



Students,

This summer learning packet is designed to keep your skills sharp and your minds active during the summer break!

It includes activities and challenges to help you review things you have already learned plus a few challenges to prepare for material we will be learning during the next school year.

The packet should be approached with a positive mindset. Complete a little bit at a time to review the concepts and build some new skills to build your confidence for the upcoming year.

For students really wanting to excel next year, in addition to this packet, a Khan Math 1 class is available that covers all the content that we will be covering in Math 1

Class Name: Quail Hollow Middle School Summer Prep for Math 1

Join by going to bit.ly/qhm1summer

Take the Summer Challenge !

Everything you learn over the summer will position you for success in your first High School math class !

We appreciate your hard work and dedication throughout the year.

We hope you have a fantastic summer filled with LEARNING AND FUN !

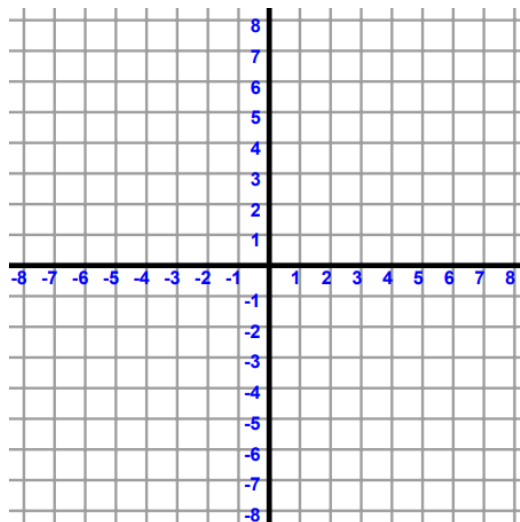
1 Plot and label each ordered pair on the coordinate plane

A. (1, 2) B. (4, -3)

C. (-1, -5) D. (-2, 0)

E. (0, 5) F. (-3, 6)

(Check answer at end of packet.)



2. Name the coordinates of the points on the graph.

A (____, ____) B (____, ____)

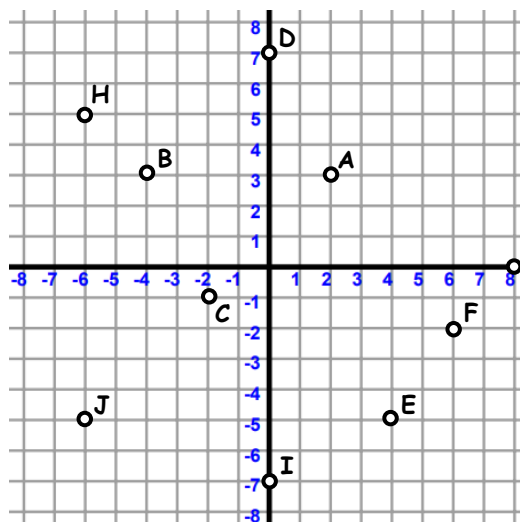
C (____, ____) D (____, ____)

E (____, ____) F (____, ____)

G (____, ____) H (____, ____)

I (____, ____) J (____, ____)

(Check answer at end of packet.)



3. Operations with Integers

Adding: if signs are the same, then add the numbers and keep the sign

if signs are mixed, subtract numbers and keep sign of larger number

Subtracting: keep first number, change subtraction to addition, change sign of second number and then follow rules for addition

Multiplying and Dividing: if signs are the same, then product or quotient is positive

if signs are mixed, then product or quotient is negative

A) $-3 + 7 =$ _____

B) $4 - 6 =$ _____

C) $-1 - 5 =$ _____

D) $3 - (-2) =$ _____

E) $5 + (-9) =$ _____

F) $12 - 3 =$ _____

G) $(4)(-2) =$ _____

H) $-3(-5) =$ _____

I) $7 \cdot 2 =$ _____

J) $-9 \cdot 5 =$ _____

K) $-16 \div 8 =$ _____

L) $-90 \div -9 =$ _____

M) $\frac{54}{6} =$ _____

N) $\frac{64}{-8} =$ _____

P) $\frac{-121}{-11} =$ _____

(Check answer at end of packet.)

4 Order of Operations

To simplify expressions with more than one operation, follow PEMDAS: Parenthesis, Exponents, Multiplication, Division, Addition, Subtraction. Remember to perform operations from left to right when there is more than one multiplication / division or addition / subtraction.

A) $2(-3) + 7 =$ _____

B) $4(6) - 3(5) =$ _____

C) $(2 - 5)^2 =$ _____

D) $-2(4 - 2)^3 =$ _____

E) $\frac{4 - 10}{-2} =$ _____

F) $\frac{3(5) + 17}{(-8)^2} =$ _____

(Check answer at end of packet.)

5. Evaluating Algebraic Expressions

A variable is a letter that represents a number. When there is an algebraic expression, we can determine that value of the expression if we know what the variables represent. For each of the following, plug-in the values of the variables and determine value of expression.

