

Mathematics Summer Review Packet

(Optional)

For ALL Students Entering Integrated Math I CP

Fall 2023



Medford Public Schools

Department of Mathematics

Medford Public Schools

489 Winthrop Street, Medford, Massachusetts 02155



Faiza I Khan

fkhan@medford.k12.ma.us

Director of Mathematics K - 12

781-393-2214

June 8th, 2023

Dear Student/Parent/Guardian:

Welcome to your Summer Mathematics Review Packet. To help students meet with success in Integrated Math I, students are provided with a packet of math problems that include topics that have been studied in middle school. In today's environment of rigorous academic standards with the newly implemented Common Core, students need to have an understanding of core topics to progress and move forward in their mathematical learning. This **OPTIONAL** packet is intended to help students retain some basic skills they have learned as well as help them gain some new skills; it is designed to help students transition to High School Mathematics.

If students need to review *how* to complete the work, there are excellent, easy-to-understand tutorials online. Most of the tutorials are under 10 minutes long. The references to different sites are given as one progresses through the packet. The site www.khanacademy.org is very popular with many topics. It can be scrolled down and clicked on **OR** can be searched using the box "*search for video or topic.*" Enter the topic students are working on for the day, and they will get a list of video tutorials. Watch as many as students need to help them complete the packet problems. There is also an opportunity to ask questions and get some online feedback. Students will find useful information there if time is taken to read the information.

The packet has nine sections. It is suggested that students work on the packet at least one section per week throughout the summer. At this rate, the packet will be completed in time for the start of school.

All work (all steps to each problem, including Calculator work) should be neatly shown on the packet or on a separate sheet of paper to be turned in with the packet. If work is done on separate paper, students should label their work and include the section and the problem number.

Good luck as you transition to high school.

Sincerely,

Faiza Khan

Director of Mathematics

Medford Public Schools

Name: _____

Order of Operations

Need a refresher? Order of Operations Video:

https://www.khanacademy.org/math/arithmetic/order-of-operations/order_of_operations/v/order-of-operations

PEMDAS

Part 1: Determine which step to perform first. The first example has been done for you.

a) $14 + 7 \cdot 40 \div 8 - 7$ $7 \cdot 40$ because it is the first multiplication when reading left to right.	b) $50 \div 5 + (7 \cdot 2) \cdot 9 + 4$	c) $(11 - 5) \cdot 2 + 7 + 36 - 9$
d) $6^2 - 20 \div (2^3 - 3) + 1$	e) $4^2 - 5 \div 12$	f) $ 4 - 6 + 2 \cdot 5$

Part 2: Simplify each expression. The first problem has been done for you.

$(34 - 4) \div 3 - 6^2$ $30 \div 3 - 6^2$ $30 \div 3 - 36$ $10 - 36$ 26	g) $(2 + 2)^2 + (12 \div 6)$	h) $(96 - 6^2) \div (9 + 6)$
i) $17 - (19 - 3^2)^2 \div 4$	j) $12 - -3 - 5 \cdot -2$	k) $5 \cdot (3^2 - 7)$
l) $(2 \cdot 6 - 8^2) - 10$	m) $(65 - 5^2) \div (15 + 5)$	n) $4 \cdot (12 + 4) + 5^2$

Order of Operations Extra Practice:

https://www.khanacademy.org/math/arithmetic/order-of-operations/order_of_operations/e/order_of_operations_2

https://www.khanacademy.org/math/arithmetic/order-of-operations/order_of_operations/e/order_of_operations

https://www.khanacademy.org/math/arithmetic/order-of-operations/order_of_operations/e/order_of_operations

Part 3: Operations with Integers – Simplify the following expressions. Use the number line if needed. The first problem has been done for you.

Operations with Integers Extra Practice:

<http://cdn.kutasoftware.com/Worksheets/PreAlg/Dividing%20Integers.pdf>

<http://cdn.kutasoftware.com/Worksheets/PreAlg/Multiplying%20Integers.pdf>

<http://cdn.kutasoftware.com/Worksheets/PreAlg/Dividing%20Integers.pdf>

RULES FOR INTEGERS (SIGNED NUMBERS)	
ADDITION	SUBTRACTION
$+$ and $+$ = $+$	ADD THE OPPOSITE! (Change the subtraction sign to an addition sign. Change the sign of the second number. Now follow the Addition rules!)
$-$ and $-$ = $-$	
$+$ and $-$ = $+$	
$-$ and $+$ = $-$	
MULTIPLICATION AND DIVISION	
$+$ and $+$ = $+$	$+$ and $-$ = $-$
$-$ and $-$ = $+$	$-$ and $+$ = $-$

