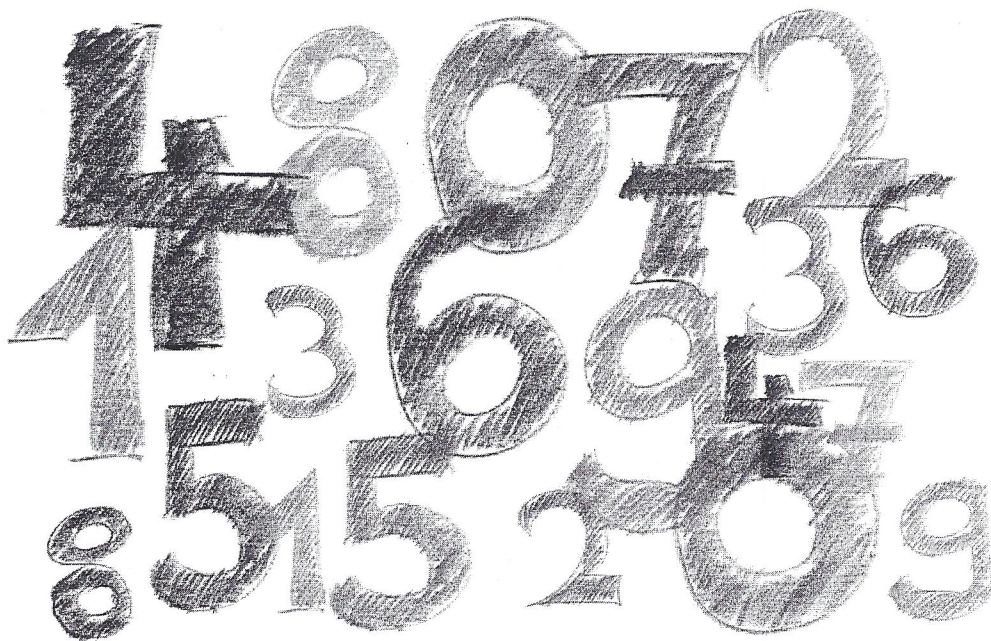


Name : _____

8th Grade

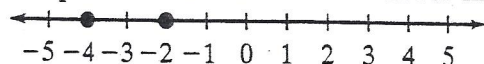
Summer Math Packet

2019



Week 1**Integers and Absolute Value****Compare. Use $>$, $<$, or $=$ to complete each statement.**

a. $-4 \square -2$

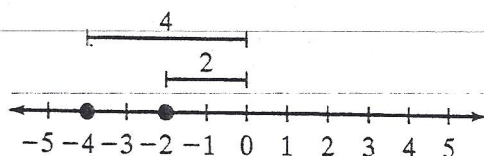
Graph -4 and -2 on the number line.

A number on the left is less than a number on the right.

Thus, -4 is less than -2 .

$-4 < -2$

b. $|-4| \square |-2|$

The *absolute value* of a number is its distance from zero on the number line.Thus $|-4| = 4$ and $|-2| = 2$.Since $4 > 2$, $|-4| > |-2|$ **Compare. Use $>$, $<$, or $=$ to complete each statement.**

1. $-3 \square -2$

2. $-5 \square 1$

3. $0 \square -2$

4. $1 \square 0$

5. $1 \square -1$

6. $-5 \square -3$

7. $|-3| \square 0$

8. $|-2| \square |-5|$

9. $|-3| \square 2$

10. $|-6| \square 6$

11. $|3| \square |-2|$

12. $|-7| \square 0$

13. $-3 \square |-3|$

14. $4 \square |-2|$

15. $|-2| \square 3$

16. $|-5| \square 3$

17. $|8| \square |-8|$

18. $-6 \square -4$

19. $5 \square |-4|$

20. $-3 \square -5$

21. $|2| \square |-3|$

22. $|-1| \square |1|$

23. $|-3| \square |-1|$

24. $-1 \square 2$

Week 2

The Distributive Property

According to the Distributive Property, you distribute or "pass out" a multiplication to each part of a sum or difference in parentheses.

