Rising 8th
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. We 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 and Ms. Fickas' web pages. You should check your work on the completed topics and rework any problems you have not completed correctly.

Have a happy and safe summer. We look forward to having you in our math classes next year! Please feel free to have your parents reach out to us if you have any questions.

Blessings,

Ms. Fickas

Ms. Fickas

Mrs. McCarron

Mrs. McCarron

Mrs. Smith

Name ____________________ Class ____________ Date ____________

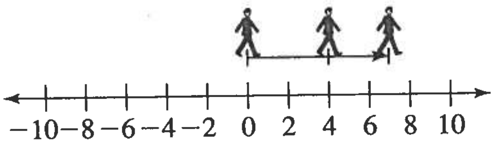
Review 82

Adding Integers

You can add integers on a number line.

Example 1: Find 4 + 3.

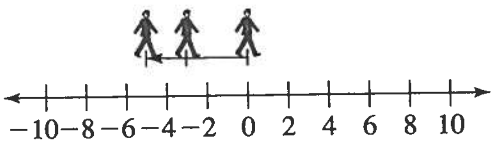
Start at 0. Move 4 units right and then 3 units right.



4 + 3 = 7

Example 2: Find −3 + −2.

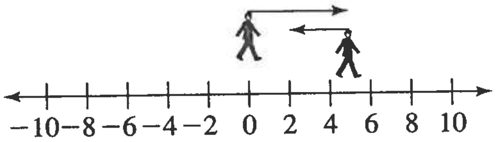
Start at 0. Move 3 units left and then 2 units left.



−3 + (−2) = −5

Example 3: Find 5 + (−3)

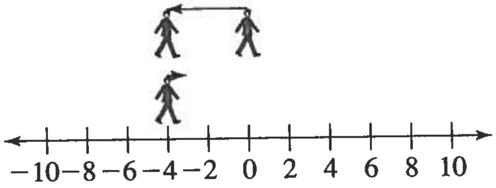
Start at 0. Move 5 units right and then 3 units left.



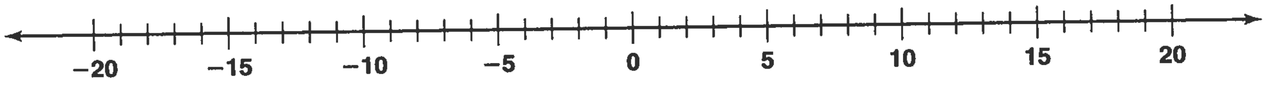
5 + (−3) = 2

Example 4: Find −4 + 1.

Start at 0. Move 4 units left and then 1 unit right.



−4 + 1 = −3



Use the number line to find each sum.

1. 3 + 2 ________

2. 6 + 4 ________

3. −4 + (−1) ________

4. −4 + (−8) ________

5. 4 + (−1) ________

6. −6 + 8 ________

7. −7 + 3 ________

8. −5 + 8 ________

9. 3 + 5 ________

10. −3 + (−5) ________

11. 3 + (−5) ________

12. −3 + 5 ________

Find each sum.

13. −6 + (−4) ________

14. 7 + (−2) ________

15. −1 + (−6) ________

16. 9 + (−2) ________

17. −6 + (−6) ________

18. 13 + 3 ________

19. −14 + (−5) ________

20. 5 + (−12) ________

21. −9 + 9 ________

22. 18 + (−18) ________

23. 0 + (−4) ________

24. 6 + 0 ________

25. 15 + (−15) ________

26. −12 + 0 ________

27. −9 + 10 ________

28. 12 + (−11) ________

29. −12 + 11 ________

30. 2 + (−10) ________

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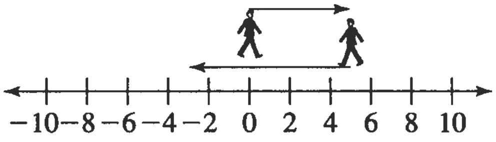
Review 83

Subtracting Integers

To subtract an integer, add the opposite.

Example 1: Subtract $5 - 8$.

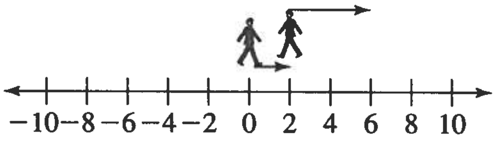
Add the opposite: $5 + (-8)$



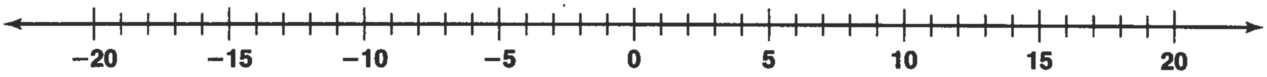
$5 - 8 = -3$

Example 2: Subtract $2 - (-4)$.

Add the opposite: $2 + 4$



$2 - (-4) = 6$



Use a number line. Find each difference.

1. $3 - (-6)$ ________
2. $2 - (-4)$ ________
3. $-1 - 2$ ________
4. $-3 - (-5)$ ________
5. $-8 - (-3)$ ________
6. $4 - (-4)$ ________
7. $-8 - 2$ ________
8. $8 - (-2)$ ________
9. $-8 - (-2)$ ________
10. $-7 - 4$ ________
11. $-10 - 2$ ________
12. $-5 - (-5)$ ________
13. $-5 - 6$ ________
14. $9 - (-3)$ ________
15. $-11 - (-6)$ ________

Find each difference.

16. $15 - (-4)$ ________
17. $-12 - 3$ ________
18. $21 - (-7)$ ________
19. $3 - (-12)$ ________
20. $-2 - 10$ ________
21. $-13 - 13$ ________
22. $5 - (-5)$ ________
23. $18 - (-10)$ ________
24. $-7 - (-13)$ ________
25. $14 - 16$ ________
26. $3 - 15$ ________
27. $-6 - (-9)$ ________
28. $-12 - 6$ ________
29. $15 - (-9)$ ________
30. $7 - 19$ ________

Solve each equation.

31. $12 + s = -10$ ________
32. $x - 8 = -3$ ________
33. $b + 18 = 12$ ________
34. $x - 21 = -2$ ________
35. $s - 25 = -100$ ________
36. $y + 5 = 9$ ________
37. $-5 + c = -10$ ________
38. $x + 30 = 5$ ________
39. $15 + b = 10$ ________

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Review 84

Multiplying Integers

When two integers have like signs, the product will always be positive.

Both integers are positive:	$3 \times 4 = 12$
Both integers are negative:	$-3 \times (-4) = 12$

When two integers have different signs, the product will always be negative.

One integer positive, one negative:	$3 \times (-4) = -12$
One integer negative, one positive:	$-3 \times 4 = -12$

Example 1: Find -8×3.

① Determine the product.
$8 \times 3 = 24$

② Determine the sign of the product. Since one integer is negative and one is positive, the product is negative.

③ So, $-8 \times 3 = -24$.

Example 2: Find $(-10) \times (-20)$.

① Determine the product.
$10 \times 20 = 200$

② Determine the sign of the product. Since both integers are negative, the product is positive.

③ So, $(-10) \times (-20) = 200$.

Find each product.

1. $7 \times (-4)$ ________
2. $-5 \times (-9)$ ________
3. -11×2 ________
4. $8 \times (-9)$ ________
5. $15 \times (-3)$ ________
6. $-7 \times (-6)$ ________
7. -12×6 ________
8. $13 \times (-5)$ ________
9. $-10 \times (-2)$ ________
10. A dog lost 2 pounds three weeks in a row. What integer expresses the total change in the dog's weight? ________

Find each quotient.

11. $18 \times (-6)$ ________
12. $-35 \times (-7)$ ________
13. -15×3 ________
14. $28 \times (-4)$ ________
15. $25 \times (-5)$ ________
16. $-27 \times (-9)$ ________
17. -12×4 ________
18. $33 \times (-11)$ ________
19. $-50 \times (-2)$ ________

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Review 85

Dividing Integers

When two integers have like signs, the quotient will always be positive.

Both integers are positive: $8 \div 2 = 4$
Both integers are negative: $-8 \div (-2) = 4$

When two integers have different signs, the quotient will always be negative.

One integer positive, one negative: $8 \div (-2) = -4$
One integer negative, one positive: $-8 \div 4 = -2$

Example 1: Find $-24 \div 8$.

① Determine the quotient.
$24 \div 8 = 3$

② Determine the sign of the quotient. Since one integer is negative and one is positive, the quotient is negative.

③ So, $-24 \div 8 = 3$.

Example 2: Find $35 \div (-7)$.

① Determine the quotient.
$35 \div 7 = 5$

② Determine the sign of the quotient. Since one integer is positive and one is negative, the quotient is negative.

③ So, $35 \div (-7) = -5$.

Find each quotient.

1. $18 \div (-6)$ ________
2. $-35 \div (-7)$ ________
3. $-15 \div 3$ ________
4. $28 \div (-4)$ ________
5. $25 \div (-5)$ ________
6. $-27 \div (-9)$ ________
7. $-12 \div 4$ ________
8. $33 \div (-11)$ ________
9. $-50 \div (-25)$ ________

Solve each equation.

10. $-2y = 12$ ________
11. $\frac{p}{10} = -6$ ________
12. $-10y = -100$ ________
13. $7x = -28$ ________
14. $-6x = 36$ ________
15. $\frac{s}{-2} = -14$ ________
16. $\frac{x}{8} = -12$ ________
17. $4x = -24$ ________
18. $3x = 30$ ________
19. A ship sank at a rate of 90 feet in 10 seconds. Represent the rate of change with an integer. ______________

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Review 104

Adding and Subtracting Decimals

Add 3.19 + 6.098 + 2.67.

① Round to estimate.

$$\begin{array}{rcr} 3.19 & \rightarrow & 3 \\ 6.098 & \rightarrow & 6 \\ \underline{+\ \ 26.7} & \rightarrow & \underline{+\ 27} \\ & & 36 \end{array}$$

② Line up the decimal points.

$$\begin{array}{r} 3.19 \\ 6.098 \\ \underline{+\ 26.700} \end{array}$$

③ Add zeros. Then add.

$$\begin{array}{r} 3.190 \\ 6.098 \\ \underline{+\ 26.700} \\ 35.988 \end{array}$$

Compare to make sure your answer is reasonable: 35.988 is close to 36.