Let $x = 3$, $y = -4$, $z = 2$ in each of the following:

A) $2y =$ _____

B) $(x - z)^2 =$ _____

C) $xz - y =$ _____

D) $(3z)^3 =$ _____

E) $7y^2 =$ _____

F) $\frac{y - z}{x} =$ _____

G) $2x - 3 =$ _____

H) $xyz =$ _____

(Check answer at end of packet.)

6 Solving One Step Equations

$$x + 2 = 6$$

When you are asked to solve an equation, the goal is to isolate the variable using inverse operations. Watch the example solution (at bit.ly/qhm1summerA), write down the steps and then follow the process for solving remaining examples.

1) $26 = 8 + v$	2) $3 + p = 8$	3) $15 + b = 23$
4) $-15 + n = -9$	5) $m + 4 = -12$	6) $x - 7 = 13$
7) $m - 9 = -13$	8) $p - 6 = -5$	9) $v - 15 = -27$
10) $n + 16 = 9$	11) $-104 = 8x$	12) $14b = -56$
13) $-6 = \frac{b}{18}$	14) $10n = 40$	After completing the examples watch the solutions at bit.ly/qhm1summerB

7 Solving Two Step Equations

$$2x + 3 = 5$$

When you are asked to solve an equation, the goal is to isolate the variable using inverse operations. Watch the example solution (at bit.ly/qhm1summerC), write down the steps and then follow the process for solving remaining examples.

1) $6 = \frac{a}{4} + 2$	2) $-6 + \frac{x}{4} = -5$	3) $9x - 7 = -7$
4) $0 = 4 + \frac{n}{5}$	5) $-4 = \frac{r}{20} - 5$	6) $-1 = \frac{5+x}{6}$
7) $\frac{v+9}{3} = 8$	8) $2(n+5) = -2$	9) $-9x + 1 = -80$
10) $-6 = \frac{n}{2} - 10$	11) $-2 = 2 + \frac{v}{4}$	12) $144 = -12(x+5)$

After completing the examples watch the solutions at bit.ly/qhm1summerD

8 Solving Multi Step Equations

$$3(1 - 2x) = -9$$

When you are asked to solve an equation, the goal is to isolate the variable using inverse operations. Watch the example solution (at bit.ly/qhm1summerE), write down the steps and then follow the process for solving remaining examples.

1) $-20 = -4x - 6x$	2) $6 = 1 - 2n + 5$	3) $8x - 2 = -9 + 7x$
4) $a + 5 = -5a + 5$	5) $4m - 4 = 4m$	6) $p - 1 = 5p + 3p - 8$
7) $5p - 14 = 8p + 4$		After completing the examples watch the solutions at bit.ly/qhm1summerF

8 Solving Multi Step Equations

8) $p - 4 = -9 + p$	9) $-8 = -(x + 4)$	10) $12 = -4(-6 - 3)$
11) $14 = -(p - 8)$	12) $-(7 - 4x) = 9$	13) $-18 - 6k = 6(1 + 3k)$
14) $5n + 34 = -2(1 - 7n)$	After completing the examples watch the solutions at bit.ly/qhm1summerH	

8 Solving Multi Step Equations

15) $2(4x - 3) - 8 = 4 + 2x$	16) $3n - 5 = -8(6 + 5n)$	17) $-(1 + 7x) - 6(-7 - x) = 36$
18) $-3(4x + 3) + 4(6x + 1) = 43$	19) $24a - 22 = -4(1 - 6a)$	20) $-5(1 - 5x) + 5(-8x - 2) = -4x - 8x$

After completing the examples watch the solutions at bit.ly/qhm1summerJ

9 Exponents

Multiplication is a way to express repeated addition of numbers or variables

$$3 \cdot 4 = 3 + 3 + 3 + 3$$

$$5x = x + x + x + x + x$$

Exponents is a way to express repeated multiplication

$$3^4 = 3 \cdot 3 \cdot 3 \cdot 3$$

$$x^5 = x \cdot x \cdot x \cdot x \cdot x$$

Rewrite each of the following exponential expressions into Expanded Form

1) $5^7 =$ <u>$5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5$</u>	2) $2^8 =$ _____
3) $x^3 =$ _____	4) $x^7 =$ _____
5) $(2x)^4 =$ _____	6) $(2x^2)^3 =$ _____

Rewrite each of the following expressions into Exponential Form

7) $2 \cdot 2 \cdot 2 =$ <u>2^3</u>	8) $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 =$ _____
9) $x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x =$ _____	10) $z \cdot z \cdot z \cdot z \cdot z =$ _____
11) $(3x) \cdot (3x) \cdot (3x) =$ _____	12) $(5x^2) \cdot (5x^2) =$ _____