In $2(a + b) = 2a + 2b$, we "pass out" the 2 by multiplying it by both the a and the b .

Multiply $6(x - 9)$.

$$\begin{aligned} 6(x - 9) &= 6x - 6(9) \\ &= 6x - 54 \end{aligned}$$

Multiply $(4 - h)(-3)$.

$$\begin{aligned} (4 - h)(-3) &= 4(-3) - h(-3) \\ &= -12 - (-3h) \\ &= -12 + 3h \\ &= 3h - 12 \end{aligned}$$

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Complete with the appropriate number or variable.

1. $12(5 + 9) = 12 \cdot 5 + \underline{\hspace{2cm}} \cdot 9$

2. $(3 - 8)7 = \underline{\hspace{2cm}} \cdot 7 - 8 \cdot \underline{\hspace{2cm}}$

3. $z(a - b - c) = \underline{\hspace{2cm}} \cdot a - z \cdot \underline{\hspace{2cm}} - \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$

4. $[14 + (-3)]7 = 14 \cdot \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \cdot 7$

5. $p[(-3) + n] = p \cdot \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}}$

Multiply each expression.

6. $4(x + 5) = \underline{\hspace{4cm}}$

7. $(6 - m)(-4) = \underline{\hspace{4cm}}$

8. $s(-6 + t) = \underline{\hspace{4cm}}$

9. $8(j - 2k + l) = \underline{\hspace{4cm}}$

10. $(z - 4)(-5) = \underline{\hspace{4cm}}$

11. $9[(-7) - y] = \underline{\hspace{4cm}}$

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Week 2

Simplifying Variable Expressions

Simplify $5n + (-n - 4)(-2)$.

$$5n + (-n - 4)(-2)$$

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

$$= 5n + 2n + 8$$

$$= (5 + 2)n + 8$$

$$= 7n + 8$$

Use the Distributive Property.

Multiply. Think of $-4(-2)$ as $+(-4)(-2)$.

Use the Distributive Property to combine like terms.

Add.

Complete each equation.

1. $9a - 7a + 5$

$$= (9 - 7) \underline{\hspace{2cm}} + 5$$

$$= \underline{\hspace{2cm}} a + 5$$

2. $5k - 4 - 8k$

$$= 5k - 8 \underline{\hspace{2cm}} - 4$$

$$= (5 - 8) \underline{\hspace{2cm}} - 4$$

$$= \underline{\hspace{2cm}} - 4$$

Simplify each expression.

3. $12a + 4 - 10a$

$$\underline{\hspace{2cm}}$$

5. $2(n - 4) + 3$

$$\underline{\hspace{2cm}}$$

7. $5(2y + 1) - 7y$

$$\underline{\hspace{2cm}}$$

9. $8c + 5(c - 3)$

$$\underline{\hspace{2cm}}$$

11. $q(-3) + 3(2 + q)$

$$\underline{\hspace{2cm}}$$

13. $(-3)(1 - 2n) + 2(n + 4)$

$$\underline{\hspace{2cm}}$$

4. $7 + x - 7x$

$$\underline{\hspace{2cm}}$$

6. $-3(a + 5) + 9$

$$\underline{\hspace{2cm}}$$

8. $2(4 - 3t) - (-3) + 2t$

$$\underline{\hspace{2cm}}$$

10. $-2(-4 - 3s)$

$$\underline{\hspace{2cm}}$$

12. $(3 + k)(-4) - 5k$

$$\underline{\hspace{2cm}}$$

14. $9p - 3(5p + 2) + 6$

$$\underline{\hspace{2cm}}$$

Week 3**Solving Equations by Adding or Subtracting Decimals**
.....Solve the equation $n + 3.2 = -4.7$.

$$n + 3.2 = -4.7$$

$$n + 3.2 - 3.2 = -4.7 - 3.2 \quad \text{Subtract 3.2 from each side.}$$

$$n = -7.9 \quad \text{Simplify.}$$

Solve each equation.