Subtract 8.7 − 4.97.

① Round to estimate.

$$\begin{array}{rcr} 8.7 & \rightarrow & 9 \\ \underline{-\ 4.97} & \rightarrow & \underline{-\ 5} \\ & & 4 \end{array}$$

② Line up the decimal points.

$$\begin{array}{r} 8.7 \\ \underline{-\ 4.97} \end{array}$$

③ Add zeros. Then subtract.

$$\begin{array}{r} 8.70 \\ \underline{-\ 4.97} \\ 3.73 \end{array}$$

Compare to make sure your answer is reasonable: 3.73 is close to 4.

Estimate first. Then find each sum or difference.

1. $\begin{array}{r} 46.2 \\ \underline{-\ 34.09} \end{array}$

2. $\begin{array}{r} 3.31 \\ \underline{+\ 9.075} \end{array}$

3. $\begin{array}{r} 9.06 \\ \underline{-\ 7.2\ \ } \end{array}$

4. $\begin{array}{r} 84.32 \\ \underline{+\ 6.94} \end{array}$

5. $\begin{array}{r} 8.037 \\ \underline{+\ 1.9\ \ \ } \end{array}$

6. $\begin{array}{r} 10.6 \\ \underline{-\ 4.59} \end{array}$

Find each sum or difference.

7. 4.102 + 7.7 ________

8. 5.4 − 1.6 ________

9. 7.09 + 4.3 + 20.1 ________

10. 0.392 − 0.26 ________

11. 15.64 − 8.5 ________

12. 8.709 + 3.2 ________

13. 6 + 0.497 ________

14. 95.1 + 6 ________

15. 0.004 − 0.0005 ________

16. 0.2408 − 0.051 ________

17. 0.36 + 4.7 + 6 ________

18. 5.306 − 0.78 ________

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Review 105

Multiplying and Dividing Decimals

Multiply 5.43 × 1.8.

① Multiply as if the numbers were whole numbers.

② Count the total number of decimal places in the factors.

③ Place the decimal point in the product.

$$\left.\begin{array}{r}5.43\\ \times\ 1.8\end{array}\right\}\textbf{3 decimal places}$$

$$\begin{array}{rl} 4344 & \\ +\ 543 & \\ \hline 9.774 & \leftarrow \textbf{3 decimal places} \end{array}$$

Multiply 38.25 ÷ 1.5.

① Rewrite the problem with a whole number divisor.

$$1.5\overline{)38.25}$$
$$\downarrow$$

② Place the decimal point in the quotient.

$$1.5.\overline{)38.2.5}$$
$$\uparrow \quad \uparrow$$

Move 1 place each.

③ Divide. Then check.

$$\begin{array}{r} 25.5\\ 15\overline{)382.5}\\ -30\\ \hline 82\\ -75\\ \hline 7\,5\\ -7\,5\\ \hline 0 \end{array}$$

25.5 × 15 = 382.5 ✔

Multiply to check.

Find each product.

1. $\begin{array}{r}1.42\\ \times\ 7.2\\ \hline\end{array}$

2. $\begin{array}{r}2.2\\ \times\ 4.1\\ \hline\end{array}$

3. $\begin{array}{r}5.11\\ \times\ 0.3\\ \hline\end{array}$

4. $\begin{array}{r}3.68\\ \times\ 5.8\\ \hline\end{array}$

5. 2.8 × 0.05 __________

6. 1.45 · 0.7 __________

7. (2.07)(4.9) __________

8. 9.3(0.56) __________

9. 0.006(3.75) __________

10. 3.8 × 912 __________

Rewrite each problem so the divisor is a whole number.

11. $5.1\overline{)351.9}$ ____________

12. $1.8\overline{)14.9}$ ____________

13. $0.32\overline{)39.68}$ ____________

14. $0.06\overline{)0.948}$ ____________

15. $0.8\overline{)2.112}$ ____________

16. $0.49\overline{)9.457}$ ____________

Find each quotient.

17. $2\overline{)15.8}$

18. $0.4\overline{)2.2}$

19. $0.09\overline{)0.99}$

20. $2.7\overline{)12.15}$

21. $0.14\overline{)28.14}$

22. $0.08\overline{)0.64}$

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Review 109

Adding and Subtracting Integers

Use these rules to add and subtract integers.

Adding Integers

Same Sign	Different Signs
• The sum of two positive integers is positive. Example: $6 + 16 = 22$ • The sum of two negative integers is negative Example: $-9 + (-3) = -12$	• First find the absolute values of each number. • Then subtract the lesser absolute value from the greater. • The sum has the sign of the integer with the greater absolute value. Example: $-10 + 9 = -1$

Subtracting Integers

- To subtract integers, add the opposite.
- Then following the rules for adding integers.
  Example: $6 - (-3) = 6 + 3 = 9$

Find each sum.

1. $8 + (-2)$ ______
2. $-9 + 4$ ______
3. $3 + (-2)$ ______
4. $-1 + 11$ ______
5. $12 + 13$ ______
6. $-9 + 5$ ______
7. $7 + 2$ ______
8. $-1 + (-7)$ ______
9. $-3 + 0$ ______
10. $-1 + (-1)$ ______
11. $6 + 5$ ______
12. $3 + (-2)$ ______

Complete.

13. $-3 -4$ Change to addition: $-3 +$ ______ = ______
14. $5 -2$ Change to addition: $5 +$ ______ = ______
15. $-6 - (-10)$ Change to addition: $-6 +$ ______ = ______
16. $8 - (-2)$ Change to addition: $8 +$ ______ = ______

Find each difference.

17. $4 -5$ ______
18. $-5 -4$ ______
19. $-8 - (-7)$ ______
20. $19 - (-6)$ ______
21. $-10 -12$ ______
22. $-12 -10$ ______
23. $-4 - (-5)$ ______
24. $-2 - (-3)$ ______
25. $9 - (-7)$ ______
26. $0 -3$ ______
27. $6 -8$ ______
28. $0 - (-10)$ ______

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Review 110

Multiplying and Dividing Integers

To multiply integers:

- If the signs are alike, the product is positive.

$$2 \cdot 3 = 6$$
$$-2 \cdot -3 = 6$$

- If the signs are different, the product is negative.

$$2 \cdot -3 = -6$$
$$-2 \cdot 3 = -6$$

To divide integers:

- If the signs are alike, the quotient is positive.

$$6 \div 3 = 2$$
$$-6 \div -3 = 2$$

- If the signs are different, the quotient is negative.

$$6 \div -3 = -2$$
$$-6 \div 3 = -2$$

Study these four examples. Write positive or negative to complete each statement.

$$\mathbf{7 \cdot 3 = 21} \qquad \mathbf{7 \cdot -3 = -21}$$
$$\mathbf{-7 \cdot -3 = 21} \qquad \mathbf{-7 \cdot 3 = -21}$$

1. When both integers are positive, the product is ____________.

2. When one integer is positive and one is negative, the product is ____________.

3. When both integers are negative, the product is ____________.

$$\mathbf{21 \div 3 = 7} \qquad \mathbf{-21 \div -3 = 7}$$
$$\mathbf{21 \div -3 = -7} \qquad \mathbf{-21 \div 3 = -7}$$

4. When both integers are positive, the quotient is ____________.

5. When both integers are negative, the quotient is ____________.

6. When one integer is positive and one is negative, the quotient is ____________.

Tell whether each product or quotient will be *positive* or *negative*.

7. 4 · 7 ____________

8. −4 · 7 ____________

9. −4 · −7 ____________

10. 4 · −7 ____________

11. −28 ÷ 4 ____________

12. 28 ÷ 4 ____________

13. −28 ÷ −7 ____________

14. 28 ÷ −7 ____________

15. 10 · −4 ____________

16. −25 ÷ 5 ____________

17. −2 · −2 ____________

18. 100 ÷ 10 ____________

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Review 115

Solving Equations by Adding or Subtracting

Follow these steps to solve equations.

	Solve: $n + (-2) = 11$	Solve: $n - 6 = -36$
① Use the inverse operation on both sides of the equation.	$n + (-2) \underset{\uparrow}{-(-2)} = 11 \underset{\uparrow}{-(-2)}$	$n - 6 \underset{\uparrow}{+6} = -36 \underset{\uparrow}{+6}$
② Simplify.	$n = 13$	$n = -30$
③ Check.	$n + (-2) = 11$ $13 + (-2) \stackrel{?}{=} 11$ $11 = 11$ ✔	$n - 6 = -36$ $-30 - 6 \stackrel{?}{=} -36$ $-36 = -36$ ✔

Solve each equation. Check each answer.

1. $n + 6 = 8$

$n + 6 - 6 = 8 -$ ______

$n =$ ______

2. $n - 3 = 20$

$n - 3 +$ ______ $= 20 + 3$

$n =$ ______

3. $n - (-3) = -1$

$n - (-3) +$ ______ $= -1 +$ ______

$n =$ ______

4. $-2 = n + 5$

$-2 -$ ______ $= n + 5 -$ ______

______ $= n$

5. $n - (-4) = -2$

$n - (-4) +$ ______ $= -2 +$ ______

$n =$ ______

6. $n - 16 = -23$

$n - 16 +$ ______ $= -23 +$ ______

$n =$ ______

Use a calculator, pencil and paper, or mental math. Solve each equation.

7. $n + 1 = 17$ ______

8. $n - (-6) = 7$ ______

9. $n - 8 = -12$ ______

10. $n - 19 = 34$ ______

11. $61 = n + 29$ ______

12. $n + 84 = 131$ ______

13. $-13 = n + 9$ ______

14. $-18 = n - (-5)$ ______

15. In track practice Jesse ran a mile in 7 minutes. His mile time was $2\frac{1}{2}$ minutes faster than Michael's time. Write and solve an equation to calculate Michael's mile time.

____

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Review 116

Solving Equations by Multiplying or Dividing

Follow these steps to solve equations.

