Incoming **Algebra 1 CP** Summer Math Guide

The following summer guide is to be used as a study tool to prepare you for the skills necessary for success in **Algebra 1 CP**. The following skills will be assessed as your first test grade. **The first test will be given within the first few weeks of school.** If you are struggling on certain skills, you can use resources such as www.IXL.com/math, www.khanacademy.org/math/, www.coolmath.com. More can be found through an online search.

None of your work will be collected or graded at the beginning of the school year. This is being provided to you in advance of the school year to help you maintain knowledge of the skills you were already taught but you will need for your next course or grade.

Section 1: Basic Math Facts

Adding and subtracting integers: Math Antics - Adding & Subtracting Integers
Multiplying and dividing integers: Math Antics - Integer Multiplication & Division

Add/ subtract

1. $(-27) - 24$	2. $(-9) + 14$	3. $38 - (-17)$
4. $(-8) - (-2)$	5. $5 + (-8)$	6. $(-41) + (-40)$
7. $(-16) - 6 + (-5)$	8. $15 - 13 + 2$	9. $16 - (-13) - (-5)$

Multiply/Divide

1. $\frac{75}{-15}$	2. $\frac{-56}{-14}$	3. $12 \div -3$
4. $-120 \div -20$	5. -3×-11	6. -6×4
7. $8 \times -6 \times -3$	8. $6 \times -5 \times 3$	9. $6 \times -1 \times 2$

Section 2: Order of Operations:

Order of Operations: Math Antics - Order Of Operations

1. $-4 - (1 - 5) - (-4)^2$	2. $(4 - 3)(1 - (3 + 5)) \times 5$	3. $-3 \times 2 \times 2(-3 - 1)$
4. $\frac{27}{2 + 3 + 4} + 3$	5. $2 + 12 \div 2 + 1$	6. $(-6 \times 2) \div -3$
7. $8 \times \frac{15}{5} - (5 + 9)$	8. $(7 - 2) \div 5$	9. $40 \div 4 - (5 - 3)$

Section 3: Evaluating Expressions

Evaluate expressions:

1. Evaluating Expressions is Easy Peasy!
2. Evaluate Expressions with Variables | Find the Value of an Expression
3. Prealgebra - Part 30 (Evaluating Variable Expressions) (Signed numbers)

1. $y+z+2$; use $y=-6$, and $z=5$	2. $p(q\div 3-p)$; use $p=-6$, and $q=-3$	3. $6+q+5-(q-p)+15$; use $p=1$, and $q=1$
4. $z\div 6+x+x-5$; use $x=1$, and $z=6$	5. $x(z+3)+1+3-y$; use $x=6$, $y=-5$, and $z=2$	6. $6\div 6+z+x-y$; use $x=2$, $y=5$, and $z=6$

Section 4: Evaluate Absolute value:

1. **What is Absolute Value? | Absolute Value Examples | Math with Mr. J**
2. **Simplify Absolute Value Expressions**

1. $\lvert -8\rvert$	2. $\lvert 15\rvert$	3. $\lvert 9\rvert-\lvert -5\rvert$
4. $\lvert -50\rvert+\lvert -7\rvert$	5. $10+\lvert 1+3\rvert+6$	6. $\lvert 4+2\rvert-4$
7. $\lvert 7-1\rvert-\lvert 3+2\rvert$	8.	9. $8-\lvert 2+2\rvert-4$

	$\lvert 5-5+3\rvert+5-\lvert 2\rvert$:	

Section 5: Fraction Operations

Operations with Fractions: Operations with Fractions

(also can view any of Math Antics on YouTube for further explanation on Fractions)

1. $\frac{1}{3}-\left(-\frac{5}{3}\right)$	2. $\frac{2}{5}+\frac{4}{5}$	3. $\left(-\frac{4}{5}\right)-\frac{7}{8}$
4. $\frac{9}{5}-\frac{5}{8}$	5. $2-\frac{13}{8}$	6. $-\frac{2}{3}\cdot\frac{5}{4}$
7. $\frac{4}{9}\cdot\frac{7}{4}$	8. $\frac{-3}{2}\div\frac{-10}{7}$	9. $\frac{1}{2}\div\frac{8}{7}$