1. $n - 17.9 = -31.05$

2. $h + (-8.5) = -0.6$

$$n = \underline{\hspace{2cm}}$$

$$h = \underline{\hspace{2cm}}$$

3. $y - 33.4 = 81.9$

4. $t + 18.5 = -41$

$$y = \underline{\hspace{2cm}}$$

5. $h + 20.4 = -15.7$

$$t = \underline{\hspace{2cm}}$$

6. $p - 1.1 = 4.4$

$$h = \underline{\hspace{2cm}}$$

7. $a + 106.7 = 62.3$

$$p = \underline{\hspace{2cm}}$$

8. $z - 241.6 = 32.7$

$$a = \underline{\hspace{2cm}}$$

$$z = \underline{\hspace{2cm}}$$

Week 3

Solving Equations by Multiplying or Dividing Decimals

Solve the equations $0.7x = -2.8$ and $\frac{x}{1.5} = 0.2$.

$$0.7x = -2.8$$

Write the equation.

$$\frac{0.7x}{0.7} = \frac{-2.8}{0.7}$$

Divide each side by 0.7.

$$x = -4$$

Simplify.

$$\frac{x}{1.5} = 0.2$$

Write the equation.

$$\frac{x}{1.5}(1.5) = 0.2(1.5)$$

Multiply each side by 1.5.

$$x = 0.3$$

Simplify.

Solve each equation.

1. $4x = -2.44$

2. $1.8x = 5.76$

$x =$ _____

3. $\frac{h}{-1.05} = -0.36$

$x =$ _____

4. $\frac{z}{-0.02} = 5.9$

$h =$ _____

5. $4.25y = 0.85$

$z =$ _____

6. $\frac{n}{-1.9} = 24.6$

$y =$ _____

7. $\frac{r}{8.04} = 1.55$

$n =$ _____

8. $11.32a = -39.62$

$r =$ _____

$a =$ _____

Week 4

Prime Factorization and Greatest Common Factor

Find the GCF of 36 and 54.

$$36 = 2^2 \cdot 3^2 = \boxed{2} \cdot \boxed{2} \cdot \boxed{3} \cdot \boxed{3} \quad \text{write the prime factorization}$$

$$54 = 2 \cdot 3^3 = \boxed{2} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3}$$

find the common factors

$$\text{GCF} = 2 \cdot 3 \cdot 3 = 2 \cdot 3^2 = 18$$

Notice 2 is the lesser power of 2^2 and 2, and 3^2 is the lesser power of 3^2 and 3^3 .

Find the GCF.

1. $50 =$ _____

2. $75 =$ _____

$35 =$ _____

$30 =$ _____

GCF = _____

GCF = _____

3. $48 =$ _____

4. $45 =$ _____

$60 =$ _____

$72 =$ _____

GCF = _____

GCF = _____

5. $98 =$ _____

6. $24 =$ _____

$42 =$ _____

$80 =$ _____

GCF = _____

GCF = _____

7. $315 =$ _____

8. $156 =$ _____

$360 =$ _____

$208 =$ _____

GCF = _____

GCF = _____

Week 5

Exponents and Multiplication

Simplify $m^3 \cdot m^4$ and $(n^2)^3$.

The base of m^3 is m and the base of m^4 is m . So, they have the same base. To multiply variables with the same base, add the exponents.

$$m^3 \cdot m^4 = m^{3+4} = m^7$$

This rule works because you are combining 3 factors of m and 4 factors of m .

$$m^3 \cdot m^4 = (m \cdot m \cdot m) \cdot (m \cdot m \cdot m \cdot m) = m^7$$

Simplifying $(n^2)^3$ involves raising a power (n^2) to a power. To find a power of a power, multiply the exponents.

$$(n^2)^3 = n^{2 \cdot 3} = n^6$$

This rule works because you are using n^2 as a factor 3 times.

$$(n^2)^3 = n^2 \cdot n^2 \cdot n^2 = (n \cdot n) \cdot (n \cdot n) \cdot (n \cdot n) = n^6$$

Simplify each expression. Show an intermediate step.