a) $8 + (-6) = 2$ 	b) $-45 \div (-9) = 5$	c) $(-11) - (-8) =$
d) $12 + (-6) =$ 	e) $14 - (-1) =$ 	f) $(-5) + (-14) =$
g) $1 - 8 =$ 	h) $-8 - 6 =$ 	i) $-9 + 7 =$
j) $-4 - 14 =$ 	k) $-26 - 39 =$	l) $677 - 798 =$
m) $-4 - (-8) =$	n) $-6 \div 2 =$	o) $-5 \times -8 =$
p) $-9 \times 8 =$	q) $-9 \times -1 =$	r) $24 \div -8 =$

Part 4: Operations with Rational Numbers

Need a refresher? Operations with Rational Numbers Video:

<https://www.khanacademy.org/math/arithmetric/fractions/fractions-unlike-denom/v/adding-and-subtracting-fractions>
<https://www.khanacademy.org/math/arithmetric/fractions/multiplying-fractions/v/multiplying-negative-and-positive-fractions>
<https://www.khanacademy.org/math/arithmetric/fractions/div-fractions-fractions/v/conceptual-understanding-of-dividing-fractions-by-fractions>

Extra Practice:

<https://www.khanacademy.org/math/arithmetric/fractions/fractions-unlike-denom/e/adding-and-subtracting-fractions>
<https://www.khanacademy.org/math/arithmetric/fractions/multiplying-fractions/e/multiplying-fractions>
https://www.khanacademy.org/math/arithmetric/fractions/div-fractions-fractions/e/dividing-fractions_2
<http://cdn.kutasoftware.com/Worksheets/PreAlg/Add%20and%20Subtracting%20Fractions%20and%20Mixed%20Numbers.pdf>
<http://cdn.kutasoftware.com/Worksheets/PreAlg/Multiplying%20and%20Dividing%20Fractions%20and%20Mixed%20Numbers.pdf>

ADDITION:

1. FIND COMMON DENOMINATOR
 - a. Whatever you do to the bottom, you must do to the top!
2. ADD NUMERATORS
3. SIMPLIFY

SUBTRACTION:

1. FIND COMMON DENOMINATOR
 - a. Whatever you do to the bottom, you must do to the top!
2. SUBTRACT NUMERATORS
3. SIMPLIFY

MULTIPLICATION:

1. MULTIPLY NUMERATORS
2. MULTIPLY DENOMINATORS
3. SIMPLIFY

DIVISION:

1. FLIP THE SECOND FRACTION
2. MULTIPLY (LOOK ABOVE FOR HELP)
3. SIMPLIFY

a) $\frac{6}{7} + \frac{7}{21}$ $\frac{18}{21} + \frac{7}{21} = \frac{25}{21}$	b) $\frac{2}{3} - \frac{3}{10}$	c) $\frac{2}{3} + \frac{8}{42}$	d) $\frac{12}{14} - \frac{4}{8}$
e) $\frac{13}{54} - \frac{1}{9}$	f) $\frac{1}{4} + \frac{4}{20}$	g) $\frac{5}{6} + \frac{2}{4}$	h) $\frac{10}{22} - \frac{5}{11}$
i) $\frac{5}{8} \div \frac{1}{6}$ $\frac{5}{8} \cdot \frac{6}{1} = \frac{30}{8} = \frac{15}{4}$	j) $\frac{1}{3} \div \frac{1}{4}$	k) $\frac{1}{2} \cdot \frac{2}{3}$	l) $\frac{3}{6} \cdot \frac{1}{2}$
m) $\frac{5}{7} \div \frac{1}{3}$	n) $\frac{3}{5} \cdot \frac{7}{10}$	o) $\frac{1}{2} \cdot \frac{5}{7}$	p) $\frac{1}{3} \div \frac{2}{6}$

Part 5: Evaluating Expressions with Given Values – Evaluate the expressions for the given replacement value. The first problem was done for you.