Section 6: Ratio Equivalence

Equivalent Ratios | How to Find Equivalent Ratios

1. **Simplify:** 40:15	**2.** **Simplify:** 49:7	**3.** **Are they Equivalent?** $\frac{12}{6}$ and $\frac{4}{2}$

4. **Are they Equivalent?** $\frac{3}{4}$ and $\frac{9}{20}$	**5.** **Are they Equivalent?** $\frac{12}{8}$ and $\frac{3}{2}$	**6.** **Are they Equivalent?** $\frac{4}{2}$ and $\frac{8}{6}$

Section 7: Translating verbal expressions into algebraic expressions

Operation	Verbal Phrases
Addition	More than, sum, plus, increased by, added to, add, put together, altogether
Subtraction	Less than (switch order), subtracted from(switch order), difference, decreased by, minus, take away
Multiplication	Product of, multiplied by, times, of, twice
Division	Quotient of, divided by, ratio
Powers	The square of, squared

Translate each verbal expression into an algebraic expression.

Examples:

Verbal expression	**Algebraic Expression**
ten more than twice a number	$2x + 10$
nine less a number	$9 - x$
The quotient three and of a number minus seven	$\frac{3}{x-7}$
A number squared added to eleven	$11 + x^2$
six multiplied by a number	6x

Video Resources for this section:

Writing Verbal Phrases as Algebraic Expressions (Examples)
Learn how to write a verbal expression from an algebraic expression

Practice Problems:

#1-4: Write each verbal expression as an algebraic expression. 1.) The product of five and a number
2.) 10 less than the product of seven and a number
3.) The difference of a number and eight
4.) The ratio of seven and ten minus a number
#5-8: Use the algebraic expression to write a verbal expression. 5.) $x + 1$
6.) $\frac{2}{3}x - 6$
7.) $\frac{1}{2}x^2$
8.) $\frac{5}{11-x}$

Section 8: Combining Like Terms

Video Resources for this section:
How to simplify a big expression by combining like terms | Algebra I | Khan Academy

Practice Problems: Simplify by combining like terms.

1.) $3x + x - 11x$	**2.)** $4c^2 + 3c - 9c^2$	**3.)** $8y + 7x^2 + x^2 - 2y$
4.) $10 - 3gh + 7h + 9gh$	**5.)** $-5 + 3a + b + b + 7$	**6.)** $-3x - 7xy + 13 + 9x - xy$

Section 9: Distributive Property

Video Resources for this section:

Simplifying Expressions using Distributive Property | Expression & Equations | Grade 6

Practice Problems:
Use the distributive property to simplify each expression.

1.) $3(4x + 2)$	**2.)** $-2(2x + 6y - 7)$	**3.)** $(x + 7)10$
4.) $-5(4g - 8)$	**5.)** $9(2m + n - 1)$	**6.)** $6(x + 3y)$

Section 10: Solving one and Two-step Equations

Video Resources for this section:

How to Solve One-Step Equations (Addition and Subtraction) | Math with Mr. J

How to Solve One-Step Equations (Multiplication and Division) | Math with Mr. J

Solving Two-Step Equations | Expressions & Equations | Grade 7

Example: two-step equation with numerator x | Linear equations | Algebra I | Khan Academy

Practice Problems:
Solve each equation.