1. $4^7 \cdot 4^2 = (\underline{\hspace{2cm}}) \cdot (\underline{\hspace{2cm}}) = \underline{\hspace{2cm}}$

2. $a^3 \cdot a^6 = (\underline{\hspace{2cm}}) \cdot (\underline{\hspace{2cm}}) = \underline{\hspace{2cm}}$

3. $3x^2 \cdot 4x^5 = (\underline{\hspace{2cm}}) \cdot (\underline{\hspace{2cm}}) = \underline{\hspace{2cm}}$

4. $3^4 \cdot 3^3 = (\underline{\hspace{2cm}}) \cdot (\underline{\hspace{2cm}}) = \underline{\hspace{2cm}}$

5. $y^5 \cdot y^3 = (\underline{\hspace{2cm}}) \cdot (\underline{\hspace{2cm}}) = \underline{\hspace{2cm}}$

6. $7r^4 \cdot 3r^2 = (\underline{\hspace{2cm}}) \cdot (\underline{\hspace{2cm}}) = \underline{\hspace{2cm}}$

7. $(5^3)^4 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

8. $(h^2)^5 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

9. $(m^4)^8 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

10. $(x^3y^2)^3 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

11. $(2s^4t^5)^4 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

12. $(-pqr^2)^3 = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

Week 6

Powers of Products and Quotients

Simplify $(\frac{x^3}{-y^2})^5$.

$$(\frac{x^3}{-y^2})^5 = \frac{(x^3)^5}{(-y^2)^5}$$

$$= \frac{x^{15}}{(-1)^5(y^2)^5}$$

$$= \frac{x^{15}}{y^{10}}$$

Raise both the numerator and the denominator to the power of 5.

Multiply exponents in the numerator.
Raise each factor to the power of 5 in the denominator.

Multiply exponents and simplify.

Simplify each expression.

1. $(2 \cdot 5)^4$ _____

2. $(-3 \cdot 2)^3$ _____

3. $(4x)^2$ _____

4. $(a^2b)^5$ _____

5. $(3ab^3)^2$ _____

6. $-(5m^2n^3)^3$ _____

7. $(\frac{2}{9})^2$ _____

8. $(-\frac{7}{8})^2$ _____

9. $(-\frac{3}{10})^3$ _____

10. $(\frac{4}{x^4})^2$ _____

11. $(\frac{3x}{5})^3$ _____

12. $(-\frac{a^2}{b^5})^4$ _____

13. $(\frac{xy^2}{2z^3})^5$ _____

14. $(\frac{-1}{2n^3})^4$ _____

15. $(\frac{-2r^3s}{3t^2})^2$ _____

16. $(\frac{-3}{a^2bc^2})^3$ _____

17. $(p^4q^3r^2)^3$ _____

18. $(\frac{x^2yz^3}{-2})^4$ _____

19. $(\frac{5}{j^3k})^2$ _____

20. $(\frac{ac^4}{4b})^3$ _____

Week 7

Proportions

Solve $\frac{x}{6} = \frac{10}{4}$

Method 1: Multiplication
Property of Equality

$$\frac{x}{6} = \frac{10}{4}$$

$$\frac{x}{6} \cdot 6 = \frac{10}{4} \cdot 6 \quad \text{Multiply each side by 6.}$$

$$x = \frac{60}{4} \quad \text{Simplify.}$$

$$x = 15$$

Method 2: cross products

$$\frac{x}{6} \times \frac{10}{4}$$

$$4x = 60 \quad \text{Find the cross products.}$$

$$\frac{4x}{4} = \frac{60}{4} \quad \text{Divide each side by 4.}$$

$$x = 15 \quad \text{Simplify.}$$

Solve each proportion. When necessary, round to the nearest hundredth.

