Rising 7th
Summer Work

Dear Students,

Attached is a summer practice packet for math. This packet contains topics and math problems for you to work on during the summer. It is recommended that you begin work on the packet by the beginning of July and complete one or two topics per day. You should work with your parents to set up a schedule for the summer that includes some time for math practice each day. I suggest that you complete all of your work in a notebook so you can keep track of everything you have done.

If you have difficulty with a topic, look for online videos through Khan Academy or Math Antics that might help you. You can also reach out to family members or friends for assistance if needed. The topics covered in the packet are ones that you have completed in previous years. There should not be anything in the packet that you have not been taught in a previous grade. The purpose of the packet is to practice topics that are necessary for you to know to be successful at the next grade level.

By August 1st the answers to all of the problems in the packet will be posted on Mrs. McCarron's web page. You should check your work on the completed topics and rework any problems you have not completed correctly.

Have a happy and safe summer. Please feel free to have your parents reach out to me if you have any questions.

Blessings,

Mrs. McCarron

Name _____ Class _____ Date _____

Review 1

Understanding Whole Numbers

Millions Period			Thousands Period			Ones Period		
Hundreds	Tens	Ones	Hundreds	Tens	Ones	Hundreds	Tens	Ones
		4	2	0	1	5	7	8
4 million			201 thousand			578		

- *Standard form:* 4,201,578
- To find the value of a digit, multiply the digit by its place value.

  4 stands for $4 \times 1{,}000{,}000$, or 4,000,000
- *Expanded form:*
  $4{,}201{,}578 = 4{,}000{,}000 + 200{,}000 + 1{,}000 + 500 + 70 + 8$

Write each number in standard form.

1. six thousand one hundred four _____
2. fifteen million twenty-one thousand _____
3. sixty thousand one hundred twelve _____
4. 2 billion, 9 million, 6 thousand, 1 _____
5. seventeen thousandths _____
6. twenty-nine hundredths _____
7. eight thousand two hundred ninety _____
8. one billion thirty thousand fifty _____

Use < or > to complete each statement.

9. 523 ☐ 567
10. 1,292 ☐ 1,192
11. 47 ☐ 45
12. 9,120 ☐ 912
13. 53,010 ☐ 53,100
14. 4,293 ☐ 4,239
15. 783 ☐ 738
16. 4,121 ☐ 4,212
17. 35,423 ☐ 34,587
18. 241,796 ☐ 242,976
19. 182 ☐ 1,820
20. 8,751 ☐ 8,715

Write in order from least to greatest.

21. 782, 785, 783, 790 _____
22. 1,240; 1,420; 1,346; 1,364 _____
23. 6,214; 6,124; 6,421; 6,241 _____
24. 92,385; 92,835; 93,582; 93,258 _____
25. 45,923; 54,923; 45,932; 54,932 _____
26. 1,111; 1,011; 1,101; 1,110 _____

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Review 3

Comparing and Ordering Decimals

Use >, < , or = to show how 4.092 and 4.089 compare.

① Write the numbers on grid paper with the decimal points lined up.

② Compare digits in the greatest place. Move to the right until you find digits that are not the same.

4 ones = 4 ones
0 tenths = 0 tenths
9 hundreths > 8 hundreths

So, 4.092 > 4.089.

4	.	0	9	2
4	.	0	8	9

To order numbers from least to greatest:

① Write the numbers on grid paper (decimal points lined up) and compare.

② Then arrange the numbers from least to greatest.

4.089, 4.09, 4.092

4	.	0	9	2
4	.	0	8	9
4	.	0	9	

Use <, =, or > to complete each statement.

1. 0.01 ☐ 0.15
2. 0.25 ☐ 0.21
3. 0.30 ☐ 0.26
4. 0.10 ☐ 0.12
5. 0.35 ☐ 0.34
6. 0.1 ☐ 0.4
7. 34.4 ☐ 34.40
8. 0.207 ☐ 0.27
9. 0.08 ☐ 0.40
10. 0.32 ☐ 0.309
11. 6.12 ☐ 6.099
12. 0.990 ☐ 0.99
13. 2.36 ☐ 2.036
14. 0.05 ☐ 0.15
15. 1.19 ☐ 1.91

Use place value to order the decimals from least to greatest.

16. 3.46, 3.64, 3.59 _____
17. 22.97, 21.79, 22.86 _____
18. 43, 43.22, 43.022 _____
19. 10.02, 10.2, 1.02 _____
20. 1.09, 1.9, 1.1 _____
21. 7.54, 75.4, 7.4 _____

Order each set of numbers on a number line.

22. 0.67, 0.7, 0.6
23. 0.03, 0.29, 0.019
24. 8.36, 8.01, 8.1

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Review 5

Adding and Subtracting Decimals

Add 3.25 + 12.6 + 18.93.

First estimate.

$$\begin{array}{rcl} 3.25 & \rightarrow & 3 \\ 12.6 & \rightarrow & 13 \\ +\,18.93 & \rightarrow & 19 \\ & & 35 \end{array}$$

Then follow these steps.

① Line up the decimal points. Write in any needed zeros.

$$\begin{array}{r} 3.25 \\ 12.60 \\ +\,18.93 \end{array}$$

② Add as you would add whole numbers. Regroup when needed.

$$\begin{array}{r} {\scriptstyle 11} \\ 3.25 \\ 12.60 \\ +\,18.93 \\ \hline 34\,78 \end{array}$$

③ Place the decimal point.

$$\begin{array}{r} 3.25 \\ 12.60 \\ +\,18.93 \\ \hline 34.78 \end{array}$$

← **Compare to your estimate.**

To subtract decimals, follow similar steps. Work from right to left and regroup when needed. Place the decimal point to complete the subtraction.

First estimate and then find each sum.

1. 0.9 + 6.7

Estimate _____

Sum _____

2. 3.1 + 9.4

Estimate _____

Sum _____

3. 4.88 + 8.19

Estimate _____

Sum _____

Use mental math to find each sum.

4. 14.05 + 9.75

_____

5. 6 + 0.22 + 0.78

_____

6. 9.104 + 5.01 + 7.99

_____

First estimate and then find each difference.

7. 8.5 − 4.2

Estimate _____

Difference _____

8. 7.2 − 3.05

Estimate _____

Difference _____

9. 5.07 − 2.8

Estimate _____

Difference _____

10. 6.347 − 2.986

_____

11. 14.2 − 9.86

_____

12. 13.45 − 5.001

_____

13. 22.7 − 12.06

_____

14. 16.1 − 10.88

_____

15. 1.79 − 0.879

_____

Name _____ Class _____ Date _____

Review 8

Multiplying and Dividing Decimals by 10, 100, and 1,000

Example 1: Multiply 10×0.65.

There is one zero in 10 so move the decimal point one place to the right.

$10 \times 0.65 = 6.5$

Check your answer using a paper and pencil.

0.65 ← 2 decimal places
×10 ← 0 decimal places
6.50 ← 2 decimal places

$6.50 = 6.5$

Example 2: Divide $15.5 \div 100$.

There are two zeros in 100 so move the decimal point two places to the left.

$15.5 \div 100 = 0.155$

Check your answer using a paper and pencil.

$$\begin{array}{r} 0.155 \\ 100\overline{)15.5} \\ -100 \\ \hline 550 \\ -500 \\ \hline 500 \\ -500 \\ \hline 0 \end{array}$$

Use mental math to find each product.

1. 2.7×10 _____
2. $2.5(10)$ _____
3. $100(0.21)$ _____
4. 0.77×100 _____
5. $10 \times 0.2 \times 1$ _____
6. $5 \times 0.2 \times 100$ _____
7. 2.64×100 _____
8. $7.5 \cdot 1{,}000$ _____
9. $0.5 \times 2 \times 20$ _____

Use mental math to find each quotient.

10. $0.4 \div 10$ _____
11. $2.3 \div 100$ _____
12. $7 \div 100$ _____
13. $52.3 \div 10$ _____
14. $3 \div 1{,}000$ _____
15. $41 \div 100$ _____

Use <, =, or > to complete each statement.

