

St. Louis School
2024 Summer Math
Entering 8th Grade
Math 8

All students in middle school are required to complete summer math work. This year, to reinforce learning during the summer and promote growth, students will be using IXL online in addition to worksheets for math practice.

- I. **IXL** – Each class has specifically assigned skills in IXL. IXL is an online program geared toward fluency practice. Students simply access the list of skills created by their teacher and click on a link to select an assigned skill. The link will take students to the skill where they login to begin. Students will use their St. Louis account to log on as they have done all school year. [Link to IXL](#)

Students should pace themselves by completing five concepts each month at a level of 80% proficiency (five by June 26, an additional five by July 28, and five more by August 23). Teachers will be monitoring students' progress throughout the summer. Failure to complete the suggested skills will result in a lower effort grade.

Please contact Mrs. Zulma Whiteford at zwhiteford@stlouisparish.org if you have any questions or concerns about IXL.

- II. **Worksheets** – Scroll down to print the worksheets.
- **Show all work either on the worksheet or on looseleaf** in order to receive credit. Answers alone without supporting work will not receive credit.
 - The looseleaf **MUST** include the student's name and be attached to the packet.
 - Make sure to number the problems clearly. Work should be neat and organized.
 - Class notes may be used for reference.

Complete some problems each week. Do not wait until the end of summer to complete the packet. This will allow you to maintain and improve your skills and help you to be successful next year.

All work should be **completed and turned in during the first week of school**. This packet will count as a **15-point assignment with five points awarded per trimester**.

Name _____ Date _____

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Powers and Exponents:

Ex. $7 \times 7 \times 7 = 7^3$ $5 \times 5 =$ $3 \times 3 \times 3 \times 3 =$ $4 \times 4 \times 4 \times 4 \times 4 \times 4 =$

Evaluate numbers using exponents:

$x^2 + y^3$ if $x = 6$ and $y = -2$ $x^3 + 2$ $3(x - 1)^2$

Prime Factorization:

$$\begin{array}{c} 36 \\ / \backslash \\ 6 \times 6 \\ / \backslash \ / \backslash \\ 2 \times 3 \ 2 \times 3 \end{array}$$

The prime factorization of 36 then is $2 \times 2 \times 3 \times 3$.

Use prime factorization for the following:

30

24

Factor monomials:

$18r^2s$ can be factored as $2 \cdot 3 \cdot 3 \cdot r \cdot r \cdot s$. $-18r^2s$ can be factored as $-1 \cdot 2 \cdot 3 \cdot 3 \cdot r \cdot r \cdot s$

Factor the following monomials:

$10xy$

$12x^2r^2$

$-18mn^3$

$14a^3$

$-6a^4b^2$

Multiply Monomials:

EX. $10^1 \cdot 10^3 = (10) \cdot (10 \cdot 10 \cdot 10) = 10^4$

$a^m \cdot a^n = a^{m+n}$

$2^4 \cdot 2^3 = 2^7$

$4^3 \cdot 4^4 = 4^7$

$6 \cdot 6^7 = 6^8$

Multiply the monomials:

$5^2 \cdot 5^5 =$

$7^3 \cdot 7^5 =$

$10^2 \cdot 10 =$

$12^6 \cdot 12^6 =$

When we add a coefficient in front of the variables, we would simply multiply the coefficients, then multiply the powers with the same base by adding their exponents.

EX. $2a^m \cdot 4a^n = 8a^{m+n}$ $2a^4 \cdot 5a^3 = 10a^7$ $4x^3 \cdot 7x^4 = 28x^7$ $6y \cdot 6y^7 = 36y^8$

Multiply the Monomials:

$5a^3 \cdot 6a^5 =$

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

$9c^2 \cdot 10c^4 =$

$8m^6 \cdot 10m^9 =$

$(5a^2)(-3a^7) =$

$(-2j^3)(-3j^7) =$

$(4a^2)(3a^7) =$

$(-5a^3)(9a^7) =$

Dividing Monomials

EX. $a^m \div a^n = a^{m-n}$ $3^6 \div 3^2 = 3^4$

$\frac{4^5}{4^2}$ expand using factors

Divide the Monomials:

$8^5 \div 8^3 =$ $c^7 \div c^2 =$ $\frac{3^9}{3^2} =$ $\frac{x^7}{x^6} =$ $(-n)^6 \div (-n)^4 =$

Evaluate each expression if $x = 2$, $a = 3$, and $b = 2$.

$11x^4$ a^3b^3

Find each product or quotient.

$-g(2g^6)$ $\frac{a^{11}}{a^3}$ $5a^3 \cdot (-3a^7)$ $j^4 \div j^3$

Negative Exponents

$\frac{4^2}{4^5}$ Expand using factors, then use the quotient of powers rule.

Never leave an answer with a negative exponent.

$6^6 \div 6^8 = 6^{-2}$ Since the exponent is negative, change the answer to $1/6^2$ because the answer is fractional since it is below one.

Write each expression using a positive exponent.

$8^3 \div 8^6 =$ $c^3 \div c^7 =$ $\frac{3^3}{3^6} =$ $\frac{x^4}{x^7} =$ $(-n)^5 \div (-n)^9 =$

Write each expression using a positive exponent.

11^{-6}

6^{-2}

$(-2)^{-3}$

x^{-5}

b^{-7}

$(-4)^{-5}$

Scientific Notation:

standard form - numbers that do not contain exponents, ex. 12,760,000 or 0.0987

scientific notation - a number written as a product of a factor and a power of 10. The factor must be greater than or equal to 1 and less than 10.

Express each number in standard form:

2×10^3

6.8×10^5

3.25×10^{-4}

4×10^2

5.94×10^7

1.3×10^{-3}

Express each number in scientific notation.