We can simplify more complex expressions by expanding - examine each example

13) $2x^3 \cdot 3x^4 =$ <u>$2 \cdot 3 \cdot (x \cdot x \cdot x) \cdot (x \cdot x \cdot x \cdot x) = 6x^7$</u>
14) $(3x^2)^3 =$ <u>$(3 \cdot x \cdot x) \cdot (3 \cdot x \cdot x) \cdot (3 \cdot x \cdot x) = 3 \cdot 3 \cdot 3 \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x = 27x^6$</u>
15) $\frac{8x^8}{2x^3} =$ <u>$\frac{8 \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot x \cdot x \cdot x \cdot x}{2 \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = 4x^5$</u>
16) $(2x^3)^4 =$ <u>$(2 \cdot x \cdot x \cdot x) \cdot (2 \cdot x \cdot x \cdot x) \cdot (2 \cdot x \cdot x \cdot x) \cdot (2 \cdot x \cdot x \cdot x) = 16x^{14}$</u>

(Check answer at end of packet.)

10 Laws of Exponents

There are rules called Laws of Exponents that you can follow to avoid the need to expanding each exponential expression. Watch each video and simplify exploring why each rule works.

Multiplying Exponential Expressions with the Same Base: bit.ly/qhm1summerK

Keep the base the same and add the exponents

$$x^a \cdot x^b = x^{a+b}$$

Examples

$$x^2 \cdot x^3 =$$

$$5^7 \cdot 5^3 =$$

Power of a Power: bit.ly/qhm1summerL

Keep the base the same and multiply the exponents

$$(x^a)^b = x^{a \cdot b}$$

Examples

$$(x^2)^3 =$$

$$(2^2)^4 =$$

Dividing Exponents with the Same Base: bit.ly/qhm1summerL

Keep the base the same and subtract the exponents

$$\frac{x^a}{x^b} = x^{a-b}$$

Examples

$$\frac{x^5}{x^3}$$

$$\frac{4^7}{4^2}$$

$$\frac{2^3}{2^8}$$

Exponents with Zero Power: bit.ly/qhm1summerN

Any base raised to the zero power = 1

$$x^0 = 1$$

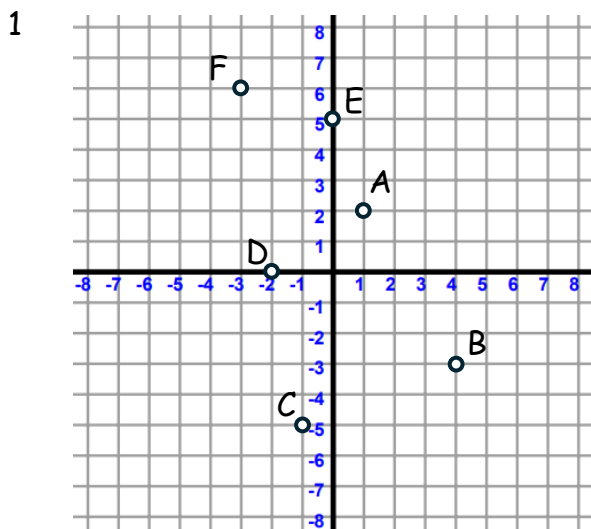
Examples

$$a^0$$

$$3^0$$

$$4^0$$

Answers



- 2.
- | | |
|------------|------------|
| A (2, 3) | B (-4, 3) |
| C (-2, -1) | D (0, 7) |
| E (4, -5) | F (6, -2) |
| G (8, 0) | H (-6, 5) |
| I (0, -7) | J (-6, -5) |

- 3.
- | | | |
|---------|--------|---------|
| A) + 4 | B) - 2 | C) - 6 |
| D) + 5 | E) - 4 | F) + 9 |
| G) - 8 | H) - 8 | I) + 14 |
| J) - 45 | K) - 2 | L) + 10 |
| M) + 9 | N) - 8 | P) + 11 |

- 4.
- | | | |
|---------|--------|--------------------|
| A) + 1 | B) + 9 | C) + 9 |
| D) - 16 | E) + 3 | F) + $\frac{1}{2}$ |

- 5.
- | | | |
|----------|----------|---------|
| A) - 8 | B) + 1 | C) + 10 |
| D) + 216 | E) + 112 | F) - 2 |
| G) + 3 | H) - 24 | F) - 2 |

6. bit.ly/qhm1summerB

7. bit.ly/qhm1summerD

8. Questions 1 - 7: bit.ly/qhm1summerF

Questions 8 - 14: bit.ly/qhm1summerH

Questions 15 - 20: bit.ly/qhm1summer

- | | | |
|---|------------------------|--|
| 9. 2) $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$ | 3) $x \cdot x \cdot x$ | 4) $x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$ |
| 5) $16 \cdot x^4$ | 6) $8x^6$ | |
| 8) 7^5 | 9) x^8 | 10) z^5 |
| 11) $(3x)^3 = 27x^3$ | 12) $(5x^2)^2 = 25x^4$ | |