16. 2.2×10 ☐ $2.2(10)(0.1)$
17. $1.1 \div 10$ ☐ $110 \div 100$
18. $60 \div 100$ ☐ $600 \div 10$
19. $5 \times 0.3 \times 2$ ☐ 10×0.3
20. $0.22 \div 10$ ☐ $0.22 \div 0.1$
21. 0.004×100 ☐ $10 \times 10 \times 0.004$
22. $5.5 \times 2 \times 10$ ☐ 5.5×100
23. $(2 \times 5)\ 0.14$ ☐ $0.14\ (10)$

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Review 13

Writing Algebraic Expressions

These terms are used to describe mathematical operations.

Addition	Subtraction	Multiplication	Division
sum more than increased by total added to	difference less than fewer than decreased by	product times multiplied by	quotient of divided by

You can use the terms above to write algebraic expressions for word phrases.

Word Phrase		Algebraic Expression
the sum of m and 17	$\rightarrow$	$m + 17$
the difference of x and 12	$\rightarrow$	$x - 12$
3 times w	$\rightarrow$	$3w$
the quotient of q and 6	$\rightarrow$	$q \div 6$

Write an expression to describe the relationship of the data in each table.

1.

n	▩
2	10
4	12
6	14

_____

2.

n	▩
1	3
2	6
3	9

_____

3.

n	▩
8	6
10	8
12	10

_____

Write an expression for each word phrase.

4. 6 increased by y

_____

5. the quotient of 8 and e

_____

6. the difference of h and 3

_____

7. 4 times w

_____

8. the difference of s and 8

_____

9. r divided by 2

_____

10. 5 more than n

_____

11. the product of 6 and m

_____

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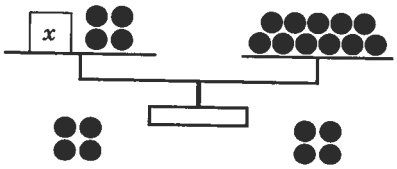
Review 16

Solving Addition and Subtraction Equations

Addition Equations

There are 4 more than needed to fill the x box.



$$x + 4 = 11$$

To *solve* this equation, find the value of x that makes the scales balance.

Since 4 is added to x, subtract 4 from both sides.

$$x + 4 = 11$$
$$x + 4 - 4 = 11 - 4$$
$$x = 7$$

The *solution* to the equation is $x = 7$.

Subtraction Equations

$$r - 3 = 9$$

To *solve* this equation, find the value of r.

Since 3 is subtracted from r, add 3 to both sides.

$$r - 3 = 9$$
$$r - 3 + 3 = 9 + 3$$
$$r = 12$$

The *solution* to the equation is $r = 12$.

Solve each equation.

1. $a + 15 = 31$

$a + 15 - \_\_\_\_ = 31 - \_\_\_\_$

$a = \_\_\_\_$

2. $5 = x - 20$

$5 + \_\_\_\_ = x - 20 + \_\_\_\_$

$\_\_\_\_ = x$

3. $19 + t = 51$

_____

4. $p - 11 = 12$

_____

5. $60 = n + 30$

_____

6. $71 = b - 29$

_____

7. $86 + m = 107$

_____

8. $w + 349 = 761$

_____

9. $50 - y = 30$

_____

10. $d - 125 = 75$

_____

11. A car dealer purchased a car for \$2,000 and then sold it for \$3,200. Write and solve an equation to find the profit.

_____

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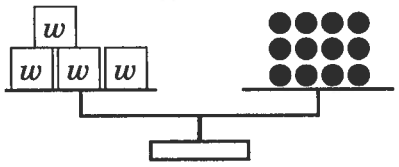
Review 17

Solving Multiplication and Division Equations

What value of w makes the scales balance?



$4w = 12$ ⟶ To solve the multiplication sentence, use division.

$4w = 12$

$4w \div 4 = 12 \div 4$ ← **Divide both sides by 4.**

$w = 3$

The solution is $w = 3$.

To solve a division sentence, use multiplication.

$y \div 3 = 7$

$y \div 3 \times 3 = 7 \times 3$ ← **Multiply both sides by 3.**

$y = 21$

The solution is $y = 21$.

State whether the number given is a solution to the equation.

1. $3g = 36; g = 12$ _____
2. $t \div 8 = 2; t = 4$ _____
3. $h \div 7 = 21; h = 3$ _____
4. $18 = 3m; m = 6$ _____
5. $6a = 18; a = 3$ _____
6. $36 = r \div 9; r = 4$ _____

Solve each equation.

7. $12 = 4y$

   $12 \div$ ____ $= 4y \div$ ____

   ____ $= y$

8. $n \div 9 = 4$

   $n \div 9 \times$ ____ $= 4 \times$ ____

   $n =$ ____

9. $23n = 115$ _____
10. $z \div 9 = 9$ _____
11. $48 = 12h$ _____
12. $10w = 150$ _____
13. $34 = t \div 14$ _____
14. $105 = 21t$ _____
15. $64 = e \div 9$ _____
16. $8v = 32$ _____
17. $22 = t \div 4$ _____
18. $3s = 66$ _____
19. $21 = b \div 2$ _____
20. $15n = 45$ _____

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Exponents

Review 18

An *exponent* tells how many times a number is used as a factor.

$3 \times 3 \times 3 \times 3$ shows the number 3 is used as a factor 4 times.

$3 \times 3 \times 3 \times 3$ can be written 3^4.

In 3^4, 3 is the *base* and 4 is the exponent.

Read 3^4 as "three to the fourth power."

- To *simplify* a power, first write it as a product.

  $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$

- When you simplify expressions with exponents, do all operations inside parentheses first. Then simplify the powers.

  Example: $30 - (2 + 3)^2 = 30 - 5^2$
  $= 30 - 25$
  $= 5$

Name the base and the exponent.

1. 3^6

base _____

exponent _____

2. 6^2

base _____

exponent _____

3. 8^4

base _____

exponent _____

Write each expression using an exponent. Name the base and the exponent.

4. $9 \times 9 \times 9$

_____

5. $6 \times 6 \times 6 \times 6$

_____

6. $1 \times 1 \times 1 \times 1 \times 1$

_____

Simplify each expression.

7. 6^2

_____

8. 3^5

_____

9. 10^4

_____

10. $4^2 + 5^2$

_____

11. $2 \times 6 - 2^3$

_____

12. $6^2 + 4^2$

_____

13. $5 + 5^2 - 2$

_____

14. $24 \div 4 + 2^4$

_____

15. $9 + (40 \div 2^3)$

_____

16. $(4^2 + 4) \div 5$

_____

17. $10 \times (30 - 5^2)$

_____

18. $12 + 18 \div 3^2$

_____

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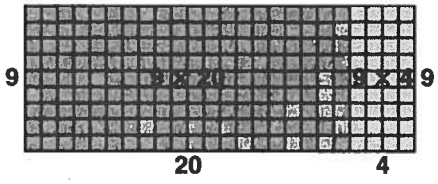
Review 19

The Distributive Property

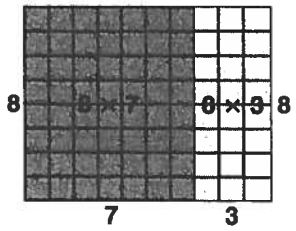
The *Distributive Property* allows you to break numbers apart to make mental math easier.



Multiply 9×24 mentally.

Think: $9 \times 24 = 9 \times (20 + 4)$
$= (9 \times 20) + (9 \times 4)$
$= 180 + 36$
$= 216$

The Distributive Property may also help you to simplify an expression.



$(8 \times 7) + (8 \times 3) = 8 \times (7 + 3)$
$= 8 \times 10$
$= 80$

Use the Distributive Property to find the missing numbers in the equation.

1. $(\square \times 4) + (3 \times \square) = 3 \times (4 + 8)$
2. $(6 \times \square) - (\square \times 3) = 6 \times (5 - 3)$
3. $4 \times (\square - 3) = (\square \times 9) - (4 \times \square)$
4. $(\square \times 7) - (6 \times \square) = 6 \times (7 - 5)$
5. $(4 \times 5) + (\square \times 7) = 4 \times (\square + 7)$
6. $\square \times (12 + 8) = (6 \times \square) + (\square \times 8)$

Use the Distributive Property to rewrite and simplify each expression.

7. $(2 \times 7) + (2 \times 5)$

_____

_____

8. $8 \times (60 - 5)$

_____

_____

9. $(7 \times 8) - (7 \times 6)$

_____

_____

10. $(12 \times 3) + (12 \times 4)$

_____

_____

Use the Distributive Property to simplify each expression.

