you must do to the other side.

- To solve a subtraction equation, use addition.
- To solve an addition equation, use subtraction.

Solve and check: $y + 8 = 14$.

$$+8 - 8 = 0$$

$$y + 8 = 14$$

$$y + 8 - 8 = 14 - 8 \quad \text{Subtract 8 from both sides.}$$

$$y + 0 = 6 \quad \text{Combine like terms.}$$

$$y = 6$$

Solving Equations by Multiplying or Dividing

When you solve an equation, you must get the variable by itself. Remember, what you do to one side of an equation, you must do to the other side.

- To solve a division equation, multiply both sides of the equation by the same number.

Solve and check: $\frac{a}{3} = 4$.

$$\frac{3a}{3} = 1a = a$$

$$\frac{a}{3} = 4$$

$$(3) \frac{a}{3} = 4(3)$$

$$a = 12$$

Multiply to solve a division equation.

- To solve a multiplication equation, divide both sides of the equation by the same number.

Solve and check: $5k = 30$.

$$\frac{5k}{5} = 1k = k$$

$$5k = 30$$

$$\frac{5k}{5} = \frac{30}{5}$$

$$k = 6$$

Divide to solve a multiplication equation.

Solving Equations

Solve. Show the correct steps. Check your answers.

1. $n - 6 = -2$

2. $x - 8 = -11$

3. $7 = a - 5$

4. $y + 4 = 2$

5. $c + 7 = -3$

6. $0 = v + 1$

7. $8j = -16$

8. $-3k = 24$

9. $-20 = -4s$

10. $\frac{m}{-2} = -5$

11. $\frac{d}{6} = -3$

12. $\frac{r}{-7} = 4$

13. $x - 5.1 = 4.8$

14. $h + 6.9 = 12.7$

15. $k + 9.2 = -7.6$

16. $g - 4.44 = 2.4$

17. $0.18 + w = 0.75$

18. $m - 3.1 = 9.65$

19. $4.2n = 14.7$

20. $9.7j = 58.2$

21. $5.6p = -11.76$

22. $\frac{s}{5.4} = 6$

23. $\frac{f}{0.8} = 7$

24. $\frac{d}{4.6} = 0.7$

4-12 Solving Equations Containing Fractions

Solve. Choose the letter for the best answer.

1. $t - \frac{3}{4} = \frac{1}{4}$

A $t = \frac{1}{4}$

B $t = \frac{1}{2}$

C $t = \frac{3}{4}$

D $t = 1$

2. $g - \frac{3}{8} = \frac{1}{8}$

F $g = \frac{1}{4}$

G $g = \frac{1}{2}$

H $g = \frac{3}{4}$

J $g = 1$

3. $k + \frac{7}{12} = \frac{11}{12}$

A $k = \frac{1}{4}$

B $k = \frac{1}{3}$

C $k = \frac{1}{2}$

D $k = 1$

4. $n + \frac{2}{5} = \frac{4}{5}$

F $n = \frac{2}{5}$

G $n = \frac{3}{5}$

H $n = \frac{4}{5}$

J $n = 1$

5. $f + \frac{1}{6} = \frac{5}{6}$

A $f = \frac{1}{6}$

B $f = \frac{1}{3}$

C $f = \frac{1}{2}$

D $f = \frac{2}{3}$

6. $\frac{1}{4}s = 4$

F $s = \frac{1}{2}$

G $s = 1$

H $s = 4$

J $s = 16$

LESSON

Reteach

6-1 Fractions, Decimals, and Percents

To change a percent to a fraction:

- drop the percent symbol;
- write the percent as the numerator;
- write 100 as the denominator;
- simplify.

$$45\% = \frac{45}{100} = \frac{9}{20}$$

Write each percent as a fraction in simplest form.

1. 37% _____ 2. 80% _____ 3. 4% _____ 4. 75% _____

To change a fraction to a percent:

- use a proportion to find an equivalent fraction with a denominator of 100.

$$\begin{aligned} \frac{7}{25} &= \frac{x}{100} \\ 25x &= 700 \\ x &= 28 \\ \frac{7}{25} &= \frac{28}{100} = 28\% \end{aligned}$$

Write each fraction as a percent.

5. $\frac{1}{10}$ _____ 6. $\frac{3}{5}$ _____ 7. $\frac{11}{20}$ _____ 8. $\frac{1}{50}$ _____

To change a percent to a decimal:

- drop the % symbol;
- move the decimal point two places to the left.

$$54\% = 54. = 0.54$$

Write each percent as a decimal.

9. 33% _____ 10. 15% _____ 11. 97% _____ 12. 20% _____

To change a decimal to a percent:

- move the decimal point two places to the right;
- write the % symbol after the number.

$$0.09 = .09 = 9\%$$

Write each decimal as a percent.

13. 0.06 _____ 14. 0.25 _____ 15. 0.49 _____ 16. 0.15 _____



Working with Percents

Example 1: What is 25% of 12?

$$.25 \times 12 = 3 \quad \text{change the percent into a decimal and multiply}$$

Example 2: 25% of what is 12?

$$.25x = 12 \quad \text{change the percent into a decimal and set up an equation}$$

$$\frac{.25x}{.25} = \frac{12}{.25} \quad \text{solve the multiplication equation by dividing}$$

$$x = 48$$

Example 3: 6 is what % of 24?

$$\frac{6}{24} \quad \text{make a fraction with the number after "of" on the bottom}$$

$$\frac{6}{24} \rightarrow 24 \overline{)6.00} \rightarrow .25 = 25\% \quad \text{change the fraction to a decimal and change the decimal to a \%}$$

Solve:

1.

40% of 90

2.

85% of 520

3.

30% of 80

4.

47% of 300

5.

45% of 200

6.

25% of what is 10?

7.

20% of what is 25?

8.

75% of what is 15?

9.

60% of what is 48?

10.

10% of what is 5?

11.

10 is what % of 50?

12.

9 is what % of 12?

13.

24 is what % of 40?

14.

9 is what % of 36?

15.

16 is what % of 20?