1.) $14 + x = 26$	**2.)** $c - 8 = 17$	**3.)** $\frac{x}{5} = -6$

4.) $-3y = -27$	**5.)** $4x + 13 = 33$	**6.)** $7 - 2x = 17$
7.) $\frac{m}{4} + 9 = 12$	**8.)** $2y - 15 = 19$	**9.)** $10 - \frac{h}{4} = 3$

Section 11: Solving Multi-Step Equations

Video resources for this section:

- **Solving Equations with Distributive Property | Expressions & Equations | Grade 8**
- **Equations with Variables on Both Sides | Expressions & Equations | Grade 7**
- **Solving Multi-Step Equations | Expressions & Equations | Grade 8**
- **Solving equations with the distributive property | Linear equations | Algebra I | Khan Acade…**

Practice Problems:
Solve each equation.

1.) $2(3x - 1) = 16$	**2.)** $\frac{4-x}{3} = 5$
3.) $3x + 4 = 5x - 8$	**4.)** $-4x - (3x + 8) = 2 + 2(x + 4)$

5.) $2 + 3(7 - x) = 6(2x + 1) + 2$	**6.)** $2(5 + 2x) =- 2(1 - 3x) - 4$

Section 12: Word Problems

Video resources for this section:

Writing Expressions from Word Problems - 7th Grade Math

Writing equations from word problems

Practice Problems:

1.) After paying 9 dollars for the pie, Joan has 77 dollars left. How much money did she have before buying the pie ?
2.) Keith bought 8 new baseball trading cards to add to his collection. The next day his dog ate half of his collection. There are now only 34 cards left. How many cards did Keith start with ?

3.) Oceanside Bike Rental Shop charges 17 dollars plus 6 dollars an hour for renting a bike. Sam paid 65 dollars to rent a bike. How many hours did he pay to have the bike checked out ?

Section 13 Determine if a Relation is a Function

Video resources for this section:

Is it a Function? (How to Tell)

Vertical Line Test - Is something a function?

Practice problems:

Determine if the relation shown below is a function.

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 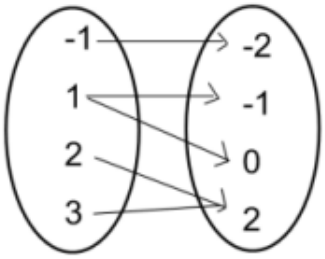
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 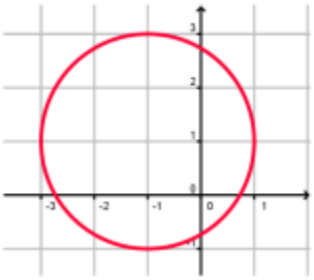 </td>
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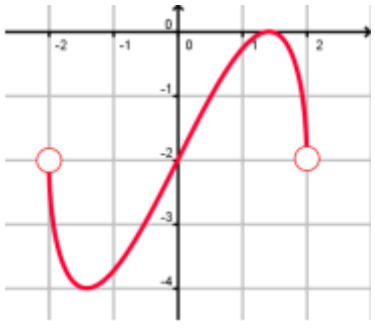
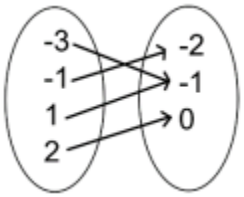
  </td>
<td>5.
{(-2, 3), (1, 4), (2, 1), (-3, 3)}</td>
<td>6.
 
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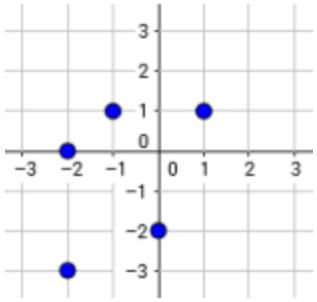
		{(-5, 6), (0, 2), (0, -3), (4, 2)}

x	y
-3	3
-1	1
0	0
1	1

Answer key

Section 1:

1. $(-27) - 24$ -51	2. $(-9) + 14$ 5	3. $38 - (-17)$ 55
4. $(-8) - (-2)$ -6	5. $5 + (-8)$ -3	6. $(-41) + (-40)$ -81
7. $(-16) - 6 + (-5)$ -27	8. $15 - 13 + 2$ 4	9. $16 - (-13) - (-5)$ 34