11. 3×27 _____
12. 5×43 _____
13. 8×59 _____
14. 7×61 _____
15. 5×84 _____
16. 6×53 _____
17. 8×48 _____
18. 4×91 _____
19. 9×38 _____

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Review 20

Divisibility and Mental Math

A number is **divisible** by a second number if the second number divides into the first with no remainder. Here are some rules.

Last Digit of a Number	The Number Is Divisible by	Examples
any	1	any number
0, 2, 4, 6, 8	2	10; 24; 32; 54; 106; 138
0, 5	5	10; 25; 70; 915; 1,250
0	10	10; 20; 90; 500; 4,300

The Sum of the Digits	The Number Is Divisible by	Examples	
is divisible by 3	3	843 → 8 + 4 + 3 = 15 and 15 ÷ 3 = 5	281 R0 3)843
is divisible by 9	9	2,898 → 2 + 8 + 9 + 8 = 27 and 27 ÷ 9 = 3	322 R0 9)2,898

Circle the numbers that are divisible by the number at the left.

1.	2	8	15	26	42	97	105	218
2.	5	14	10	25	18	975	1,005	2,340
3.	10	100	75	23	60	99	250	655
4.	3	51	75	12	82	93	153	274
5.	9	27	32	36	108	126	245	387

Use mental math to determine if the first number is divisible by the second.

6. 185; 5 _____ **7.** 76,870; 10 _____ **8.** 461; 1 _____

9. 456; 3 _____ **10.** 35,994; 2 _____ **11.** 6,791; 3 _____

12. 12,866; 9 _____ **13.** 151,002; 9 _____ **14.** 55,340; 5 _____

15. 6,888; 2 _____ **16.** 31,067; 5 _____ **17.** 901,204; 3 _____

18. 2,232; 3 _____ **19.** 45,812; 9 _____ **20.** 3,090; 10 _____

21. 312; 9 _____ **22.** 1,933; 3 _____ **23.** 28,889; 2 _____

Test each number for being divisible by 2, 5, or 10. Some numbers may be divisible by more than one number.

24. 800 _____ **25.** 65 _____ **26.** 1, 010 _____

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Review 22

Greatest Common Factor

You can find the *greatest common factor (GCF)* of 12 and 18 using a division ladder, factor trees, or by listing the factors. Two of these methods are shown.

① List the factors of 12 and 18.

12: 1, 2, 3, 4, 6, 12
18: 1, 2, 3, 6, 9, 18

② Find the common factors.

12: ①,②,③, 4,⑥, 12
18: ①,②,③,⑥, 9, 18

The common factors are 1, 2, 3, and 6.

③ Name the greatest common factor: 6.

① Draw factor trees.

② Write each prime factorization. Identify common factors.

12: ②× 2 ×③
18: ②×③× 3

③ Multiply the common factors. $2 \times 3 = 6$. The GCF of 12 and 18 is 6.

List the factors to find the GCF of each set of numbers.

1. 10: _____
15: _____
GCF: _____

2. 14: _____
21: _____
GCF: _____

3. 9: _____
21: _____
GCF: _____

4. 12: _____
13: _____
GCF: _____

5. 15: _____
25: _____
GCF: _____

6. 15: _____
18: _____
GCF: _____

7. 36: _____
48: _____
GCF: _____

8. 24: _____
30: _____
GCF: _____

Find the GCF of each set of numbers.

9. 21, 60 _____

10. 15, 45 _____

11. 32, 40 _____

12. 54, 60 _____

13. 20, 50 _____

14. 21, 63 _____

15. 36, 40 _____

16. 48, 72 _____

17. 90, 150 _____

Name _____ Class _____ Date _____

Review 23

Equivalent Fractions

Equivalent fractions are fractions that name the same amount.

To find equivalent fractions, multiply or divide the numerator and denominator by the same number.

$\frac{2}{5} \overset{\times 2}{=} \frac{4}{10}$ $\qquad$ $\frac{4}{10} \overset{\div 2}{=} \frac{2}{5}$

So, $\frac{2}{5} = \frac{4}{10}$.

To write a fraction in *simplest form,* divide the numerator and denominator by their greatest common factor.

Example: Write $\frac{8}{12}$ in simplest form.

① Find the greatest common factor.

8: 1, 2, **4,** 8
12: 1, 2, 3, **4,** 6, 12

The GCF is 4.

② Divide the numerator and denominator by the GCF.

$\frac{8}{12} \overset{\div 4}{=} \frac{2}{3}$

$\frac{8}{12}$ in simplest form is $\frac{2}{3}$.

Write two fractions equivalent to each fraction.

1. $\frac{5}{6}$ _____
2. $\frac{3}{7}$ _____
3. $\frac{7}{8}$ _____
4. $\frac{3}{11}$ _____
5. $\frac{3}{6}$ _____
6. $\frac{1}{5}$ _____

State whether each fraction is in simplest form. If it is not, write it in simplest form.

7. $\frac{12}{15}$ _____
8. $\frac{8}{15}$ _____
9. $\frac{9}{21}$ _____
10. $\frac{15}{22}$ _____
11. $\frac{14}{30}$ _____
12. $\frac{25}{70}$ _____

Write each fraction in simplest form.

13. $\frac{12}{24}$ _____
14. $\frac{10}{200}$ _____
15. $\frac{56}{64}$ _____
16. $\frac{3}{9}$ _____
17. $\frac{130}{170}$ _____
18. $\frac{12}{16}$ _____
19. $\frac{7}{49}$ _____
20. $\frac{22}{33}$ _____
21. $\frac{30}{225}$ _____

22. There are 420 girls out of 1,980 people attending a state fair. In simplest form, what fraction of the people attending are girls?

_____

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Name _____ Class _____ Date _____

Review 24

Mixed Numbers and Improper Fractions

To write a mixed number as an *improper fraction:*

① Multiply the whole number by the denominator.

② Add this product to the numerator.

③ Write this sum over the denominator.

② ③
$3\frac{5}{8} = \frac{29}{8}$
①

To write an improper fraction as a *mixed number:*

① Divide the numerator by the denominator. $\frac{20}{8} = 2$ remainder 4

② Write the remainder over the denominator. $= 2\frac{4}{8}$

③ Simplify, if possible. $= 2\frac{1}{2}$

$\frac{20}{8} = 2\frac{1}{2}$

Write each mixed number as an improper fraction.

1. $2\frac{2}{7}$ _____
2. $5\frac{3}{4}$ _____
3. $6\frac{1}{2}$ _____
4. $6\frac{5}{8}$ _____
5. $3\frac{4}{10}$ _____
6. $4\frac{3}{5}$ _____
7. $9\frac{1}{3}$ _____
8. $4\frac{4}{5}$ _____
9. $1\frac{7}{8}$ _____
10. $3\frac{3}{8}$ _____
11. $2\frac{3}{7}$ _____
12. $8\frac{1}{6}$ _____

On a separate sheet of paper, draw a model of a 4-inch ruler marked off in eighths. Find and label each measurement on your ruler.

13. $3\frac{5}{8}$
14. $2\frac{6}{8}$
15. $3\frac{1}{2}$
16. $1\frac{3}{4}$
17. $2\frac{1}{2}$
18. $3\frac{1}{4}$

Write each improper fraction as a mixed number in simplest form.

19. $\frac{9}{8}$ _____
20. $\frac{7}{2}$ _____
21. $\frac{12}{5}$ _____
22. $\frac{8}{3}$ _____
23. $\frac{14}{8}$ _____
24. $\frac{6}{5}$ _____
25. $\frac{20}{3}$ _____
26. $\frac{17}{5}$ _____
27. $\frac{18}{4}$ _____
28. $\frac{9}{5}$ _____
29. $\frac{29}{8}$ _____
30. $\frac{24}{9}$ _____

Name _____ Class _____ Date _____

Review 25

Least Common Multiple

Find the *least common multiple (LCM)* of 8 and 12.

① Begin listing multiples of each number.

8: 8, 16, 24, 32, 40

12: 12, 24

② Continue the lists until you find the first multiple that is common to both lists. That is the LCM.

The least common multiple of 8 and 12 is 24.

List multiples to find the LCM of each pair of numbers.