	Solve: $\frac{t}{5} = -7$	Solve: $-2x = 8$
① Use the inverse operation on both sides of the equation.	$(5)\frac{t}{5} = (5)(-7)$	$\frac{-2x}{-2} = \frac{8}{-2}$
② Simplify.	$t = -35$	$x = -4$
③ Check.	$\frac{t}{5} = -7$ $\frac{-35}{5} \overset{?}{=} -7$ $-7 = -7$ ✓	$-2x = 8$ $-2(-4) \overset{?}{=} 8$ $8 = 8$ ✓

Solve and check each equation.

1. $-5n = 30$

$\frac{-5n}{\boxed{}} = \frac{30}{\boxed{}}$

$n =$ ________

2. $\frac{a}{2} = -16$

$(\boxed{})\frac{a}{2} = (\boxed{})(-16)$

$a =$ ________

3. $-2w = -4$

$\frac{-2w}{\boxed{}} = \frac{-4}{\boxed{}}$

$w =$ ________

4. $8t = 32$

$\frac{8t}{\boxed{}} = \frac{32}{\boxed{}}$

$t =$ ________

5. $5 = \frac{g}{6}$

$(\boxed{})(5) = (\boxed{})\frac{g}{6}$

________ $= g$

6. $\frac{n}{-3} = -5$

$(\boxed{})\frac{n}{-3} = (\boxed{})(-5)$

$n =$ ________

Use a calculator, pencil and paper, or mental math. Solve each equation.

7. $\frac{x}{4} = -1$ ________

8. $-5w = 125$ ________

9. $\frac{m}{-8} = 10$ ________

10. $-2 = \frac{x}{-4}$ ________

11. $3y = 12$ ________

12. $-4t = -64$ ________

13. $9w = -81$ ________

14. $21 = -3z$ ________

15. $\frac{a}{-4} = 12$ ________

16. $-6b = 42$ ________

17. $-3 = \frac{c}{-8}$ ________

18. $5 = \frac{d}{7}$ ________

19. $2t = 38$ ________

20. $-9 = 9q$ ________

21. $n \div 6 = -3$ ________

22. $-8k = -40$ ________

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Review 121

Solving Inequalities by Adding or Subtracting

To solve an inequality you can add the same number to or subtract it from each side of the inequality.

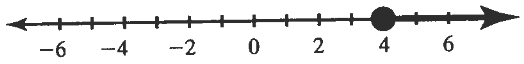
Solve $x + 5 \geq 9$. Graph the solution.

$x + 5 \geq 9$

$x + 5 - 5 \geq 9 - 5$ Subtract 5 from each side.

$x \geq 4$ Simplify.

Graph:



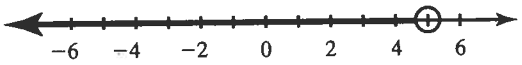
Solve $y - 3 < 2$. Graph the solution.

$y - 3 < 2$

$y - 3 + 3 < 2 + 3$ Add 3 to each side.

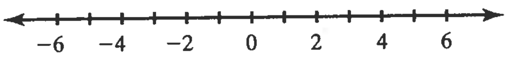
$y < 5$ Simplify.

Graph:

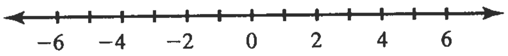


Solve each inequality. Graph the solution.

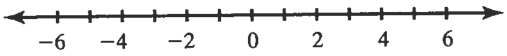
1. $2 + a > 6$ ______________



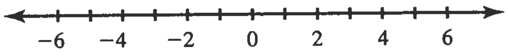
2. $-4 + w \leq 0$ ______________



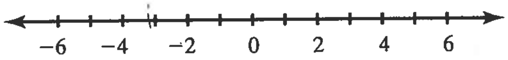
3. $3 + a \geq 8$ ______________



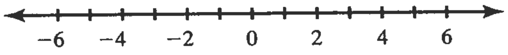
4. $w + 1 \leq 4$ ______________



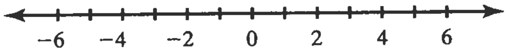
5. $y + 3 < 5$ ______________



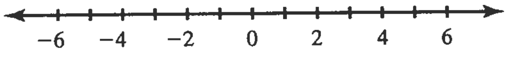
6. $6 + g \geq 12$ ______________



7. $2 + x > 7$ ______________



8. $2 + r < 8$ ______________



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Review 122

Solving Inequalities by Multiplying or Dividing

To solve an inequality you can multiply or divide each side by the same number. However, if the number is negative, you must also reverse the direction of the inequality sign.

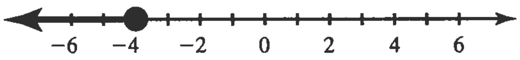
Solve $-4y \geq 16$. Graph the solution.

$-4y \geq 16$

$\frac{-4y}{-4} \leq \frac{16}{-4}$ Divide each side by -4. Reverse the direction of the inequality symbol.

$y \leq -4$ Simplify.

Graph:



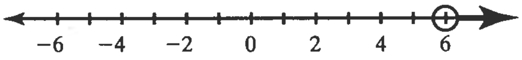
Solve $\frac{w}{3} > 2$. Graph the solution.

$\frac{w}{3} > 2$

$(3)\frac{w}{3} > 2(3)$ Multiply each side by 3.

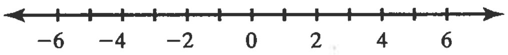
$w > 6$ Simplify.

Graph:



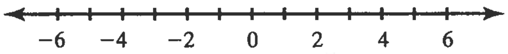
Solve each inequality. Graph the solution.

1. $2a > 10$ ________________



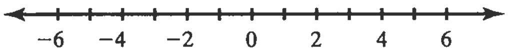
2. $-4w < 16$ ________________

3. $\frac{r}{2} \geq -2$ ________________

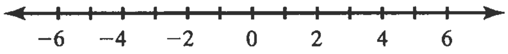


4. $18 \leq 9a$ ________________

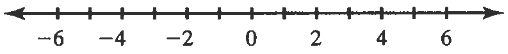
5. $\frac{a}{3} < 1$ ________________



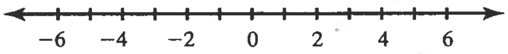
6. $6g < 6$ ________________



7. $-3x \geq -6$ ________________



8. $\frac{m}{-2} > 0$ ________________



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Review 123

Exponents and Order of Operations

You can use a shortcut to indicate repeated multiplication. The **exponent** tells how many times the **base** is used as a factor.

$$5 \times 5 \times 5 \times 5 = \overset{\text{exponent}}{\underset{\text{base}}{5}^4} = 625$$

5^4 is called an **exponential expression** and 625 is the **value of the expression.**

You can use this sentence to remember the order of operations for expressions with exponents. → **P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally.

$2^2 + 4(7 - 3) + 6 = 2^2 + 4(4) + 6$ — **P** Do all operations within **P**arentheses first.

$= 4 + 4(4) + 6$ — **E** Evaluate any terms with **E**xponents.

$= 4 + 16 + 6$ — **M-D** **M**ultiply and **D**ivide in order from left to right.

$= 26$ — **A-S** **A**dd and **S**ubtract in order from left to right.

Write each expression using exponents.

1. $6 \times 6 \times 6 \times 6 \times 6$ ________
2. $0.2 \times 0.2 \times 0.2$ ________
3. $9 \times 9 \times 9 \times 9$ ________
4. $12 \times 12 \times 12 \times 12 \times 12$ ________

Write each expression as a product of its factors. Then evaluate each expression.

5. 12^2 ____________________
6. 8^3 ____________________
7. $(0.4)^3$ ____________________
8. 5^5 ____________________
9. 3^6 ____________________
10. 1.4^2 ____________________

Simplify each expression.

11. $7^2 + 3^3$ ________
12. $8 + 4^2$ ________
13. $5(0.2 + 0.8)^{10}$ ________
14. $(9 - 7)^2$ ________
15. $(8^2 + 16) \div 2$ ________
16. $5^3 + 100$ ________
17. $(4 + 7)^2 - 8$ ________
18. $(9 - 3)^2 + 6 \times 2$ ________

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Review 125

Divisibility Tests

One integer is **divisible** by another if the remainder is 0 when you divide the larger number by the smaller number.

Divisibility Tests for 2, 3, 4, 5, 8, 9, and 10.

An integer is divisible by

- 2 if it ends in 0, 2, 4, 6, or 8.
- 3 if the sum of its digits is divisible by 3.
- 4 if the number formed by the last two digits is divisible by 4.
- 5 if it ends in 0 or 5.
- 8 if the number formed by the last three digits is divisible by 8.
- 9 if the sum of its digits is divisible by 9.
- 10 if it ends in zero.

Is the first number divisible by the second?

a. 1,256 by 2	Yes, 1,256 is even.
b. 287 by 3	No, 2 + 8 + 7 = 17, which is not divisible by 3.
c. 1,536 by 4	Yes, 36 is divisible by 4.
d. 922 by 5	No, 922 does not end in 5 or 0.
e. 30,780 by 8	No, 780 is not divisible by 8.
f. 4,518 by 9	Yes, 4 + 5 + 1 + 8 = 18, which is divisible by 9.
g. 541 by 10	No, 541 does not end in zero.

Is the first number divisible by the second? Explain.

1. 2,336 by 8 ______________________

2. 580 by 10 ______________________

3. 722 by 5 ______________________

4. 2,505 by 3 ______________________

5. 225,325 by 9 ______________________

6. 421 by 4 ______________________

Tell whether each number is divisible by 2, 3, 4, 5, 8, 9, or 10. Some numbers may be divisible by more than one number.

7. 526 ______________________

8. 1,325 ______________________

9. 888 ______________________

10. 981 ______________________

11. 62,810 ______________________

12. 565,852 ______________________

Course 2 Topics

Name ______________________ Class ______________ Date ______________

Review 127

Simplifying Fractions

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

To write $\frac{18}{24}$ in the simplest form:

① Divide the numerator and denominator by a common factor. $\frac{18 \div 2}{24 \div 2} = \frac{9}{12}$

② Continue dividing by common factors until the only common factor is 1. $\frac{9 \div 3}{12 \div 3} = \frac{3}{4}$ The only factor common to 3 and 4 is 1.