Need a refresher? Evaluating Expressions with Given Values Video:

<https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-expressions-and-variables/cc-6th-evaluating-expressions/v/variables-and-expressions-1>

$3a + 5b$, for $a = -1$, $b = 2$ $3(-1) + 5(2)$ $-3 + 10$ 7	a) $4r + \frac{21}{s}$, for $r = 7$, $s = -7$	b) $-2 + \frac{6}{x} - y - 3$, for $x = 2$, $y = -6$
c) $-(g - 2h) + 3$, for $g = 1$, $h = -1$	d) $6(p - q)$, for $p = 9$, $q = -2$	e) $3m + n + m$, for $m = 5$, $n = 2$

Evaluating Expressions with Given Values Extra Practice:

<http://cdn.kutasoftware.com/Worksheets/PreAlg/Evaluating%20Variable%20Expressions.pdf>

<http://cdn.kutasoftware.com/Worksheets/PreAlg/Evaluating%20Variable%20Expressions.pdf>

Part 6: Number Sense

Need a refresher? Number Sense Video:

<https://www.khanacademy.org/math/pre-algebra/decimals-pre-alg/comparing-decimals-pre-alg/v/comparing-decimals-1-example>

<https://www.khanacademy.org/math/pre-algebra/decimals-pre-alg/comparing-decimals-pre-alg/v/ordering-decimals-example>

a) $4.5 > -4.5$	b) -0.707 _____ 07.07	c) -18.2 _____ 18.0
d) -3.21 _____ -3.12	e) -0.3 _____ -0.33	f) -0.06 _____ 0.6

Fill the place holder in with the correct inequality $<$, $>$, or $=$. The first problem has been done for you

Rewrite the decimals in increasing order. The first problem has been done for you.

f) 14.367, -28.7784 , 213.22, -361.238 , 5.2, -5.33 -361.238 , -28.7784 , -5.33 , 5.2, 14.367, 213.22
g) -11.111 , -111.11 , 1.11, 11.1, -11.1 , -1.11
h) 8.1, -67.3 , -82.55 , -121.91 , -2.2 , 46.76

Number Sense Extra Practice:

<https://www.khanacademy.org/math/pre-algebra/decimals-pre-alg/comparing-decimals-pre-alg/v/comparing-decimals-1-example>

<https://www.khanacademy.org/math/pre-algebra/decimals-pre-alg/comparing-decimals-pre-alg/v/ordering-decimals-example>

Part 7: Properties of Exponents

Need a refresher on Properties of Exponents? Use the links below

Property Name	Definition	Example
Product of Powers	$a^m \cdot a^n = a^{m+n}$	$5^3 \cdot 5^{-1} = 5^{3+(-1)} = 5^2 = 25$
Power of a Power	$(a^m)^n = a^{mn}$	$(3^3)^2 = 3^{3 \cdot 2} = 3^6 = 729$
Power of a Product	$(ab)^m = a^m b^m$	$(2 \cdot 3)^4 = 2^4 \cdot 3^4 = 1296$
Negative Exponent	$a^{-m} = \frac{1}{a^m}, a \neq 0$	$7^{-2} = \frac{1}{7^2} = \frac{1}{49}$
Zero Exponent	$a^0 = 1, a \neq 0$	$(-89)^0 = 1$
Quotient of Powers	$\frac{a^m}{a^n} = a^{m-n}, a \neq 0$	$\frac{6^{-3}}{6^{-6}} = 6^{-3-(-6)} = 6^3 = 216$
Power of a Quotient	$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$	$\left(\frac{4}{7}\right)^2 = \frac{4^2}{7^2} = \frac{16}{49}$

<https://www.khanacademy.org/math/pre-algebra/exponents-radicals/exponent-properties/v/exponent-rules-part-1>

<https://www.khanacademy.org/math/pre-algebra/exponents-radicals/exponent-properties/v/exponent-rules-part-2>

<https://www.khanacademy.org/math/pre-algebra/exponents-radicals/exponent-properties/v/exponent-properties-involving-quotients>

<https://www.khanacademy.org/math/pre-algebra/exponents-radicals/negative-exponents-tutorial/v/negative-exponents>

Simplify the following exponents. The first problem has been done for you.

a) $(-2)^2 = (-2)(-2) = 4$	b) $5^0 =$	c) $(-10)^{-1} =$
d) $(-3)^3 =$	e) $(-5)^1 =$	f) $8^{-1} =$
g) $\frac{6z^5}{9z} = \frac{6z^{5-1}}{9} = \frac{2z^4}{3}$	h) $\frac{4b^{-6}}{2b^5 k^{-4}}$	i) $2n^6 y^{-3} \cdot 6n^{-2} y^2$
j) $\frac{8h^{-5} r^{-3}}{4hr^{-4}}$	k) $\frac{9^{-5}}{9}$	l) $\frac{8^6}{8^4}$
m) $2k^6 \cdot 7k^{-3} g^2$	n) $\left(\frac{6}{7}\right)^4 \cdot \left(\frac{6}{7}\right)^{-9} \cdot \left(\frac{6}{7}\right)^5$	o) $d^6 \cdot d^{-2} \cdot d^{-3}$