1. 4: _____

5: _____

LCM: _____

2. 6: _____

7: _____

LCM: _____

3. 9: _____

15: _____

LCM: _____

4. 10: _____

25: _____

LCM: _____

5. 8: _____

24: _____

LCM: _____

6. 8: _____

12: _____

LCM: _____

7. 4: _____

7: _____

LCM: _____

8. 15: _____

25: _____

LCM: _____

9. 15: _____

20: _____

LCM: _____

10. 4: _____

9: _____

LCM: _____

Use prime factorization to find the LCM of each set of numbers.

11. 9, 21 _____

12. 6, 8 _____

13. 18, 24 _____

14. 40, 50 _____

15. 42, 49 _____

16. 6, 12 _____

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Review 26

Comparing and Ordering Fractions

To compare and order fractions, use the *least common denominator (LCD).*
The LCD is the least common multiple (LCM) of the original denominators.

Compare Fractions

Example 1: Compare $\frac{3}{4}$ and $\frac{7}{10}$.

① Find the LCD of the denominators 4 and 10:

$4 = 2 \times 2$

$10 = 2 \times 5$

$\text{LCD} = 2 \times 2 \times 5 = 20$

② Write equivalent fractions:

$\frac{3}{4} \overset{\times 5}{=} \frac{15}{20}$ $\quad$ $\frac{7}{10} \overset{\times 2}{=} \frac{14}{20}$

③ Compare: $\frac{15}{20} > \frac{14}{20}$, or

$\frac{3}{4} > \frac{7}{10}$

Order Fractions

Example 2: Order from least to greatest: $\frac{2}{3}, \frac{5}{8}, \frac{3}{4}$.

① Find the LCD of the denominators 3, 8, and 4:

$3 = 3$

$8 = 2 \times 2 \times 2$

$4 = 2 \times 2$

$\text{LCD} = 2 \times 2 \times 2 \times 3 = 24$

② Write equivalent fractions:

$\frac{2}{3} \overset{\times 8}{=} \frac{16}{24}$ $\quad$ $\frac{5}{8} \overset{\times 3}{=} \frac{15}{24}$ $\quad$ $\frac{3}{4} \overset{\times 6}{=} \frac{18}{24}$

③ Order:

15 , 16 , 18

$\frac{15}{24} < \frac{16}{24} < \frac{18}{24}$, or $\frac{5}{8} < \frac{2}{3} < \frac{3}{4}$

Compare each pair of numbers using <, =, or >.

1. $\frac{2}{9} \square \frac{1}{3}$
2. $\frac{5}{6} \square \frac{7}{8}$
3. $\frac{7}{20} \square \frac{3}{10}$
4. $\frac{3}{6} \square \frac{4}{11}$
5. $\frac{2}{3} \square \frac{4}{6}$
6. $\frac{4}{8} \square \frac{2}{8}$
7. $\frac{3}{7} \square \frac{5}{8}$
8. $\frac{1}{3} \square \frac{3}{9}$
9. $\frac{1}{2} \square \frac{3}{7}$
10. $\frac{4}{5} \square \frac{7}{9}$
11. $\frac{2}{3} \square \frac{7}{10}$
12. $2\frac{5}{9} \square 2\frac{3}{5}$

Order each set of numbers from least to greatest.

13. $\frac{3}{4}, \frac{5}{8}, \frac{1}{2}$ _____
14. $\frac{5}{8}, \frac{5}{6}, \frac{2}{3}$ _____
15. $\frac{1}{2}, \frac{5}{12}, \frac{2}{3}$ _____
16. $\frac{3}{5}, \frac{2}{3}, \frac{7}{12}$ _____
17. $\frac{1}{2}, \frac{3}{5}, \frac{3}{8}$ _____
18. $\frac{7}{8}, \frac{3}{4}, \frac{13}{16}$ _____

19. Suzanne swims $1\frac{1}{9}$ miles. Eugene swims $1\frac{5}{12}$ miles. Who swims farther? Show your work.

_____

Review 27

Example 1: Write 0.320 as a fraction in simplest form.

① Read. "320 thousandths"

② Write. $\frac{320}{1{,}000}$

③ Simplify. $\frac{320}{1{,}000} = \frac{320 \div 40}{1{,}000 \div 40} = \frac{8}{25}$

$0.320 = \frac{8}{25}$

Example 2: Write 6.95 as a mixed number in simplest form.

① Read. "6 and 95 hundredths"

② Write. $6\frac{95}{100}$

③ Simplify. $6\frac{95}{100} = 6\frac{19}{20}$

$6.95 = 6\frac{19}{20}$

Example 3: Write $\frac{1}{5}$ and $\frac{2}{3}$ as decimals.

Divide the numerator by the denominator. Insert zeros if needed.

$$\begin{array}{r} 0.2 \\ 5\overline{)1.0} \end{array}$$

$$\begin{array}{r} 0.666\ \ldots \leftarrow \text{The digits repeat because the remainder} \\ 3\overline{)2.0000} \\ -18 \\ \hline 20 \\ -18 \\ \hline 2 \leftarrow \text{repeats.} \end{array}$$

$\frac{1}{5} = 0.2$ $\quad \frac{2}{3} = 0.666\ \ldots = 0.\overline{6}$

0.2 is a *terminating decimal* because there is no remainder.

0.666 . . . is a repeating decimal because the remainder repeats. Write it as $0.\overline{6}$.

Write each decimal as a fraction or mixed number in simplest form.

1. 0.8 _____
2. 0.55 _____
3. 1.25 _____
4. 1.75 _____
5. 3.375 _____
6. 0.125 _____
7. 1.32 _____
8. 0.34 _____
9. 0.084 _____
10. 0.006 _____
11. 0.65 _____
12. 4.95 _____

Write each fraction or mixed number as a decimal.

13. $\frac{13}{20}$ _____
14. $\frac{1}{6}$ _____
15. $\frac{7}{20}$ _____
16. $2\frac{3}{5}$ _____
17. $\frac{19}{25}$ _____
18. $\frac{4}{9}$ _____
19. $\frac{7}{11}$ _____
20. $1\frac{5}{8}$ _____
21. $1\frac{2}{9}$ _____
22. $2\frac{2}{8}$ _____
23. $\frac{1}{25}$ _____
24. $\frac{5}{12}$ _____

State whether each fraction is less than, equal to, or greater than 0.50. Show your work.

25. $\frac{1}{3}$ _____
26. $\frac{20}{40}$ _____
27. $\frac{1}{6}$ _____
28. $\frac{7}{8}$ _____
29. $\frac{11}{13}$ _____
30. $\frac{8}{20}$ _____

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Review 30

Fractions With Like Denominators

Add: $\frac{1}{6} + \frac{3}{6}$

① Combine numerators over the denominator. $\frac{1}{6} + \frac{3}{6} = \frac{1+3}{6}$

② Add numerators. $= \frac{4}{6}$

③ Simplify, if possible. $= \frac{2}{3}$

$\frac{1}{6} + \frac{3}{6} = \frac{2}{3}$

Subtract: $\frac{7}{10} - \frac{2}{10}$

① Combine numerators over the denominator. $\frac{7}{10} - \frac{2}{10} = \frac{7-2}{10}$

② Subtract numerators. $= \frac{5}{10}$

③ Simplify, if possible. $= \frac{1}{2}$

$\frac{7}{10} - \frac{2}{10} = \frac{1}{2}$

Find each sum.

1. $\frac{1}{5} + \frac{3}{5}$ _____
2. $\frac{4}{6} + \frac{1}{6}$ _____
3. $\frac{3}{12} + \frac{3}{12}$ _____
4. $\frac{6}{10} + \frac{5}{10}$ _____
5. $\frac{3}{10} + \frac{2}{10}$ _____
6. $\frac{6}{12} + \frac{3}{12}$ _____
7. $\frac{5}{8} + \frac{1}{8}$ _____
8. $\frac{3}{8} + \frac{9}{8}$ _____
9. $\frac{3}{8} + \frac{6}{8}$ _____

Find each difference.

10. $\frac{6}{8} - \frac{3}{8}$ _____
11. $\frac{9}{10} - \frac{3}{10}$ _____
12. $\frac{3}{4} - \frac{1}{4}$ _____
13. $\frac{7}{12} - \frac{1}{12}$ _____
14. $\frac{8}{10} - \frac{6}{10}$ _____
15. $\frac{4}{6} - \frac{2}{6}$ _____
16. $\frac{5}{10} - \frac{1}{10}$ _____
17. $\frac{7}{12} - \frac{6}{12}$ _____
18. $\frac{9}{10} - \frac{4}{10}$ _____

Find each sum or difference.