1. $\frac{6}{p} = \frac{18}{42}$

2. $\frac{12}{21} = \frac{x}{14}$

3. $\frac{y}{9} = \frac{26}{6}$

4. $\frac{x}{9} = \frac{7}{12}$

5. $\frac{63}{t} = \frac{14}{16}$

6. $\frac{28}{15} = \frac{y}{25}$

7. $\frac{7}{20} = \frac{e}{70}$

8. $\frac{8}{3} = \frac{40}{k}$

9. $\frac{m}{54} = \frac{5}{12}$

10. $\frac{8}{w} = \frac{5}{24}$

11. $\frac{63}{18} = \frac{14}{z}$

12. $\frac{a}{70} = \frac{2}{5}$

13. $\frac{5}{13} = \frac{20}{r}$

14. $\frac{6}{t} = \frac{7}{56}$

15. $\frac{c}{21} = \frac{6}{20}$

16. $\frac{10}{e} = \frac{15}{27}$

Week 7

Probability

Suppose you select a letter at random from the words MIDDLE SCHOOL. Find $P(L)$ and $P(\text{not } L)$.

First determine the number of possible outcomes. There are 12 letters in the two words, so there are 12 possible outcomes when you select a letter at random. Next determine the number of favorable outcomes for $P(L)$. There are two L's.

$$\text{Thus, } P(L) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}} = \frac{2}{12} = \frac{1}{6}$$

You can find $P(\text{not } L)$ several ways. Since there are 12 possible outcomes and 2 are L, $12 - 2 = 10$ are not L.

$$\text{Thus, } P(\text{not } L) = \frac{\text{number of favorable outcomes}}{\text{number of possible outcomes}} = \frac{10}{12} = \frac{5}{6}$$

$$\begin{aligned}\text{Also } P(\text{not } L) &= 1 - P(L) \\ &= 1 - \frac{1}{6} = \frac{5}{6}\end{aligned}$$

A drawer contains 6 red socks, 4 blue socks, and 14 white socks. A sock is pulled from the drawer at random. Find the probability for each case.

- | | |
|-----------------------------------|--|
| 1. $P(\text{red})$ _____ | 2. $P(\text{blue})$ _____ |
| 3. $P(\text{red or white})$ _____ | 4. $P(\text{red, white, or blue})$ _____ |
| 5. $P(\text{not red})$ _____ | 6. $P(\text{green})$ _____ |

Suppose you spin a spinner that is equally likely to land on any one of the numbers from 1 to 20. Find the probability for each event.

- | | |
|--|---|
| 7. $P(17)$
_____ | 8. $P(\text{an odd number})$
_____ |
| 9. $P(\text{a number divisible by 5})$
_____ | 10. $P(26)$
_____ |
| 11. $P(\text{a number with a 1 in it})$
_____ | 12. $P(\text{a prime number})$
_____ |
| 13. $P(\text{a number less than 6})$
_____ | 14. $P(\text{a number})$
_____ |
| 15. $P(\text{a number that is not less than 17})$
_____ | 16. $P(\text{a number divisible by 3 or 4})$
_____ |

Week 8

Solving Two-Step Equations

Solve $\frac{k}{5} - 9 = -7$.

$$\frac{k}{5} - 9 = -7$$

$$\frac{k}{5} - 9 + 9 = -7 + 9$$

Add 9 to each side.

$$\frac{k}{5} = 2$$

Simplify.

$$\frac{k}{5} \cdot 5 = 2 \cdot 5$$

Multiply each side by 5.

$$k = 10$$

Simplify.

Complete the example.

1. $4n + 13 = 1$

Subtract 13 from each side.

Simplify.

Divide each side by 4.

Simplify.

Solve each equation.