In simplest form $\frac{18}{24}$ is $\frac{3}{4}$.

You can use the greatest common factor (GCF) to write a fraction in simplest form. Divide the numerator and the denominator by the GCF.

The GCF of 18 and 24 is 6.

$\frac{18}{24} = \frac{18 \div 6}{24 \div 6} = \frac{3}{4}$

Complete to write each fraction in simplest form.

1. $\frac{10}{20} = \frac{10 \div \quad}{20 \div 2} = \frac{\quad \div \quad}{10 \div \quad} =$ ______

2. $\frac{24}{60} = \frac{24 \div 6}{60 \div \quad} = \frac{\quad \div \quad}{10 \div \quad} =$ ______

Find the GCF of the numerator and denominator of each fraction. Then write each fraction in simplest form.

3. $\frac{12}{14} =$ ______
GCF = ______

4. $\frac{9}{15} =$ ______
GCF = ______

5. $\frac{35}{42} =$ ______
GCF = ______

6. $\frac{40}{50} =$ ______
GCF = ______

Write each fraction in simplest form.

7. $\frac{42}{60} =$ ______

8. $\frac{20}{36} =$ ______

9. $\frac{18}{20} =$ ______

10. $\frac{9}{27} =$ ______

11. $\frac{42}{56} =$ ______

12. $\frac{16}{72} =$ ______

13. $\frac{24}{40} =$ ______

14. $\frac{18}{32} =$ ______

15. $\frac{25}{75} =$ ______

16. $\frac{65}{75} =$ ______

17. $\frac{40}{60} =$ ______

18. $\frac{50}{95} =$ ______

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Review 130

Mixed Numbers and Improper Fractions

An **improper fraction** is greater than or equal to 1. Its numerator is greater than or equal to its denominator.

Improper fractions

$\frac{6}{4}$ $\frac{8}{8}$ $\frac{10}{8}$ $\frac{7}{2}$

A mixed number is the sum of a whole number and a fraction.

Mixed numbers

$1\frac{2}{3}$ $5\frac{4}{9}$ $3\frac{1}{2}$

To write a mixed number as an improper fraction:

① Write the mixed number as a sum.

② Write both numbers as fractions.

③ Add the fractions.

$$3\frac{1}{2} = 3 + \frac{1}{2} = \frac{6}{2} + \frac{1}{2} = \frac{7}{2}$$

To write an improper fraction as a mixed number:

① Divide the numerator by the denominator.

② Write the whole number, then the remainder over the divisor.

$\frac{7}{2}$ Think: 7 ÷ 2

$$\begin{array}{r} 3 \\ 2\overline{)7} \\ -6 \\ \hline 1 \end{array}$$

$\frac{7}{2} = 3\frac{1}{2}$

Write each mixed number as an improper fraction.

1. $3\frac{1}{4}$ = ______

2. $2\frac{2}{3}$ = ______

3. $1\frac{3}{8}$ = ______

4. $5\frac{2}{7}$ = ______

5. $6\frac{3}{4}$ = ______

6. $1\frac{1}{9}$ = ______

7. $4\frac{1}{2}$ = ______

8. $3\frac{4}{5}$ = ______

9. $5\frac{1}{6}$ = ______

10. $3\frac{1}{3}$ = ______

11. $5\frac{7}{8}$ = ______

12. $4\frac{1}{8}$ = ______

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

13. $\frac{14}{4}$ = ______

14. $\frac{12}{2}$ = ______

15. $\frac{22}{5}$ = ______

16. $\frac{16}{3}$ = ______

17. $\frac{47}{8}$ = ______

18. $\frac{56}{7}$ = ______

19. $\frac{17}{4}$ = ______

20. $\frac{21}{6}$ = ______

21. $\frac{13}{5}$ = ______

22. $\frac{23}{4}$ = ______

23. $\frac{13}{9}$ = ______

24. $\frac{14}{2}$ = ______

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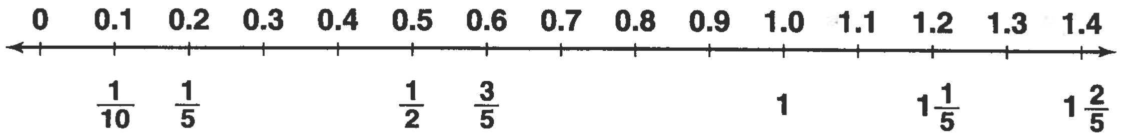
Review 131

Fractions and Decimals



To change a fraction to a decimal, divide the numerator by the denominator.

$\frac{3}{5}$ Think: 3 ÷ 5

$$\begin{array}{r} 0.6 \\ 5\overline{)3.0} \\ -30 \\ \hline 0 \end{array}$$

$\frac{3}{5} = 0.6$

To change a decimal to a fraction:

① Read the decimal to find the denominator. Write the decimal digits over 10, 100, or 1,000.

0.65 is 65 *hundredths* → $\frac{65}{100}$

② Use the GCF to write the fraction in simplest form.

The GCF of 65 and 100 is 5.

$$\frac{65}{100} = \frac{65 \div 5}{100 \div 5} = \frac{13}{20}$$

Write each fraction as a decimal.

1. $\frac{4}{5} =$ ______
2. $\frac{3}{4} =$ ______
3. $\frac{1}{6} =$ ______
4. $\frac{1}{4} =$ ______
5. $\frac{2}{3} =$ ______
6. $\frac{7}{10} =$ ______
7. $\frac{5}{9} =$ ______
8. $\frac{1}{5} =$ ______
9. $\frac{3}{8} =$ ______

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

10. 0.4 = ______
11. 0.75 = ______
12. 1.5 = ______
13. 0.35 = ______
14. 2.7 = ______
15. 1.8 = ______
16. 0.625 = ______
17. 0.78 = ______
18. 0.88 = ______

Order from least to greatest.

19. $2.\overline{6}, \frac{13}{6}, 2\frac{5}{6}$ ______________
20. $2.\overline{02}, 2\frac{1}{200}, 2.0202$ ______________
21. $\frac{5}{4}, 1\frac{4}{5}, 1.\overline{4}$ ______________

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Review 134

Adding and Subtracting Fractions

Follow these steps to add or subtract fractions with different denominators.

	Add: $\frac{1}{3} + \frac{1}{6}$	Subtract: $\frac{11}{12} - \frac{1}{6}$
① Write the fractions with the same denominator.	$\frac{2}{6} + \frac{1}{6}$	$\frac{11}{12} - \frac{2}{12}$
② Add or subtract the numerators.	$\frac{2}{6} + \frac{1}{6} = \frac{3}{6}$	$\frac{11}{12} - \frac{2}{12} = \frac{9}{12}$
③ Simplify the fraction.	$\frac{3}{6} = \frac{1}{2}$	$\frac{9}{12} = \frac{3}{4}$

Complete to find each sum or difference.

1. $\frac{3}{10} + \frac{2}{5}$

$\frac{3}{10} + \frac{\square}{10} = \frac{\square}{\square}$

2. $\frac{1}{4} + \frac{3}{6}$

$\frac{\square}{12} + \frac{\square}{12} = \frac{\square}{\square} = \frac{\square}{\square}$

3. $\frac{5}{8} + \frac{1}{4}$

$\frac{5}{8} + \frac{\square}{8} = \frac{\square}{\square}$

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

$\frac{3}{4} - \frac{\square}{4} = \frac{\square}{\square}$

5. $\frac{5}{9} - \frac{1}{3}$

$\frac{5}{9} - \frac{\square}{9} = \frac{\square}{\square}$

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

$\frac{\square}{15} - \frac{\square}{15} = \frac{\square}{\square}$

Find each sum or difference. Write it in simplest form.

7. $\frac{4}{5} + \frac{4}{5}$ ____________

8. $\frac{7}{8} - \frac{5}{8}$ ____________

9. $\frac{5}{6} - \frac{2}{3}$ ____________

10. $\frac{5}{12} - \frac{1}{4}$ ____________

11. $\frac{7}{8} + \frac{1}{4}$ ____________

12. $\frac{3}{4} - \frac{1}{8}$ ____________

13. $\frac{2}{5} + \frac{1}{10}$ ____________

14. $\frac{7}{12} - \frac{1}{3}$ ____________

15. $\frac{3}{5} + \frac{7}{15}$ ____________

16. $\frac{1}{2} + \frac{9}{10}$ ____________

17. $\frac{5}{6} - \frac{1}{4}$ ____________

18. $\frac{9}{10} - \frac{1}{2}$ ____________

19. $\frac{5}{8} + \frac{1}{2}$ ____________

20. $\frac{2}{5} - \frac{3}{10}$ ____________

21. $\frac{5}{6} - \frac{7}{12}$ ____________

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Review 135

Adding and Subtracting Mixed Numbers

Follow these steps to add or subtract mixed numbers with different denominators.

	Add:	Subtract:
	$2\frac{2}{5} + 1\frac{3}{4}$	$4\frac{1}{3} - 2\frac{5}{6}$
① Write the equivalent fractions with the LCD.	$2\frac{8}{20} + 1\frac{15}{20}$	$4\frac{2}{6} - 2\frac{5}{6}$
② Rename, if necessary.		$4\frac{2}{6} = 3 + 1\frac{2}{6} = 3\frac{8}{6}$
③ Add or subtract the whole numbers. Add or subtract the fractions.	$2\frac{8}{20} + 1\frac{15}{20} = 3\frac{23}{20}$	$3\frac{8}{6} - 2\frac{5}{6} = 1\frac{3}{6}$
④ Simplify.	$3\frac{23}{20} = 4\frac{3}{20}$	$1\frac{3}{6} = 1\frac{1}{2}$

Complete to find each sum or difference.