19. $\frac{2}{7} + \frac{2}{7} - \frac{1}{7}$ _____
20. $\frac{10}{100} + \frac{20}{100} + \frac{90}{100}$ _____
21. $\frac{2}{5} - \frac{2}{5} + \frac{5}{5}$ _____
22. $\frac{10}{11} - \left(\frac{2}{11} + \frac{4}{11}\right)$ _____
23. $\frac{8}{10} - \frac{2}{10} - \frac{1}{10}$ _____
24. $\frac{62}{80} - \frac{10}{80} - \frac{5}{80}$ _____

25. For school photos, $\frac{1}{5}$ of the students choose to have a blue background, $\frac{2}{5}$ of the students choose to have a purple background, and $\frac{1}{5}$ of the students choose to have a gray background. What portion of the students choose to have another background color?

_____

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Review 31

Fractions With Unlike Denominators

To add or subtract fractions with unlike denominators, you can use equivalent fractions.

Find $\frac{5}{6} + \frac{1}{2}$.

① Find the least common denominator of 6 and 2.

The LCD is 6.

② Write equivalent fractions using the LCD.

$\frac{5}{6} = \frac{5}{6}$ $\quad \frac{1}{2} = \frac{1 \times 3}{2 \times 3} = \frac{3}{6}$

③ Add. Write the sum in simplest form.

$$\frac{5}{6} + \frac{1}{2} = \frac{5}{6} + \frac{3}{6}$$
$$= \frac{5+3}{6}$$
$$= \frac{8}{6}$$
$$= \frac{4}{3}$$
$$= 1\frac{1}{3}$$

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

Find $\frac{4}{5} - \frac{1}{3}$.

① Find the least common denominator of 5 and 3.

The LCD is 15.

② Write equivalent fractions using the LCD.

$\frac{4}{5} = \frac{4 \times 3}{5 \times 3} = \frac{12}{15}$ $\quad \frac{1}{3} = \frac{1 \times 5}{3 \times 5} = \frac{5}{15}$

③ Subtract. Write the difference in simplest form.

$$\frac{4}{5} - \frac{1}{3} = \frac{12}{15} - \frac{5}{15}$$
$$= \frac{12-5}{15}$$
$$= \frac{7}{15}$$

$\frac{4}{5} - \frac{1}{3} = \frac{7}{15}$

Find each sum or difference.

1. $\frac{1}{2} + \frac{3}{4}$ _____
2. $\frac{11}{16} - \frac{5}{16}$ _____
3. $\frac{1}{6} + \frac{1}{3}$ _____
4. $\frac{7}{8} - \frac{1}{2}$ _____
5. $\frac{9}{10} + \frac{1}{2}$ _____
6. $\frac{2}{3} + \frac{5}{9}$ _____
7. $\frac{1}{2} + \frac{7}{10}$ _____
8. $\frac{3}{4} - \frac{5}{12}$ _____
9. $\frac{5}{8} + \frac{1}{4}$ _____
10. $\frac{15}{16} - \frac{1}{4}$ _____
11. $\frac{7}{12} - \frac{1}{3}$ _____
12. $\frac{5}{6} + \frac{1}{3}$ _____
13. $\frac{7}{8} - \frac{1}{4}$ _____
14. $\frac{3}{5} + \frac{1}{6}$ _____
15. $\frac{1}{12} + \frac{1}{10}$ _____
16. $\frac{7}{8} - \frac{3}{10}$ _____
17. $\frac{2}{6} + \frac{3}{4}$ _____
18. $\frac{3}{8} - \frac{1}{3}$ _____
19. $\frac{5}{8} + \frac{2}{3}$ _____
20. $\frac{3}{5} - \frac{1}{2}$ _____
21. $\frac{1}{8} + \frac{1}{5}$ _____
22. $\frac{7}{10} - \frac{3}{5}$ _____
23. $\frac{9}{10} - \frac{1}{2}$ _____
24. $\frac{1}{10} + \frac{4}{5}$ _____

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Review 32

Adding Mixed Numbers

Some mixed numbers can be added mentally.

Find $5\frac{1}{4} + 2\frac{1}{8}$.

① Add the whole numbers.

$$5 + 2 = 7$$

② Add the fractions.

$$\frac{1}{4} + \frac{1}{8} = \frac{2}{8} + \frac{1}{8} = \frac{3}{8}$$

③ Combine the two parts.

$$7 + \frac{3}{8} = 7\frac{3}{8}$$

$$5\frac{1}{4} + 2\frac{1}{8} = 7\frac{3}{8}$$

Or, you can follow these steps.

Find $4\frac{4}{5} + 2\frac{9}{10}$.

① Write with a common denominator.

$$4\frac{4}{5} + 2\frac{9}{10} = 4\frac{8}{10} + 2\frac{9}{10}$$

② Add the whole numbers. Add the fractions. $= 6\frac{17}{10}$

③ Rename $6\frac{17}{10}$ as $7\frac{7}{10}$. $= 7\frac{7}{10}$

$$4\frac{4}{5} + 2\frac{9}{10} = 7\frac{7}{10}$$

Find each sum.

1. $4\frac{4}{7} + 1\frac{1}{7}$ _____
2. $1\frac{1}{3} + 3\frac{1}{3}$ _____
3. $2\frac{1}{2} + 4$ _____
4. $8\frac{2}{5} + 4\frac{1}{10}$ _____
5. $7\frac{3}{4} + 2\frac{1}{8}$ _____
6. $2\frac{7}{10} + 3\frac{1}{5}$ _____
7. $7\frac{2}{9} + 1\frac{4}{9}$ _____
8. $8\frac{3}{14} + 2\frac{1}{7}$ _____
9. $9\frac{3}{8} + 2\frac{1}{2}$ _____
10. $1\frac{3}{4} + 4\frac{7}{8}$ _____
11. $7\frac{2}{3} + 8\frac{5}{6}$ _____
12. $1\frac{2}{5} + 9\frac{2}{3}$ _____
13. $6\frac{3}{4} + 8\frac{4}{5}$ _____
14. $3\frac{2}{3} + 5\frac{5}{6}$ _____
15. $4\frac{2}{5} + 6\frac{7}{10}$ _____
16. $6 + 3\frac{2}{5}$ _____
17. $9\frac{1}{6} + 1\frac{1}{3}$ _____
18. $8\frac{1}{16} + 4\frac{5}{8}$ _____

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Review 33

Subtracting Mixed Numbers

Some mixed numbers can be subtracted mentally.

Find $5\frac{2}{3} - 2\frac{1}{6}$.

① Subtract the whole numbers.

$$5 - 2 = 3$$

② Then, subtract the fractions.

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

③ Combine the two parts.

$$3 + \frac{1}{2} = 3\frac{1}{2}$$

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

Sometimes you must rename the first fraction before subtracting.

Find $6\frac{1}{2} - 2\frac{3}{4}$.

Cannot subtract $\frac{1}{2} - \frac{3}{4}$.

① Write with a common denominator.

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

② Rename $6\frac{2}{4}$. $= 5\frac{6}{4} - 2\frac{3}{4}$

③ Subtract the whole numbers. Then, subtract the fractions. Simplify, if necessary. $= 3\frac{3}{4}$

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

Find each difference.

1. $7\frac{7}{10} - 2\frac{3}{10}$ _____
2. $3\frac{3}{4} - 1\frac{1}{2}$ _____
3. $6\frac{2}{3} - 2\frac{1}{6}$ _____
4. $9\frac{7}{8} - 7\frac{3}{4}$ _____
5. $8\frac{1}{2} - 3\frac{1}{4}$ _____
6. $14\frac{1}{3} - 8\frac{1}{4}$ _____
7. $12\frac{1}{3} - 9\frac{2}{3}$ _____
8. $6\frac{5}{8} - 2\frac{3}{4}$ _____
9. $7\frac{5}{7} - 4\frac{13}{14}$ _____
10. $10\frac{2}{3} - 7\frac{5}{6}$ _____
11. $5\frac{7}{16} - 1\frac{1}{2}$ _____
12. $8\frac{2}{5} - 3\frac{2}{3}$ _____
13. $6\frac{1}{8} - 3\frac{1}{16}$ _____
14. $9\frac{5}{12} - 5\frac{3}{4}$ _____
15. $12\frac{3}{4} - 6\frac{1}{8}$ _____
16. $7\frac{2}{5} - 2\frac{1}{4}$ _____
17. $15\frac{5}{12} - 8\frac{1}{3}$ _____
18. $4\frac{1}{10} - 2\frac{4}{5}$ _____

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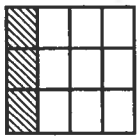
Review 37

Multiplying Fractions

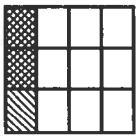
You can model $\frac{2}{3}$ of $\frac{1}{4}$.