Properties of Exponents Extra Practice:

https://www.khanacademy.org/math/pre-algebra/exponents-radicals/exponent-properties/e/exponent_rules

<https://www.khanacademy.org/math/pre-algebra/exponents-radicals/exponent-properties/e/properties-of-integer-exponents>

<http://cdn.kutasoftware.com/Worksheets/Alg1/Properties%20of%20Exponents.pdf>

<http://cdn.kutasoftware.com/Worksheets/Alg1/More%20Properties%20of%20Exponents.pdf>

Part 8: Solving Equations with One Variable

Need a refresher? Solving Equations with One Variable Video:

<https://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/why-of-algebra/v/one-step-equation-intuition>

<https://www.khanacademy.org/math/algebra/solving-linear-equations-and-inequalities/why-of-algebra/v/why-we-do-the-same-thing-to-both-sides--two-step-equations>

a) $h - 15 = -22$ **One Step**	b) $21k = -105$	c) $\frac{g}{-12} = 11$
d) $s + 9 = 25$	e) $x - 7 = 1$	f) $\frac{-x}{4} = 5$
g) $-15 - 9c = 3$ **Two-steps**	h) $\frac{6-h}{22} = -16$	i) $7 + \frac{2}{7}k = 20$
j) $\frac{3}{7}a - 17 = -11$	k) $5f - 28 = -11$	l) $-18 + 25y = -6$
m) $\frac{21-r}{28} = -12$	n) $\frac{7+z}{-20} = -24$	o) $\frac{16-n}{-18} = -2$

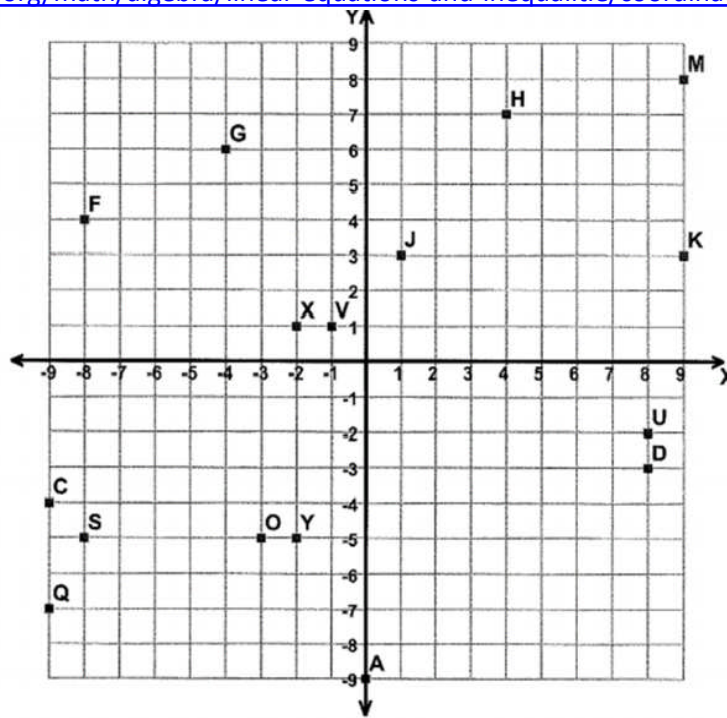
Solving Equations with One Variable Extra Practice:

<http://cdn.kutasoftware.com/Worksheets/PreAlg/One-Step%20Equations%20With%20Integers.pdf>

Part 9: The Coordinate Plane

Need a refresher? Watch this video:

<https://www.khanacademy.org/math/algebra/linear-equations-and-inequalitie/coordinate-plane/v/the-coordinate-plane>



Tell what point is located at each ordered pair. The first problem has been done for you.

a) $(-9, -4)$ C	b) $(4, 7)$	c) $(8, -2)$	d) $(8, -3)$
e) $(1, 3)$	f) $(-3, -5)$	g) $(9, 3)$	h) $(-1, 1)$