1. $4\frac{3}{4} - 2\frac{3}{8}$

$4\frac{\square}{8} - 2\frac{\square}{8} = \square\frac{\square}{\square}$

2. $4\frac{7}{12} + 2\frac{5}{6}$

$4\frac{\square}{12} + 2\frac{\square}{\ } = \square\frac{\square}{\square}$

$= \square\frac{\square}{\square}$

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

$4\frac{\square}{15} - 1\frac{\square}{15}$

$= \square\frac{\square}{\square} - \square\frac{\square}{\square}$

$= \square\frac{\square}{\square}$

Find each sum or difference. Write it in simplest form.

4. $2\frac{3}{5} + 1\frac{1}{10}$ ________

5. $2\frac{5}{6} + 3\frac{4}{9}$ ________

6. $5 - 3\frac{7}{10}$ ________

7. $3\frac{1}{6} - 2\frac{1}{3}$ ________

8. $4\frac{3}{4} - 1\frac{2}{3}$ ________

9. $3\frac{1}{2} + 4\frac{1}{3}$ ________

10. $3\frac{3}{10} + 1\frac{3}{5}$ ________

11. $6\frac{1}{3} + 7\frac{1}{4}$ ________

12. $4\frac{3}{5} + 6\frac{7}{10}$ ________

13. $7\frac{15}{16} - 2\frac{3}{8}$ ________

14. $4 - 2\frac{3}{10}$ ________

15. $5\frac{1}{4} - 1\frac{3}{8}$ ________

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

17. $7\frac{1}{4} - 3\frac{3}{5}$ ________

18. $5 - 2\frac{5}{8}$ ________

19. $9\frac{3}{5} + 1\frac{7}{10}$ ________

20. $6 - 5\frac{5}{6}$ ________

21. $4\frac{7}{10} + 4\frac{1}{2}$ ________

22. Shea cut $2\frac{1}{8}$ in. material off of the bottom of a $21\frac{1}{4}$ in. skirt. How long is the skirt now?

____

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Review 136

Multiplying Fractions and Mixed Numbers

Follow these steps to multiply fractions and mixed numbers.

	Multiply: $\frac{3}{4} \cdot \frac{2}{5}$	Multiply: $2\frac{2}{3} \cdot 1\frac{5}{8}$
① Write the mixed numbers as improper fractions if necessary.		$\frac{8}{3} \cdot \frac{13}{8}$
② Multiply numerators. Multiply denominators.	$\frac{3 \cdot 2}{4 \cdot 5} = \frac{6}{20}$	$\frac{8 \cdot 13}{3 \cdot 8} = \frac{104}{24}$
③ Simplify, if necessary.	$\frac{6}{20} = \frac{3}{10}$	$\frac{104}{24} = 4\frac{1}{3}$

Complete to find each product.

1. $\frac{1}{5} \cdot \frac{2}{3}$

$\frac{1 \cdot 2}{5 \cdot 3} = \frac{\boxed{}}{\boxed{}}$

Product ________

2. $\frac{1}{4} \cdot 4\frac{1}{8}$

$\frac{1}{4} \cdot \frac{\boxed{}}{8} = \frac{\boxed{}}{32}$

Product ________

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

$\frac{\boxed{}}{4} \cdot \frac{\boxed{}}{3} = \frac{\boxed{}}{12}$

Product ________

Find each product. Write the product in simplest form.

4. $\frac{5}{8} \cdot \frac{2}{5}$ ________

5. $\frac{2}{3} \cdot 9$ ________

6. $\frac{5}{12} \cdot \frac{3}{10}$ ________

7. $\frac{3}{4} \cdot 1\frac{4}{5}$ ________

8. $\frac{1}{2} \cdot 5\frac{1}{6}$ ________

9. $3\frac{4}{5} \cdot \frac{1}{6}$ ________

10. $1\frac{2}{3} \cdot 5$ ________

11. $1\frac{3}{4} \cdot 3\frac{1}{7}$ ________

12. $2\frac{3}{5} \cdot \frac{1}{4}$ ________

13. $2\frac{3}{5} \cdot \frac{7}{8}$ ________

14. $4\frac{1}{5} \cdot \frac{5}{7}$ ________

15. $\frac{1}{2} \cdot 2\frac{1}{8}$ ________

16. $3\frac{5}{6} \cdot 2\frac{1}{4}$ ________

17. $2\frac{5}{7} \cdot 1\frac{1}{3}$ ________

18. $7\frac{2}{3} \cdot 2\frac{1}{7}$ ________

19. $5\frac{1}{2} \cdot 2\frac{2}{3}$ ________

20. $\frac{5}{6} \cdot 3\frac{3}{5}$ ________

21. $7\frac{3}{4} \cdot 2$ ________

Name ______________________ Class ______________ Date ______________

Review 137

Dividing Fractions and Mixed Numbers

To find the **reciprocal** of a fraction, interchange the numerator and the denominator.

Examples: The reciprocal of $\frac{1}{4}$ is $\frac{4}{1}$. The reciprocal of $\frac{7}{5}$ is $\frac{5}{7}$.

Follow these steps to divide fractions and mixed numbers.

	Divide: $\frac{2}{3} \div \frac{1}{4}$	Divide: $3\frac{3}{4} \div 1\frac{2}{5}$
① Rewrite mixed numbers as improper fractions as needed.		$\frac{15}{4} \div \frac{7}{5}$
② Multiply by the reciprocal of the divisor.	$\frac{2}{3} \cdot \frac{4}{1}$	$\frac{15}{4} \cdot \frac{5}{7}$
③ Multiply numerators. Multiply denominators.	$\frac{2 \cdot 4}{3 \cdot 1} = \frac{8}{3}$	$\frac{15 \cdot 5}{4 \cdot 7} = \frac{75}{28}$
④ Simplify.	$\frac{8}{3} = 2\frac{2}{3}$	$\frac{75}{28} = 2\frac{19}{28}$

Find the reciprocal of each number.

1. $\frac{7}{8}$ ________ **2.** $\frac{1}{6}$ ________ **3.** $\frac{8}{3}$ ________ **4.** $\frac{9}{10}$ ________

Write each mixed number as an improper fraction. Then find the reciprocal.

5. $1\frac{1}{2}$ ________ **6.** $2\frac{1}{3}$ ________ **7.** $1\frac{4}{5}$ ________ **8.** $2\frac{3}{4}$ ________

Complete to find each quotient. Write the quotient in simplest form.

9. $\frac{2}{3} \div \frac{3}{8}$

$$\frac{2}{3} \cdot \frac{\square}{3} = \frac{\square}{9}$$

Quotient ________

10. $10 \div \frac{7}{8}$

$$\frac{\square}{1} \div \frac{7}{8} = \frac{\square}{1} \cdot \frac{\square}{\square}$$

$$= \frac{\square}{7}$$

Quotient ________

11. $3\frac{3}{5} \div 1\frac{1}{5}$

$$\frac{\square}{5} \div \frac{\square}{5} = \frac{\square}{5} \cdot \frac{\square}{\square}$$

$$= \frac{\square}{30}$$

Quotient ________

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

13. $\frac{3}{8} \div \frac{2}{3}$ ________

14. $8 \div \frac{4}{5}$ ________

15. $6 \div \frac{3}{4}$ ________

16. $1\frac{1}{8} \div 2\frac{2}{5}$ ________

17. $3\frac{1}{5} \div 2\frac{2}{3}$ ________

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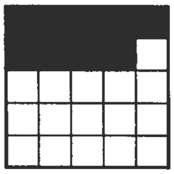
Review 149

Understanding Percents

A **percent** is a ratio that compares a number to 100. The figure at the right contains 25 squares.



$\frac{9}{25}$ of the squares are shaded.

To write $\frac{9}{25}$ as a percent, follow these steps.

① Write a ratio with a denominator of 100 that is equal to $\frac{9}{25}$.

$$\frac{9}{25} = \frac{9 \cdot 4}{25 \cdot 4} = \frac{36}{100}$$

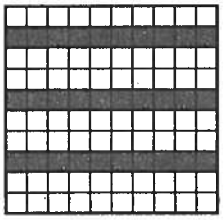
② Write the ratio as a percent.

$$\frac{36}{100} = 36\%$$

36% of the squares are shaded.

Write a percent for each shaded figure.

1.



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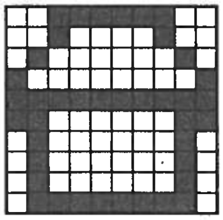

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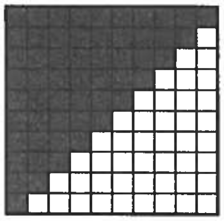

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4.

____

5.

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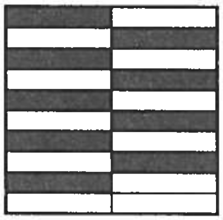
6.



____

Write each ratio as a percent.

7. $\frac{3}{5}$ ______________

8. $\frac{17}{100}$ ______________

9. $\frac{18}{25}$ ______________

10. $\frac{13}{20}$ ______________

11. $\frac{8}{10}$ ______________

12. $\frac{1}{4}$ ______________

13. $\frac{17}{50}$ ______________

14. $\frac{11}{25}$ ______________

15. $\frac{7}{20}$ ______________

16. $\frac{21}{25}$ ______________

17. $\frac{3}{10}$ ______________

18. $\frac{16}{25}$ ______________

19. $\frac{2}{5}$ ______________

20. $\frac{99}{100}$ ______________

21. $\frac{11}{20}$ ______________

22. $\frac{13}{25}$ ______________

23. $\frac{1}{10}$ ______________

24. $\frac{39}{50}$ ______________

25. $\frac{19}{20}$ ______________

26. $\frac{6}{25}$ ______________

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Review 150

Percents, Fractions, and Decimals

To write a percent as a fraction, write a fraction with 100 as the denominator.

$45\% = \frac{45}{100}$ ← **Denominator 100**

$= \frac{45 \div 5}{100 \div 5} = \frac{9}{20}$ ← **Simplify.**

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

To write a decimal as a percent, multiply by 100.

Write 0.85 as a percent.

$0.85 \cdot 100 = 85$

$0.85 = 85\%$

To write a percent as a decimal, divide by 100.

Write 46% as a decimal.

$46 \div 100 = 0.46$

$46\% = 0.46$

Write each fraction as a percent.