① Show $\frac{1}{4}$.

② Divide into thirds.



③ Shade $\frac{2}{3}$ of the $\frac{1}{4}$.

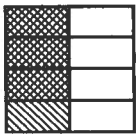


$\frac{2}{3}$ of $\frac{1}{4} = \frac{2}{12} = \frac{1}{6}$

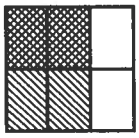
Or you can use multiplication.

$$\frac{2}{3} \text{ of } \frac{1}{4} = \frac{2}{3} \times \frac{1}{4}$$
$$= \frac{2 \times 1}{3 \times 4}$$
$$= \frac{2}{12}$$
$$= \frac{1}{6}$$

Write the multiplication problem each model represents.

1. 

_____

2. 

_____

Find each product.

3. $\frac{1}{9}$ of $\frac{2}{3}$ _____

4. $\frac{2}{7} \times \frac{1}{2}$ _____

5. $\frac{5}{8} \cdot 6$ _____

6. $\frac{3}{4} \cdot \frac{4}{7}$ _____

7. $\frac{7}{10}$ of $\frac{1}{3}$ _____

8. $\frac{5}{6} \times \frac{3}{4}$ _____

9. $\frac{3}{8}$ of $\frac{7}{10}$ _____

10. $\frac{3}{4} \times \frac{1}{9}$ _____

11. $\frac{2}{9}$ of 8 _____

12. $\frac{1}{3}$ of 2 _____

13. $\frac{5}{9}$ of 4 _____

14. $\frac{3}{4} \cdot \frac{2}{5}$ _____

15. Every day you eat $\frac{1}{4}$ cup of cereal. Your brother eats 5 times as much. How many cups of cereal does your brother eat? _____

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Review 38

Multiplying Mixed Numbers

Example 1: Multiply: $2\frac{1}{7} \times 2\frac{2}{5}$

① Change to improper fractions. $\frac{15}{7} \times \frac{12}{5}$

② Simplify. $\frac{{}^{3}15}{7} \times \frac{12}{{}_{1}5}$

③ Multiply. $\frac{36}{7} \leftarrow 3 \times 12$, $\leftarrow 7 \times 1$

④ Simplify. $5\frac{1}{7}$

$2\frac{1}{7} \times 2\frac{2}{5} = 5\frac{1}{7}$

Example 2: Multiply: $\frac{2}{3} \times 5\frac{1}{4}$

$\frac{2}{3} \times \frac{21}{4}$

$\frac{{}^{1}2}{{}_{1}3} \times \frac{21^{7}}{4_{2}}$

$\frac{7}{2} \leftarrow 1 \times 7$, $\leftarrow 1 \times 2$

$3\frac{1}{2}$

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

Find each product.

1. $1\frac{1}{4} \times 2\frac{2}{3}$ _____
2. $2\frac{2}{5} \times 4\frac{1}{2}$ _____
3. $3\frac{1}{7} \times 2\frac{4}{5}$ _____
4. $\frac{1}{5} \times 2\frac{7}{9}$ _____
5. $12\frac{1}{2} \times 2\frac{2}{5}$ _____
6. $2\frac{1}{8} \times 2\frac{2}{3}$ _____
7. $5\frac{1}{3} \times 1\frac{7}{8}$ _____
8. $\frac{1}{2} \times 3\frac{3}{5}$ _____
9. $2\frac{1}{7} \times 4\frac{2}{3}$ _____
10. $1\frac{1}{2} \times 2\frac{6}{7}$ _____
11. $1\frac{5}{6} \times 2\frac{1}{4}$ _____
12. $5\frac{1}{4} \times 2\frac{2}{7}$ _____
13. $\frac{1}{4} \times 1\frac{3}{5}$ _____
14. $\frac{1}{7} \times 1\frac{3}{4}$ _____
15. $\frac{2}{9} \times 2\frac{1}{4}$ _____
16. $3\frac{1}{3} \times 3\frac{3}{10}$ _____
17. $1\frac{2}{3} \times 3\frac{1}{2}$ _____
18. $1\frac{2}{5} \times 4\frac{1}{3}$ _____
19. $\frac{1}{7} \times 1\frac{3}{5}$ _____
20. $\frac{3}{5} \times 8\frac{1}{2}$ _____
21. $3\frac{2}{5} \times 2\frac{1}{2}$ _____
22. $1\frac{2}{3} \times 7\frac{1}{2}$ _____
23. $1\frac{3}{10} \times 2\frac{6}{7}$ _____
24. $\frac{3}{16} \times 1\frac{1}{7}$ _____
25. $2\frac{6}{7} \times 1\frac{2}{5}$ _____

Solve.

26. Estimate the area of a window pane that has dimensions $6\frac{1}{8}$ by $11\frac{1}{4}$ inches.

_____

27. A hamster is $2\frac{1}{2}$ inches long. A rabbit is $3\frac{1}{2}$ times as long as the hamster. How long is the rabbit?

_____

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Review 39

Dividing Fractions

Find $8 \div \frac{4}{5}$.

① The *reciprocal* of $\frac{4}{5}$ is $\frac{5}{4}$.

$\frac{4}{5} \times \frac{5}{4}$

② Multiply 8 by the reciprocal.

$8 \div \frac{4}{5} = 8 \times \frac{5}{4} = \frac{\overset{2}{\cancel{8}}}{1} \times \frac{5}{\cancel{4}_1} = \frac{2 \times 5}{1 \times 1} = 10$

$8 \div \frac{4}{5} = 10$

Find $\frac{4}{9} \div \frac{8}{15}$.

① The *reciprocal* of $\frac{8}{15}$ is $\frac{15}{8}$.

$\frac{8}{15} \times \frac{15}{8}$

② Multiply $\frac{4}{9}$ by the reciprocal.

$\frac{4}{9} \div \frac{8}{15} = \frac{4}{9} \times \frac{15}{8} = \frac{\overset{1}{\cancel{4}}}{\underset{3}{\cancel{9}}} \times \frac{\overset{5}{\cancel{15}}}{\cancel{8}_2} = \frac{1 \times 5}{3 \times 2} = \frac{5}{6}$

$\frac{4}{9} \div \frac{8}{15} = \frac{5}{6}$

Write the reciprocal of each number.

1. $\frac{1}{4}$ _____
2. $\frac{5}{3}$ _____
3. $\frac{1}{20}$ _____
4. $\frac{8}{9}$ _____
5. 14 _____
6. 18 _____
7. $\frac{5}{9}$ _____
8. $\frac{3}{11}$ _____
9. $\frac{9}{7}$ _____
10. $\frac{11}{12}$ _____
11. $\frac{2}{7}$ _____
12. $\frac{3}{15}$ _____

Find each quotient.

13. $2 \div \frac{2}{3}$ _____
14. $7 \div \frac{7}{8}$ _____
15. $9 \div \frac{3}{4}$ _____
16. $6 \div \frac{2}{5}$ _____
17. $5 \div \frac{2}{3}$ _____
18. $14 \div \frac{5}{6}$ _____
19. $\frac{4}{5} \div \frac{4}{7}$ _____
20. $\frac{7}{8} \div \frac{7}{9}$ _____
21. $\frac{4}{7} \div 2$ _____
22. $\frac{7}{8} \div \frac{2}{3}$ _____
23. $\frac{1}{2} \div 4$ _____
24. $\frac{2}{5} \div \frac{3}{4}$ _____
25. $\frac{9}{10} \div 3$ _____
26. $\frac{3}{5} \div 5$ _____
27. $\frac{5}{8} \div 10$ _____
28. $\frac{3}{4} \div \frac{7}{8}$ _____
29. $\frac{5}{6} \div \frac{1}{3}$ _____
30. $\frac{11}{12} \div \frac{3}{4}$ _____

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Review 45

Ratios

A *ratio* is a comparison of two numbers by division. Each number in a ratio is called a *term*. You can write a ratio in three different ways. For example, the ratio 4 to 5 can be written:

4 to 5

4 : 5

$\frac{4}{5}$

Equal ratios name the same number. They have the same *simplest form.*

- To find equal ratios, multiply *or* divide both the numerator and denominator of a ratio by the same number.