2. $3x - 5 = 10$ $x =$ _____

3. $\frac{n}{2} + 10 = 7$ $n =$ _____

4. $\frac{m}{7} - 9 = -5$ $m =$ _____

5. $5w - 2 = -12$ $w =$ _____

6. $4a + 12 = -8$ $a =$ _____

7. $\frac{b}{3} + 8 = -7$ $b =$ _____

Week 8

Multi-Step Equations With Fractions and Decimals

Solve $0.25x - 0.4 = 1.6$

You can clear the decimals first. Since 0.25 is the decimal with the greatest number of decimal places and $0.25 = \frac{25}{100}$, multiply each side by 100.

$$0.25x - 0.4 = 1.6$$

$$100(0.25x - 0.4) = 100(1.6)$$

$$25x - 40 = 160$$

$$25x - 40 + 40 = 160 + 40$$

$$25x = 200$$

$$\frac{25x}{25} = \frac{200}{25}$$

$$x = 8$$

Multiply each side by 100.

Distribute and simplify.

Add 40 to each side.

Simplify.

Divide each side by 25.

Simplify.

Solve each equation.

1. $0.8x + 2.1 = 5.3$

2. $0.5k - 3.4 = 0.1$

$x = \underline{\hspace{2cm}}$

3. $2.7n + 4.1 = 36.5$

$k = \underline{\hspace{2cm}}$

4. $0.96m - 1.8m = -12.6$

$n = \underline{\hspace{2cm}}$

5. $0.7b + 6 - 0.3b = 6.8$

$m = \underline{\hspace{2cm}}$

6. $1.4a + 3.5a - 4.3 = 44.7$

$b = \underline{\hspace{2cm}}$

$a = \underline{\hspace{2cm}}$

Week 9**Simple and Compound Interest**

Find the balance in an account when \$500 is deposited at 4% interest compounded semi-annually for 2 years.

The table shows the interest and balance for each half year.

Principal at Beginning of Period	Interest	Balance
$\frac{1}{2}$ year: \$500		
1 year:		
$1\frac{1}{2}$ year:		
2 year:		

The balance after 2 years is \$541.21.

You can also find the balance with the formula $B = p(1 + r)^n$, where B is the ending balance. The principal p is 500. The rate is for a half year; 4% annual interest equals 2% per half year. Thus r is 0.02. The number of compounding periods n is 4, because there are 4 half years in 2 years.

$$B = p(1 + r)^n$$

$$B = 500(1 + 0.02)^4 \text{ Substitute.}$$

$$B = \$541.22 \quad \text{Use a calculator. Round to the nearest cent.}$$

With the formula, the ending balance is \$541.22. The difference is due to rounding error.

Find the ending balance when \$1,500 is deposited at 6% interest compounded semi-annually for 2 years.

1. Use a table.

Principal at Beginning of Period	Interest	Balance
$\frac{1}{2}$ year: \$1,500		
1 year:		
$1\frac{1}{2}$ year:		
2 year:		

2. Use the formula:

$$B = p(1 + r)^n = \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Week 10

Fractions, Decimals, and Percents

Write $\frac{7}{8}$ as a percent and 64% as a fraction in lowest terms.

Divide $7 \div 8$.

$$\begin{array}{r} 0.875 \\ 8 \overline{)7.000} \\ \underline{64} \\ 60 \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

$$\frac{7}{8} = 0.875$$

$$0.875 = 87.5\%$$

$$\text{Thus } \frac{7}{8} = 87.5\%.$$

64% means 64 parts per 100.

$$\begin{aligned} 64\% &= \frac{64}{100} \\ &= \frac{2^4}{2^2 \cdot 5^2} \\ &= \frac{16}{25} \end{aligned}$$

$$\text{Thus } 64\% = \frac{16}{25}.$$

Write each fraction as a percent.

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

2. $\frac{3}{5}$ _____

3. $\frac{11}{20}$ _____

4. $\frac{17}{25}$ _____

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

6. $\frac{39}{100}$ _____

7. $\frac{1}{20}$ _____

8. $\frac{13}{50}$ _____

9. $\frac{5}{8}$ _____

10. $\frac{3}{16}$ _____

Write each percent as a fraction in simplest terms.

11. 15% _____

12. 12.5% _____

13. 76% _____

14. 14% _____

15. 60% _____

16. 97% _____

17. 25% _____

18. 30% _____

19. 82% _____

20. 68.75% _____