1. $\frac{3}{4}$ ____________
2. $\frac{12}{25}$ ____________
3. $\frac{4}{5}$ ____________
4. $\frac{23}{4}$ ____________

Write each percent as a fraction in simplest form.

5. 45% ____________
6. 60% ____________
7. 16% ____________
8. 25% ____________
9. 37.5% ____________
10. 99% ____________
11. 40% ____________
12. 86% ____________

Write each percent as a decimal or each decimal as a percent.

13. 35% ____________
14. 48% ____________
15. 116% ____________
16. 8% ____________
17. 12% ____________
18. 5.5% ____________
19. 400% ____________
20. 0.6% ____________
21. 0.39 ____________
22. 0.735 ____________
23. 0.86 ____________
24 0.34 ____________
25. 0.4 ____________
26. 0.6 ____________
27. 0.004 ____________
28. 6 ____________

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Review 151

Percents Greater Than 100 or Less Than 1

You can express a percent that is less than 1% or greater than 100% as a decimal and as a fraction. A percent that is less than 1% is a quantity that is less than $\frac{1}{100}$. A percent that is greater than 100% is a quantity that is greater than 1.

- Write 0.5% as a decimal and as a fraction.

  Move the decimal point two places to the left to write a percent as a decimal. Add zeros as needed. $00.5\% = 0.005$

  Since percent means per 100, you can write the percent as a fraction with a denominator of 100. $0.5\% = \frac{0.5}{100}$

  Then rewrite the numerator as a whole number. Since $10 \times 0.5 = 5$, multiply the numerator and the denominator by 10. Then simplify. $\frac{0.5}{100} = \frac{0.5 \times 10}{100 \times 10} = \frac{5}{1{,}000} = \frac{1}{200}$

  So, $0.5\% = 0.005 = \frac{1}{200}$.

- Write 125% as a decimal and as a fraction.

  Move the decimal point two places to the left to write a percent as a decimal. Add zeros as needed. $125\% = 1.25.$

  Since percent means per 100, you can write the percent as a fraction with a denominator of 100. $125\% = \frac{125}{100}$

  Then simplify. $\frac{125}{100} = \frac{125 \div 25}{100 \div 25} = \frac{5}{4} = 1\frac{1}{4}$

  So, $125\% = 1.25 = 1\frac{1}{4}$.

Write each percent as a fraction and a decimal.

1. 0.01% ____________________

2. 0.45% ____________________

3. 0.2% ____________________

4. 0.67% ____________________

5. 150% ____________________

6. 225% ____________________

7. 186% ____________________

8. 201% ____________________

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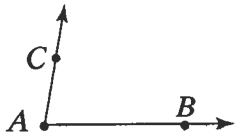
Review 159

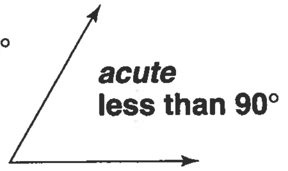
Measuring and Classifying Angles

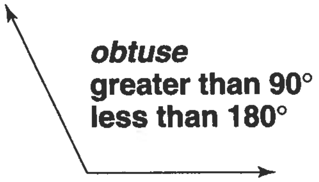


An **angle** is made up of two rays (the *sides* of the angle) with a common endpoint (the *vertex* of the angle).

You can name this angle $\angle A$, $\angle BAC$, or $\angle CAB$.

$\angle A$ is an **acute** angle because its measure is less than 90°. If an angle has a measure greater than 90° and less than 180°, it is an **obtuse** angle.





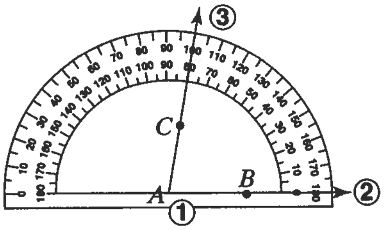
You can measure an angle using a protractor. Write the measure of $\angle A$ as $m\angle A$.

To measure an angle:

① Place the center point of your protractor on the vertex of the angle.

② Line up one side of the angle with zero on the protractor scale.

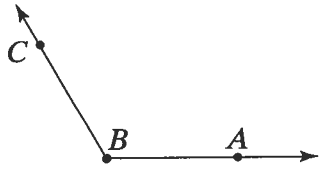
③ Read the scale at the second side of the angle. Since $\angle A$ is an acute angle, read 80° and not 100°.



$m\angle A = 80°$

Measure each angle. Then circle *acute* or *obtuse*.

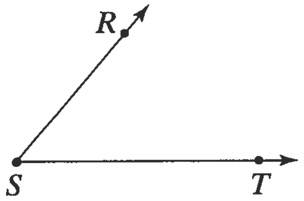
1.



$m\angle B =$ ________

acute obtuse

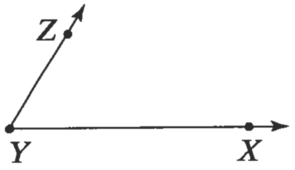
2.



$m\angle S =$ ________

acute obtuse

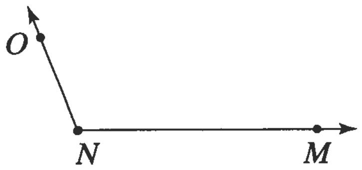
3.



$m\angle Y =$ ________

acute obtuse

4.



$m\angle N =$ ________

acute obtuse

Classify each angle with the given measure as *acute* or *obtuse*.

5. 45° ________

6. 148° ________

7. 4° ________

8. 106° ________

9. 65° ________

10. 179° ________

11. 23° ________

12. 115° ________

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Review 268

Pairs of Angles

- *Vertical angles* are pairs of opposite angles formed by two intersecting lines. They are congruent.

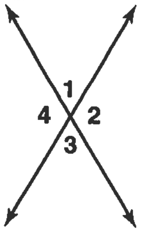
  Example 1: ∠1 and ∠3, ∠4 and ∠2

- *Adjacent angles* have a common vertex and a common side, but no common interior points.

  Example 2: ∠1 and ∠2, ∠1 and ∠4

- Two *supplementary angles* form a 180° angle.

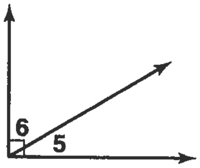
  Example 3: ∠1 and ∠4 are supplementary angles.
  ∠3 is also a supplement of ∠4.



If you know the measure of one supplementary angle, you can find the measure of the other. → If $m\angle 4$ is 120°, then $m\angle 1$ is $180° - 120°$, or 60°.

- Two *complementary angles* form a 90° angle.

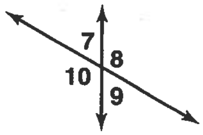
  Example 4: ∠5 and ∠6 are complementary angles.
  ∠6 is a complement of ∠5.

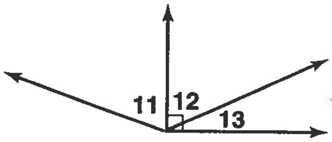


If you know the measure of one complementary angle, you can find the measure of the other. → If $m\angle 5$ is 30°, then $m\angle 6$ is $90° - 30°$, or 60°.

Use the diagrams at the right for Exercises 1–6.

1. Vertical angles ∠7 and ____________
2. Adjacent angles ∠10 and ____________
3. Supplementary angles ∠8 and ____________
4. Complementary angles ∠12 and ____________
5. Vertical angles ∠8 and ____________
6. Supplementary angles ∠7 and ____________





Find the measure of the supplement of each angle.

7. 38° ____________
8. 65° ____________
9. 120° ____________
10. 152° ____________

Find the measure of the complement of each angle.

11. 25° ____________
12. 18° ____________
13. 40° ____________
14. 64° ____________

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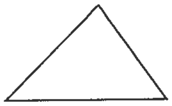
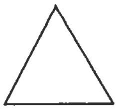
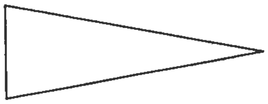
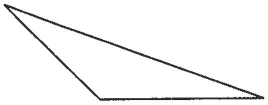
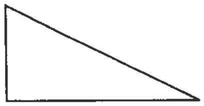
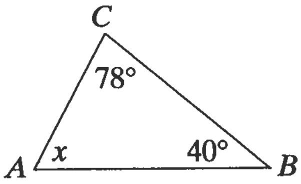
Review 161

Classifying Triangles by Angles	Classifying Triangles by Sides
Acute triangle: three acute angles 	**Equilateral triangle:** three congruent sides 
Right triangle: one right angle 	**Isosceles triangle:** at least two congruent sides 
Obtuse triangle: one obtuse angle 	**Scalene triangle:** no congruent sides 

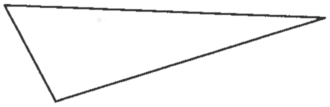
The sum of the measures of the angles of a triangle is 180°.

Find the value of x in the triangle at the right.

$$\begin{aligned} x &= m\angle A \\ m\angle A + 40^\circ + 78^\circ &= 180^\circ \\ m\angle A + 118^\circ &= 180^\circ \\ m\angle A &= 180^\circ - 118^\circ \\ m\angle A &= 62^\circ \\ x &= 62^\circ \end{aligned}$$



Classify each triangle by its sides and then by its angles.

1.


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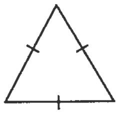

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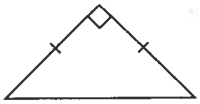

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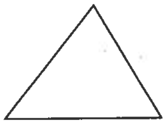
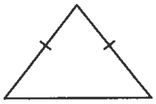
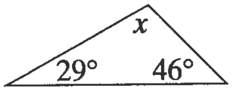
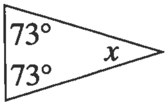


6.


Find the value of x in each triangle.

7.


8.


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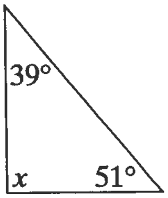

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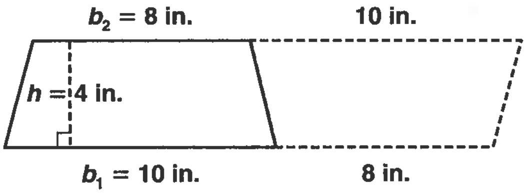
Review 169

Areas of Other Figures

Trapezoid

Two identical trapezoids, together as shown, form a parallelogram. The trapezoid has half the area of the parallelogram.