Find a ratio equal to $\frac{4}{7}$.

$\frac{4}{7} = \frac{4 \times 2}{7 \times 2} = \frac{8}{14}$

$\frac{8}{14}$ is equal to $\frac{4}{7}$.

Find the simplest form for the ratio $\frac{16}{20}$.

$\frac{16}{20} = \frac{16 \div 4}{20 \div 4} = \frac{4}{5}$

$\frac{4}{5}$ is the simplest form for $\frac{16}{20}$.

Write three different ratios equal to each ratio.

1. $\frac{2}{5}$ _____

2. 1 : 3 _____

3. 3 to 4 _____

4. 5 : 8 _____

5. 2 to 7 _____

6. $\frac{1}{5}$ _____

7. 12 to 20 _____

8. 6 : 16 _____

Write each ratio in simplest form.

9. 32 : 16 _____

10. $\frac{14}{24}$ _____

11. $\frac{36}{50}$ _____

12. 60 : 25 _____

13. $\frac{25}{40}$ _____

14. 60 : 180 _____

15. $\frac{75}{120}$ _____

16. 80 : 20 _____

Find the value that makes the ratios equal.

17. 3 : 4, ? : 16 _____

18. 20 to 25, 40 to ? _____

19. 9 to 12, 81 to ? _____

20. 7 : 10, ? : 100 _____

21. 1 to 8, ? to 24 _____

22. 30 : 120, 90 : ? _____

23. 5 : 100, 25 : ? _____

24. $\frac{7}{56}, \frac{?}{280}$ _____

25. $\frac{6}{12}, \frac{36}{?}$ _____

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Review 46

Unit Rates

A *rate* is a ratio that compares quantities that are measured in different units. Suppose a sprinter runs 100 yards in 10 seconds.

$\frac{100\text{ yd}}{10\text{ s}}$ compares yards to seconds.

A *unit rate* compares a quantity to one unit of another quantity.

You can find the unit rate by dividing by the denominator.

$$\frac{100\text{ yd} \div 10}{10\text{ s} \div 10} = \frac{10\text{ yd}}{1\text{ s}}$$

10 yards per second is the sprinter's unit rate.

Find the unit rate for each situation.

1. $70 for 10 shirts _____
2. $150 for 3 games _____
3. $20 for 5 toys _____
4. $120 for 6 shirts _____
5. $45 for 5 boxes _____
6. $132 for 3 books _____
7. $100 for 5 rackets _____
8. $56 for 7 hours _____
9. $1.98 for 6 cans _____

Write the unit rate as a ratio. Then find an equal ratio.

10. The cost is $4.25 for 1 item. Find the cost of 5 items. _____
11. There are 7 cheerleaders in a squad. Find the number of cheerleaders on 12 squads. _____
12. The cost if $10.10 for 1 item. Find the cost of 10 items. _____
13. There are 2.54 centimeters per one inch. Find the number of centimeters in 5 inches. _____
14. The cost is $8.50 for 1 item. Find the cost of 3 items. _____

For Exercises 15–20, tell which unit rate is greater.

15. Dillan scores 24 points in 2 games. Eric scores 40 points in 4 games. _____
16. A fern grows 4 inches in 2 months. A tree grows 6 inches in 4 months. _____
17. Tyler jogs 4 miles in 32 minutes. Joey jogs 2 miles in 18 minutes. _____
18. Dixie drinks 2 cups of water in 5 minutes. Dale drinks 10 cups of water in 12 minutes. _____

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Review 50

Percents, Fractions, and Decimals

- To *write a percent as a fraction* in simplest form, first write a fraction with a denominator of 100. Then simplify.

  $74\% = \frac{74}{100} = \frac{37}{50}$

- To *write a percent as a decimal,* first write a fraction with a denominator of 100. Then write the decimal.

  $74\% = \frac{74}{100} = 0.74$

- To *write a decimal as a percent,* move the decimal point two places to the right.

  $0.23 = 23\%$

Here are two ways to *write a fraction as a percent.*

- Write an equivalent fraction with a denominator of 100, then write the percent.

  $\frac{3}{20} = \frac{15}{100} = 15\%$

- Divide the numerator by the denominator.

$$\frac{3}{8} = \begin{array}{r} 0.375 \\ 8\overline{)3.000} \\ -24 \\ \hline 60 \\ -56 \\ \hline 40 \\ -40 \\ \hline 0 \end{array} = 37.5\%$$

↑ Move the decimal point two places to the right.

So, $\frac{3}{8} = 37.5\%$.

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

1. 30% _____
2. 14% _____
3. 16% _____
4. 5% _____
5. 92% _____
6. 80% _____
7. 21% _____
8. 38% _____

Write each fraction or decimal as a percent.

9. $\frac{17}{25}$ _____
10. 0.85 _____
11. 0.16 _____
12. $\frac{5}{40}$ _____
13. $\frac{7}{200}$ _____
14. $\frac{1}{10}$ _____
15. 0.64 _____
16. 0.008 _____
17. $\frac{9}{20}$ _____
18. $\frac{6}{15}$ _____
19. 0.32 _____
20. 0.07 _____
21. $\frac{13}{100}$ _____
22. $\frac{45}{50}$ _____
23. 0.010 _____
24. 0.60 _____

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Review 54

Mean, Median, and Mode

- The *mean* of a set of data is the sum of the values divided by the number of data items.
  $74 + 77 + 80 + 81 + 85 + 87 + 94 + 94 = 672$
  $672 \div 8 = 84$
  The mean math test grade is 84.
- The *median* of a data set is the middle value when the data are arranged in numerical order. When the grades are arranged in order from least to greatest, there are two middle numbers.
  74, 77, 80, 81, 85, 87, 94, 94
  To find the median, add the two middle numbers and divide the total by 2.
  $81 + 85 = 166$
  $166 \div 2 = 83$
  The median grade is 83.
- The *mode* of a data set is the item in the data set that appears most often. For this data, 94 is the mode.

Math Test Grades	
Sharon	81
Rashid	94
Durrin	77
Nicole	80
Terry	74
Mei-lin	94
Kevin	87
Carlos	85

Find the mean of each data set.

1. 8, 6, 5, 9, 7, 13 _____
2. 12, 10, 16, 14, 8, 24 _____
3. 9, 12, 14, 6, 8, 5 _____
4. 104, 126, 128, 100, 97 _____
5. 86, 68, 70, 48, 66, 76 _____
6. 65, 50, 95, 35, 75, 100 _____

Find the median of each data set.

7. 5, 4, 7, 9, 8 _____
8. 12, 16, 19, 14, 14, 18 _____
9. 9, 19, 21, 13 _____
10. 46, 38, 22, 48, 61 _____
11. 60, 57, 53, 78, 44, 51 _____
12. 8, 6, 6, 5, 8, 9 _____

Find the mode of each data set.

13. 3, 4, 5, 5, 3, 5, 4, 2 _____
14. 1, 2, 1, 1, 2, 2, 3, 1 _____
15. 6, 8, 3, 8, 3, 9, 3 _____
16. 33, 35, 34, 33, 35, 33 _____
17. 98, 97, 98, 98, 97 _____
18. 110, 121, 121, 110, 115, 117, 119 _____

Review 73

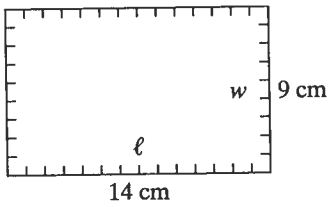
Perimeters and Areas of Rectangles

Perimeter

The *perimeter* of a figure is the sum of the lengths of its sides. Opposite sides of a rectangle are equal. To find the perimeter, add the 2 lengths (ℓ) and the 2 widths (w).

$$P = \ell + \ell + w + w \text{ or } P = 2\ell + 2w$$

Find the perimeter.



$$\begin{aligned} P &= 2\ell + 2w \\ &= 2(14) + 2(9) \\ &= 28 + 18 = 46 \end{aligned}$$

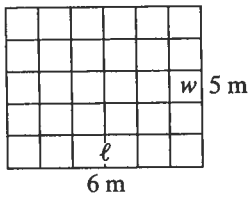
The perimeter is 46 centimeters.