$4,000,000$

5800

0.072

900

$18,900$

0.000064

Order the set from least to greatest.

$3.4 \times 10^2, 3.5 \times 10^2, 3.7 \times 10^{-2}, 400$

$6.5 \times 10^3, 6.12 \times 10^5, 6.01 \times 10^4, 6.1 \times 10^{-2}$

Powers of Monomials

power of a power property - to find the power of a power, multiply exponents

$$\begin{aligned}
 (4^2)^5 &= (4^2)(4^2)(4^2)(4^2)(4^2) \\
 &= 4^{2+2+2+2+2} \text{ (powers of products property)} \\
 &= 4^{10}
 \end{aligned}$$

$(9^6)^2$

$(x^4)^5$

$(4^3)^7$

$(p^4)^4$

$(x^2)^5$

$(5^2)^7$

$(2^3)^{-2}$

$(4^2)^{-4}$

power of a product property - to find the power of a product, find the power of each factor and multiply

$$\begin{aligned}
 (2x^3)^5 &= (2x^3)(2x^3)(2x^3)(2x^3)(2x^3) \text{ (power of a power)} \\
 &= 2^5 \cdot (x^3)(x^3)(x^3)(x^3)(x^3) \text{ (product of a power)} \\
 &= 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot x^{3+3+3+3+3} \\
 &= 32x^{15}
 \end{aligned}$$

Simplify.

$(6^2)^4$

$(a^5)^5$

$(r^6)^{-2}$

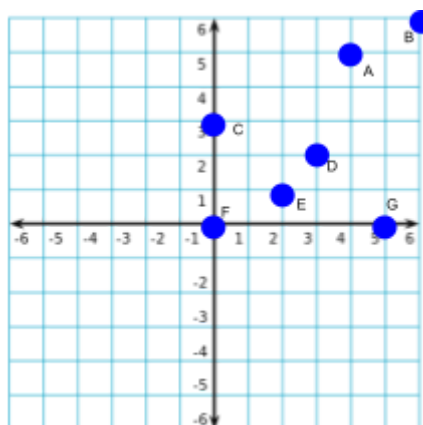
$(3x^4)^3$

$(4m^2n)^2$

$(-2f^3g^4)^2$

$(2^6)^2$

$(x^6)^{-3}$



Functions:

Write the ordered pair that names each point.

A (,) E (,)

B (,) F (,)

C (,) G (,)

Plot each pair of points: H (0, 6) I (2, 4) and J (3, 6) using the same graph.

domain - the set of x-coordinates

range - the set of y-coordinates

Express the relation $\{ (0,2), (1,4), (2,5), (3,8) \}$ as a table, then state the domain and range.

table

| | | | | |
|---|--|--|--|--|
| x | | | | |
| y | | | | |

domain: _____

range: _____

Simplify Algebraic Expressions:

$4(x + 5)$

$(y + 10)6$

$2(a + 5)$

$-9(n - 3)$

$-4(x + 2)$

Sarah charges \$6 per hour to babysit. She babysat for 3 hours on Friday, and 5 hours on Saturday. Write an expression for her total wages, then find how much money she earned.

Solving Equations by Adding and Subtracting and Check your work

$x - 7 = -4$

Check:

$x + 4 = -3$

Check:

$23 = y - 10$

$a + 5.7 = 9.2$

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

$$d - \frac{1}{3} = \frac{1}{6}$$

Solving Equations by Multiplying or Dividing:

$$5c = 25$$

$$7x = 63$$

$$4x = -24$$

$$4x = 12$$

$$-121 = -11x$$

$$3m = -9$$

$$\frac{x}{4} = -8$$

$$7 = \frac{x}{-2}$$

$$\frac{y}{6} = 12$$

$$\frac{-3x}{5} = 6$$

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

$$0.3x = 4.5$$

Solving Two-Step Equations

Steve is planning a hot air balloon ride. The cost of the ride is \$125 plus \$50 for each hour in the air. The equation $c = 50h + 125$ represents the total cost c to ride a hot air balloon for h hours.

Write an equation to represent the problem.

Find the total cost if Steve rides for 2 hours.

How long could Steve ride if he had \$325?

Solve Two-Step Equations:

$3a + 9 = 33$ check:

$6x + 1 = 25$ check:

$\frac{x}{5} - 12 = 20$ check:

$9 - x = -34$ check:

Translate the following into an equation:

Zack has 6 shirts. This is 4 less than twice the number of shirts n that Alex has.

Eight more than the quotient of a number y and -3 is -24 .

Joe has 13 cards, which is 7 more than 3 times the number that Mike has.

Percent proportion - one ratio compares part of a quantity to a whole quantity

part = **percent** (percent is always written as a fraction)
whole 100
(of number)

12 is what percent of 32?

15 is what percent of 20?

What number is 15.5% of 450?

78 is 60% of what number?

Percent Equations:

62% of 75? Think, 62% is .62 as a decimal and “of” means multiply. So, $.62 \times 75 = ?$

287 is what percent of 410? Think, “is” means equal, “what percent” is the unknown, or x , and “of” means multiply. So, $287 = x410$, but we don’t write x in front of a number, so it becomes $410x$. Solve like you would an equation.

So, if $287 = 410x$, you would divide each side by 410 to find x . Because it asks for a percent, you would change the answer to percent by multiplying by 100.

33 is 55% of what number? Think, 55% is .55, and “of what number” means multiply by n. So, $33 = .55n$

Solve:

60% of 96?

45% of 70?

15 is what percent of 25?

Estimate:

18 is 30% of what number?

79 is 80% of what number?

How many degrees are in any given triangle? _____

How many degrees are in a straight line? _____

List all perfect squares from one to thirteen.