Area of parallelogram: $A = (b_1 + b_2)h$

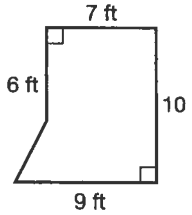
Area of trapezoid: $A = \frac{1}{2}h(b_1 + b_2)$

$= \frac{1}{2}(4)(10 + 8)$

$= 2(18) = 36 \text{ in.}^2$

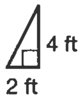
Irregular Figures

Not all geometric figures are shapes with which you are familiar. Some of them, however, can be divided into familiar shapes.



Find the area of the figure.

Use the area formulas to find the areas of the triangle and the rectangle.

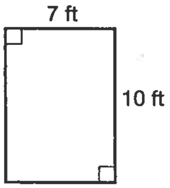


Area of a triangle $= \frac{1}{2}bh$

$= \frac{1}{2}(2)(4)$

$= \frac{1}{2}(8)$

$= 4 \text{ ft}^2$



Area of a rectangle $= bh$

$= (7)(10)$

$= 70 \text{ ft}^2$

Find the total area by adding the area of each figure.

Total area = area of triangle + area of rectangle

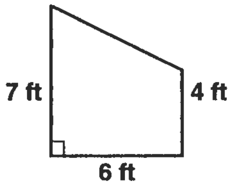
= 4 + 70

= 74

The total area is 74 ft^2.

Find the area of each figure.

1.



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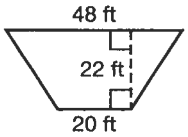

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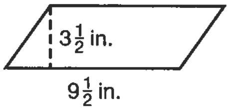
3.



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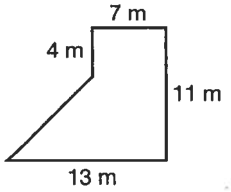
4.



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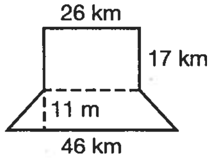

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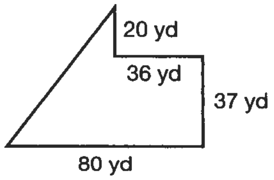

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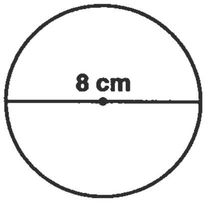
Review 170

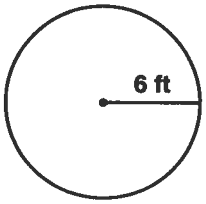
Circumferences and Areas of Circles

The **circumference** of a circle is the distance around it. To find the circumference of a circle with radius r and diameter d, use either the formula $C = 2\pi r$ or $C = \pi d$. Use 3.14 for π.



$$\begin{aligned} d &= 8 \text{ cm} \\ C &= \pi d \\ &\approx 3.14 \cdot 8 \\ &= 25.12 \text{ cm} \end{aligned}$$

To the nearest centimeter, the circumference is 25 cm.



$$\begin{aligned} r &= 6 \text{ ft} \\ C &= 2\pi r \\ &\approx 2 \cdot 3.14 \cdot 6 \\ &= 37.68 \text{ ft} \end{aligned}$$

To the nearest foot, the circumference is 38 ft.

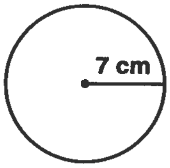
To find the area of a circle, use $A = \pi r^2$.
The diameter of the circle is 8 cm, so the radius is 4 cm.

$$\begin{aligned} A &= \pi r^2 \\ &\approx 3.14 \cdot 4 \cdot 4 \\ &= 50.24 \text{ cm}^2 \end{aligned}$$

To the nearest square centimeter, the area is 50 cm^2.

Find the circumference and area of each circle. Round your answer to the nearest whole unit.

1.



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2.

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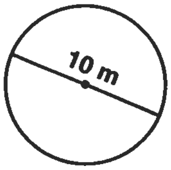
3.



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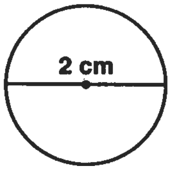

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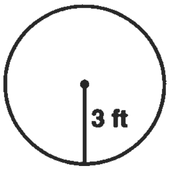

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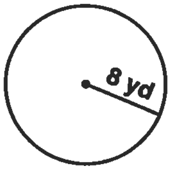

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Name ______________________ Class ______________ Date ______________

Review 185

Transforming Formulas

A **formula** such as $I = prt$ states the relationship among unknown quantities represented by the variables I, p, r, and t. It means that *interest* equals the *principal* times the *rate* times the *time.*

You can use a formula by **substituting** values for the variables. Some formulas have numbers that do not vary, such as this formula for finding the perimeter of a square: $P = 4s$. The number 4 is a **constant.**

A Boeing 747 airplane traveled at 600 mi/hr. At this speed how many hours did it take to travel 2,100 miles?

$d = r \cdot t$ Use the formula $d = rt$.

$2{,}100 = 600 \cdot t$ Substitute the known values.

$3.5 = t$ Divide to find the unknown value.

The Boeing 747 airplane traveled 2,100 miles in 3.5 hours.

Course 2 Topics

1. Lisa rides her bike for 2 hours and travels 12 miles. Find her rate of speed.
   a. Which formula should you use to find the rate? ____________
   b. What is the rate of speed? ______________________

Solve each formula for the values given.

2. $A = lw$ for A, given $l = 35$ m and $w = 22$ m

____

3. $P = 2l + 2w$ for l given $P = 30$ in. and $w = 7$ in.

____

4. $r = \frac{d}{t}$ for t, given $d = 366$ mi and $r = 30.5$ mi/hr

____

5. $C = 2\pi r$ for $r = 10$ cm. Use 3.14 for π.

____

6. $V = lwh$ for l given $V = 60\ \text{ft}^3$, $w = 3$ ft, and $h = 5$ ft

____

7. $I = prt$ for $p = \$100$, $r = 0.05$, and $t = 2$ years

____

Name ______________________ Class ______________ Date ______________

Review 186

Graphing Points in Four Quadrants

The intersection of a horizontal number line and a vertical number line forms the **coordinate plane.** The coordinate plane below shows point *A* for the **ordered pair** (3, −4).

To graph point *A* with **coordinates** (3, −4):

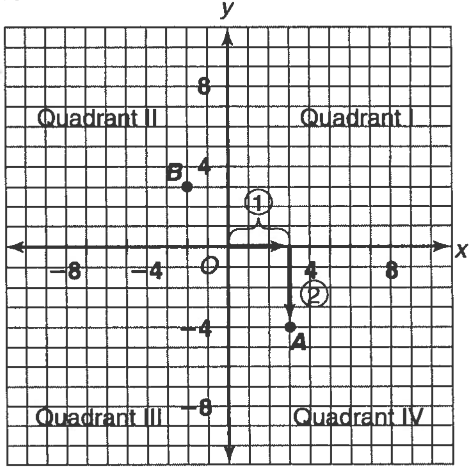
① Start at the origin, *O*. Move 3 units to the right.

② Move 4 units down for −4. Draw point *A*.

The axes form four **quadrants** in the coordinate plane.

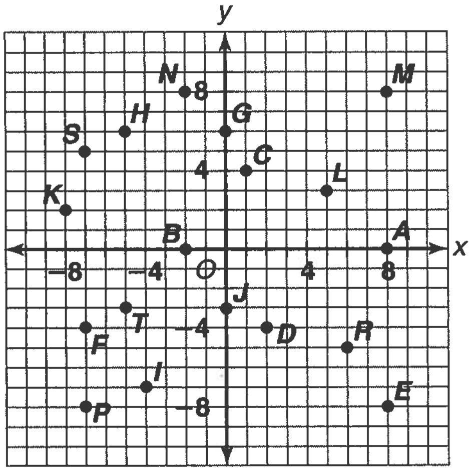
- The point (3, −4) is located in quadrant IV.
- Point *B* is located in quadrant II.

The line containing two points with the same *x*-coordinate is a vertical line. The line containing two points with the same *y*-coordinate is a horizontal line.



Name the point with the given coordinates.

1. (8, 0) ________
2. (8, −8) ________
3. (1, 4) ________
4. (−7, −4) ________
5. (−5, 6) ________
6. (−2, 0) ________
7. (6, −5) ________
8. (−5, −3) ________



Write the coordinates of each point.

9. *D* ____________
10. *G* ____________
11. *I* ____________
12. *J* ____________
13. *K* ____________
14. *L* ____________
15. *M* ____________
16. *S* ____________

Identify the quadrant in which each point lies.

17. *F* ________
18. *C* ________
19. *D* ________
20. *H* ________
21. *N* ________
22. *P* ________
23. *S* ________
24. *R* ________

Without graphing, tell whether the line containing each pair of points is vertical or horizontal.

25. *F* and *P* ____________
26. *H* and *G* ____________
27. *A* and *M* ____________

Name ______________________ Class ______________ Date ______________

Review 202

Probability

To find a **theoretical probability,** first list all possible **outcomes.** Then use the formula:

$$P(\text{event}) = \frac{\text{number of favorable outcomes}}{\text{total number of possible outcomes}}$$

A letter is selected at random from the letters of the word FLORIDA. What is the probability that the letter is an A?

- There are 7 letters (possible outcomes).
- There is one A, which represents a favorable outcome.

$$P(\text{A}) = \frac{\text{number of favorable outcomes}}{\text{total number of outcomes}} = \frac{1}{7}$$

The probability that the letter is an A is $\frac{1}{7}$.

Selecting a letter other than A is called *not* A and is the **complement** of the event A. The sum of the probabilities of an event and its complement equals 1, or 100%.

What is the probability of the event "*not* A"?