Area

The *area* of a figure is the number of square units needed to cover the figure. To find the area of a rectangle, multiply the length (ℓ) and the width (w).

$$A = \ell \times w$$

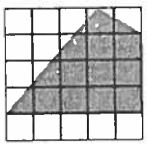
Find the area.

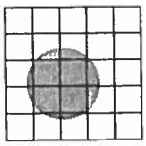


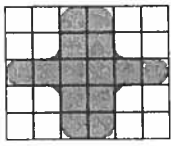
$$\begin{aligned} A &= \ell \times w \\ &= 6 \times 5 \\ &= 30 \end{aligned}$$

The area is 30 square meters.

Estimate the area of each figure. Each square represents 1 square inch.

1. 

2. 

3. 

Find the perimeter and area of each rectangle or square.

4. $\ell = 12$ cm, $w = 2$ cm

5. $\ell = 9$ ft, $w = 7.5$ ft

6. $\ell = 2.5$ m, $w = 2.5$ m

7. $\ell = 5.5$ in., $w = 5.5$ in.

8. $\ell = 6.2$ in., $w = 3.4$ in.

9. $\ell = 4.5$ ft, $w = 0.75$ ft

10. $\ell = 8$ cm, $w = 8$ cm

11. $\ell = 10.5$ m, $w = 5.2$ m

12. $\ell = 22$ in., $w = 9$ in.

13. What is the area of a square with a perimeter of 60 meters?

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Review 74

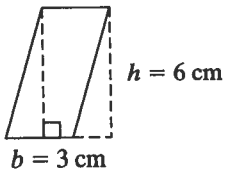
Areas of Parallelograms and Triangles

Parallelogram

To find the area of a parallelogram, multiply base times height.

$A = b \times h$

Find the area of the parallelogram.



$A = b \times h$
$= 3 \times 6$
$= 18$

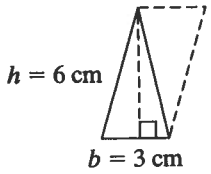
The area is 18 square centimeters.

Triangle

The area of a triangle is $\frac{1}{2}$ times the base times the height.

$A = \frac{1}{2}b \times h$

Find the area of the triangle.



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

The area is 9 square centimeters.

Find the area of each parallelogram.

1. $b = 6$ ft, $h = 8$ ft _____
2. $b = 12$ in, $h = 9$ in. _____
3. $b = 6$ yd, $h = 12$ yd _____
4. $b = 2.8$ in., $h = 3.4$ in. _____
5. $b = 31$ yd, $h = 19$ yd _____
6. $b = 4.5$ m, $h = 4.5$ m _____
7. $b = 15$ cm, $h = 7$ cm _____
8. $b = 8.3$ ft, $h = 11.7$ ft _____
9. $b = 14.4$ m, $h = 6.5$ m _____

Find the area of each triangle.

10. $b = 8$ cm, $h = 14$ cm _____
11. $b = 7$ in., $h = 18$ in. _____
12. $b = 11$ m, $h = 4.6$ m _____
13. $b = 6.4$ ft, $h = 3.5$ ft _____
14. $b = 104$ in., $h = 55$ in. _____
15. $b = 5.9$ cm, $h = 4.2$ cm _____
16. $b = 1.7$ m, $h = 3.3$ m _____
17. $b = 5.8$ yd, $h = 5.8$ yd _____
18. $b = 8.6$ in., $h = 0.8$ in. _____

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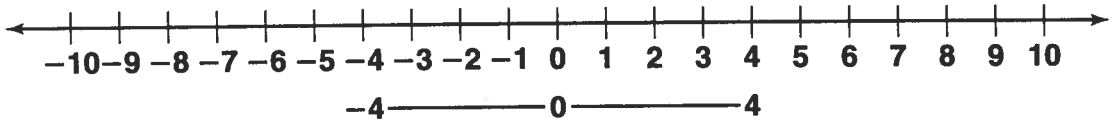
Review 81

Using a Number Line

The numbers . . . −3, −2, −1, 0, +1, +2, +3, . . . are *integers.*
Integers are the set of positive whole numbers, their opposites, and 0.



The absolute value of a number is its distance from 0 on a number line. $|-4| = 4$. *Opposite integers,* like −4 and 4, are the same distance from 0.

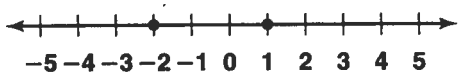
Compare −2 and 1.

For two integers on a number line, the greater integer is farther to the right.

① Locate −2 and 1 on the number line.

② Find that 1 is farther to the right.

③ Write $1 > -2$ (1 is greater than −2), or $-2 < 1$ (−2 is less than 1.)



Name the opposite of each integer.

1. 7 _____
2. −212 _____
3. 49 _____
4. 1,991 _____
5. −78 _____
6. 16 _____

Compare using < or >.

7. 6 ☐ 3
8. 2 ☐ 8
9. −2 ☐ 2
10. 9 ☐ −9
11. 0 ☐ 5
12. −9 ☐ −5
13. 0 ☐ 10
14. −5 ☐ −2
15. 7 ☐ −9
16. −5 ☐ −1
17. 6 ☐ −6
18. −12 ☐ 0
19. 8 ☐ −3
20. −1 ☐ −2
21. −5 ☐ 4
22. −3 ☐ −2

Find each absolute value.

23. $|-2|$ _____
24. $|-100|$ _____
25. $|-16|$ _____
26. $|8|$ _____
27. $|-25|$ _____
28. $|-250|$ _____
29. $|16|$ _____
30. $|12|$ _____
31. $|75|$ _____

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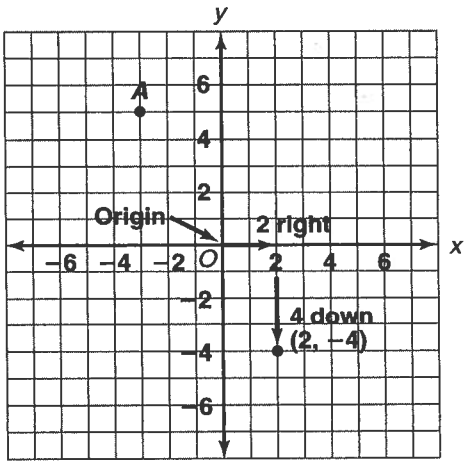
Review 86

Graphing in the Coordinate Plane

Example: Graph (2, −4).

- 2 is the *x-coordinate.* It tells how far to move left or right from the origin.
- −4 is the *y-coordinate.* It tells how far to move up or down from the origin.



Find the coordinates of point *A*.

① Start at the origin.

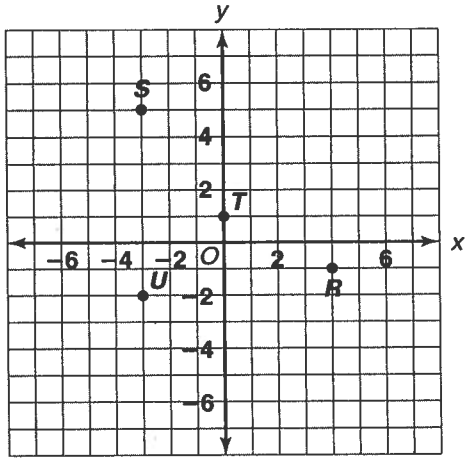
② How far left or right? *3 left*
The *x-coordinate* is −3.

③ How far up or down? *5 up*
The *y-coordinate* is 5.

The coordinates of point *A* are (−3, 5).

Graph each point in a coordinate plane.

1. *B* (1, 6)
2. *C* (−4, −3)
3. *D* (0, 5)
4. *E* (−2, 2)
5. *F* (−1, −5)
6. *G* (6, −4)
7. *H* (5, 5)
8. *J* (4, 0)
9. *K* (−4, −4)
10. *L* (2, −3)
11. *M* (−2, 0)
12. *N* (5, −1)
13. *P* (0, −3)
14. *Q* (−4, 0)



Find the coordinates of each point.

15. *R* _____
16. *S* _____
17. *T* _____
18. *U* _____

Look at the coordinate grid above.

19. If you travel 7 units down from *S*, at which point will you be located?

_____

20. If you travel 4 units right from *T* and 2 units down, at which point will you be located?

_____