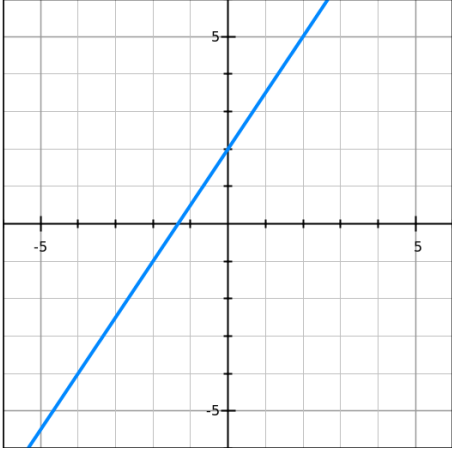
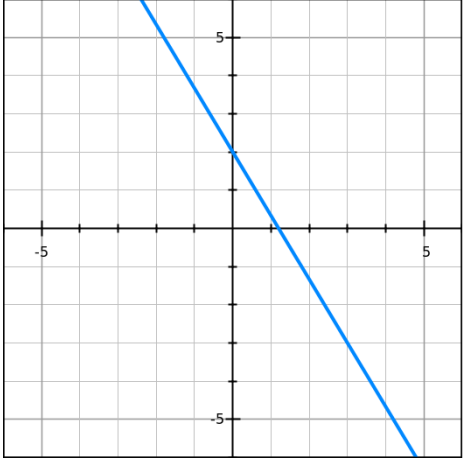
Write the ordered pair for each given point. The first problem has been done for you.

a) S $(-8, -5)$	b) M	c) X	d) F
e) Y	f) Q	g) G	h) A

Plot the following points on the coordinate grid

a) $W(3, 5)$	b) $N(-7, -2)$	c) $P(-3, 5)$	d) $B(-3, -1)$
e) $T(6, 8)$	f) $I(0, 7)$	g) $E(6, -8)$	h) $Z(8, 3)$

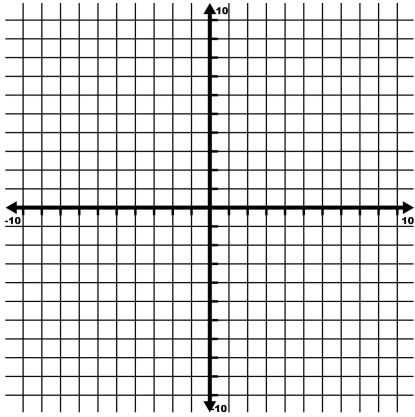
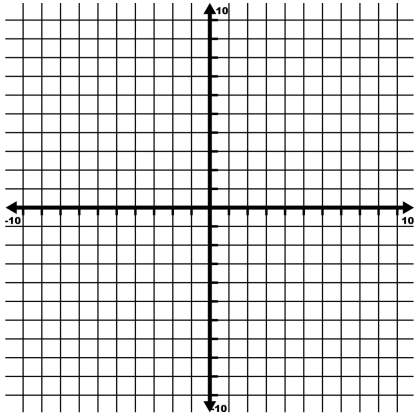
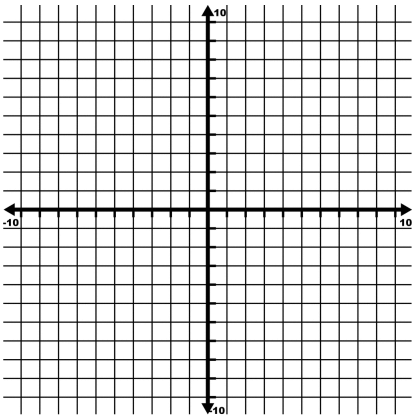
Need a refresher? Slope Intercept Form of Linear Equations Video:

<p>a) $y = \frac{-1}{4}x - 2$</p> <p>m = _____ b = _____</p>	<p>b) $y = \frac{1}{3}x - 1$</p> <p>m = _____ b = _____</p>	<p>c) $y = \frac{-2}{7}x + 1$</p> <p>m = _____ b = _____</p>	<p>d) $y = \frac{3}{4}x + 3$</p> <p>m = _____ b = _____</p>
<p>e)</p>  <p>Slope: _____</p> <p>Y-intercept: _____</p>	<p>f)</p>  <p>Slope: _____</p> <p>Y-intercept: _____</p>		

<https://www.khanacademy.org/math/algebra/linear-equations-and-inequalitie/graphing-slope-intercept/v/graphing-a-line-in-slope-intercept-form>

Label the slope and y-intercept of each linear equation below:

Sketch the graph of each line.

<p>a) $y = \frac{1}{3}x - 4$</p> 	<p>b) $y = \frac{-1}{3}x + 1$</p> 	<p>c) $y = \frac{-4}{9}x - 3$</p> 
--	---	--