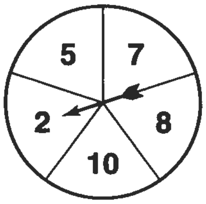
$$P(\text{A}) + P(\textit{not}\ \text{A}) = 1$$

$$\frac{1}{7} + P(\textit{not}\ \text{A}) = 1$$

$$P(\textit{not}\ \text{A}) = 1 - \frac{1}{7} = \frac{6}{7}$$

The probability of the event "*not* A," (selecting F, L, O, R, I, or D), is $\frac{6}{7}$.

Spin the spinner shown once. Find each probability as a fraction, a decimal, and a percent.



1. $P(5)$

$\frac{\text{number of favorable outcomes}}{\text{total number of outcomes}}$

$= \frac{\square}{5}$ ______________

2. $P(\text{odd number})$

$\frac{\text{number of favorable outcomes}}{\text{total number of outcomes}}$

$= \frac{2}{\square}$ ______________

You select a card at random from a box that contains cards numbered from 1 to 10. Find each probability as a fraction, a decimal, and a percent.

3. $P(\text{even number})$ ______________

4. $P(\text{number less than 4})$ ______________

5. $P(\text{not 5})$ ______________

The letters H, A, P, P, I, N, E, S, and S are written on pieces of paper. Select one piece of paper. Find each probability.

6. $P(\text{P})$ ________

7. $P(\text{not vowel})$ ________

8. $P(\text{not E})$ ________

A number is selected at random from the numbers 1 to 50. Find the odds in favor of each outcome.

9. selecting a multiple of 5 ______________

10. selecting a factor of 50 ______________

11. selecting a number that is not a factor of 50 ______________

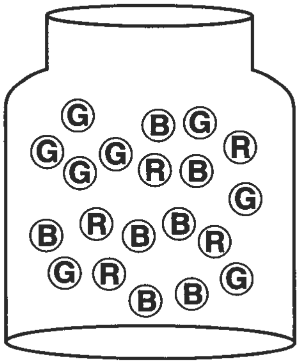
Name ____________________ Class ______________ Date ______________

Review 203

Experimental Probability

Probability measures how likely it is that an event will occur. For an **experimental probability,** you collect data through observations or experiments and use the data to state the probability.

The jar contains red, green, and blue chips. You shake the jar, draw a chip, note its color, and then put it back. You do this 20 times with these results: 7 blue chips, 5 red chips, and 8 green chips. The experimental probability of drawing a green chip is

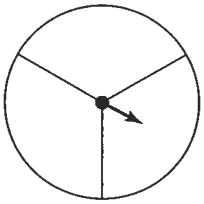


$$P(\text{green chip}) = \frac{\text{number of times "green chips" occur}}{\text{total number of trials}}$$

$$P(\text{green chip}) = \frac{8}{20} = \frac{2}{5} = 0.4 = 40\%$$

The probability of drawing a green chip is $\frac{2}{5}$, or 0.4, or 40%.

Sometimes a model, or simulation, is used to represent a situation. Then, the simulaton is used to find the experimental probability. For example, spinning this spinner can simulate the probability that 1 of 3 people is chosen for president of the student body.



Use the 20 draws above to complete each exercise.

1. What is the experimental probability of drawing a red chip? Write the probability as a fraction.

   $P(\text{red chip}) = \frac{\quad}{20} =$ ________

2. What is the experimental probability of drawing a blue chip? Write the probability as a percent.

   $P(\text{blue chip}) = \frac{\quad}{\quad} =$ ________

Suppose you have a bag with 30 chips: 12 red, 8 white, and 10 blue. You shake the jar, draw a chip, note its color, and then put it back. You do this 30 times with these results: 10 blue chips, 12 red chips, and 8 white chips. Write each probability as fraction in simplest form.

3. $P(\text{red})$ ________

4. $P(\text{white})$ ________

5. $P(\text{blue})$ ________

Describe a probability simulation for each situation.

6. You guess the answers on a true/false test with 20 questions.

   ____

   ____

7. One student out of 6 is randomly chosen to be the homeroom representative.

   ____

   ____

Name ________________________ Class ________________ Date ________________

Review 206

Compound Events

If you toss a coin and roll a number cube, the events are **independent.** The outcome of one event does not affect the outcome of the second event.

Find the probability of tossing a heads (H) and rolling an even number (E).

Find $P(\text{H and E})$. H and E are independent.

① Find $P(\text{H})$:

$$P(\text{H}) = \frac{1 \text{ heads}}{2 \text{ sides}} = \frac{1}{2}$$

② Find $P(\text{E})$:

$$P(\text{E}) = \frac{3 \text{ evens}}{6 \text{ faces}} = \frac{1}{2}$$

③ $P(\text{H and E}) = P(\text{H}) \times P(\text{E}) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

If the outcome of the first event affects the outcome of the second event, the events are **dependent.**

A bag contains 3 blue and 3 red marbles. Draw a marble, then draw a second marble without replacing the first marble. Find the probability of drawing 2 blue marbles.

① Find $P(\text{blue})$.

$$P(\text{blue}) = \frac{3 \text{ blue}}{6 \text{ marbles}} = \frac{1}{2}$$

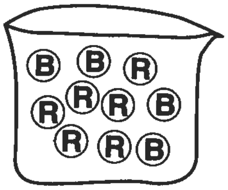
② Find $P(\text{blue after blue})$.

$$P(\text{blue after blue}) = \frac{2 \text{ blue}}{5 \text{ marbles}} = \frac{2}{5}$$

③ Find $P(\text{blue, then blue})$

$$P(\text{blue, then blue}) = P(\text{blue}) \times P(\text{blue after blue}) = \frac{1}{2} \times \frac{2}{5} = \frac{1}{5}$$

In Exercises 1–6, you draw a marble at random from the bag of marbles shown. Then, you replace it and draw again. Find each probability.



1. $P(\text{blue and red})$ ________
2. $P(\text{2 reds})$ ________
3. $P(\text{2 blues})$ ________

Next, you draw two marbles randomly *without* replacing the first marble. Find each probability.

4. $P(\text{blue and red})$ ________
5. $P(\text{2 reds})$ ________
6. $P(\text{2 blues})$ ________

You draw two letters randomly from a box containing the letters M, I, S, S, O, U, R, and I.

7. Suppose you do not replace the first letter before drawing the second. What is $P(\text{M and I})$?

____

8. Suppose you replace the first letter before drawing the second. What is $P(\text{M and I})$?

____

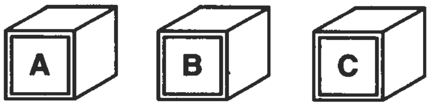
Name ______________________ Class ______________ Date ______________

Review 207

Permutations

You can arrange the letters A, B, and C in different ways: ABC, ACB, and so on. An arrangement in which order is important is a **permutation.**

How many ways can the three blocks be arranged in a line?



① List the ways.

② Count the number of arrangements.

ABC ACB
BAC BCA
CAB CBA

There are 6 possible arrangements.

You can use the counting principle as a shortcut.

choices for 1st block		choices for 2nd block		choice for 3rd block		
3	×	2	×	1	= 6	

A factorial can be used to show the product of all integers less than or equal to a number.

3! = 3 × 2 × 1 = 6

Complete to find the number of permutations for each.

1. In how many ways can you arrange 4 different books on a shelf?

4 × ______ × ______ × 1 = ______

2. In how many ways can the first, second, and third prizes be awarded to 10 contestants?

______ × ______ × ______ = ______

Find the number of permutations for each.

3. In how many different ways can the four letters in BIRD be arranged?

______

4. How many different ways can you frame two of five pictures in different frames?

______

5. How many different seating arrangements are possible for a row of five chairs, choosing from six people?

______

6. A basket contains five different pieces of fruit. If three people each choose one piece, in how many different ways can they make their choices?

______

Find the number of two-letter permutations of the letters.

7. R, I, B ______

8. H, E, L, P ______

9. R, A, M, B, L, E ______

10. C, A, N, D, L, E, S ______

Find the number of three-letter permutations of the letters.

11. T, A, B ______

12. R, A, D, I, O ______

13. T, O, P, S ______

14. W, A, L, R, U, S ______

Name ____________________ Class ____________ Date ____________

Review 208

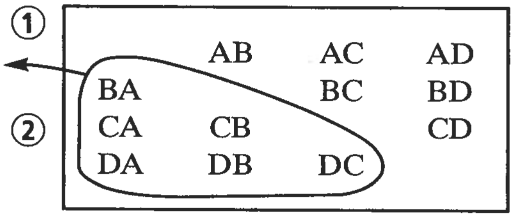
Combinations

An arrangement in which order does *not* matter is a **combination.** For example, if you pair Raiz and Carla to play tennis, it is the same as if you pair Carla and Raiz.

How many groups of 2 letters can you form from A, B, C, and D?

① Make an organized list.

② Eliminate any duplicates.



③ List the combinations. AB, AC, AD, BC, BD, CD

There are 6 possible combinations.

You can also get the number of combinations from the number of permutations.

$$\text{combinations} = \frac{\text{total number of permutations}}{\text{number of permutations of smaller group}} = \frac{4 \times 3}{2 \times 1} = 6 \text{ possible combinations}$$

Use the letters C, O, M, P, U, T, E, R for Exercises 1–4.

1. How many combinations of 2 vowels are there? Show an organized list with no duplicates.

____

____

____

2. How many combinations of 3 consonants are there? Show an organized list with no duplicates.

____

____

____

3. If you use C, O, M, P, U, T, E, R, S instead of C, O, M, P, U, T, E, R, how many combinations of 2 vowels are there?

____

4. If you use C, O, M, P, U, T, E, R, S instead of C, O, M, P, U, T, E, R, how many combinations of 3 consonants are there?

____

Find the number of combinations.

5. In how many ways can Robin pick 2 different kinds of muffins from a choice of wheat, raisin, blueberry, banana, garlic, and plain?

____

6. Sara has 24 tapes. In how many different ways can she take 2 tapes to school?

____

7. Augusto has purple, green, black, red, and blue T-shirts. In how many ways can he choose 3 for his vacation?

____

8. Abdul selects three light filters from a box of ten different filters. How many different sets could he choose?

____