1. $\frac{75}{-15}$ -5	2. $\frac{-56}{-14}$ 4	3. $12 \div -3$ -4
4. $-120 \div -20$ 6	5. -3×-11 33	6. -6×4 -24
7. $8 \times -6 \times -3$ 144	8. $6 \times -5 \times 3$ -90	9. $6 \times -1 \times 2$ -12

Section 2

1. $-4 - (1 - 5) - (-4)^2$ -16	2. $(4 - 3)(1 - (3 + 5)) \times 5$ -35	3. $-3 \times 2 \times 2(-3 - 1)$ 48

4. $\frac{27}{2+3+4}+3$ 6	5. $2+12\div 2+1$ 9	6. $(-6\times 2)\div -3$ 4
7. $8\times\frac{15}{5}-(5+9)$ 10	8. $(7-2)\div 5$ 1	9. $40\div 4-(5-3)$ 4

Section 3:

1. $y+z+2$; use $y=-6$, and $z=5$ 1	2. $p(q\div 3-p)$; use $p=-6$, and $q=-3$ -30	3. $6+q+5-(q-p)+15$; use $p=1$, and $q=1$ 27
4. $z\div 6+x+x-5$; use $x=1$, and $z=6$ -2	5. $x(z+3)+1+3-y$; use $x=6$, $y=-5$, and $z=2$ 39	6. $6\div 6+z+x-y$; use $x=2$, $y=5$, and $z=6$ 4

Section 4:

1. $\lvert -8\rvert$ 8	2. $\lvert 15\rvert$ 15	3. $\lvert 9\rvert-\lvert -5\rvert$ 4

4. $\lvert -50 \rvert + \lvert -7 \rvert$ 57	5. $10 + \lvert 1 + 3 \rvert + 6 =$ 20	6. $\lvert 4 + 2 \rvert - 4$ 2
7. $\lvert 7 - 1 \rvert - \lvert 3 + 2 \rvert =$ 1	8. $\lvert 5 - 5 + 3 \rvert + 5 - \lvert 2 \rvert =$ 6	9. $8 - \lvert 2 + 2 \rvert - 4$ 0

Section 5:

1. $\frac{1}{3} - \left(-\frac{5}{3}\right)$ 2	2. $\frac{2}{5} + \frac{4}{5}$ 6/5	3. $\left(-\frac{4}{5}\right) - \frac{7}{8}$ -67/40
4. $\frac{9}{5} - \frac{5}{8}$ 47/40	5. $2 - \frac{13}{8}$ 3/8	6. $-\frac{2}{3} \cdot \frac{5}{4}$ -5/6
7. $\frac{4}{9} \cdot \frac{7}{4}$ 7/9	8. $\frac{-3}{2} \div \frac{-10}{7}$ 21/20	9. $\frac{1}{2} \div \frac{8}{7}$ 7/16

Section 6:

1. **Simplify:**	**2.** **Simplify:** 49:7	**3.** **Are they Equivalent?**

40:15 5:3	7:1	$\frac{12}{6}$ and $\frac{4}{2}$ **yes**
4. **Are they Equivalent?** $\frac{3}{4}$ and $\frac{9}{20}$ **no**	**5.** **Are they Equivalent?** $\frac{12}{8}$ and $\frac{3}{2}$ **yes**	**6.** **Are they Equivalent?** $\frac{4}{2}$ and $\frac{8}{6}$ **no**

Section 7:

#1-4: Write each verbal expression as an algebraic expression. 1.) The product of five and a number 5x
2.) 10 less than the product of seven and a number $7x - 10$
3.) The difference of a number and eight $x - 8$
4.) The ratio of seven and ten minus a number $\frac{7}{10-x}$
#5-8: Use the algebraic expression to write a verbal expression. 5.) x + 1 Examples: a number increased by one, a number plus one, one more than a number, the sum of a number and one, one added to a number
6.) $\frac{2}{3}x - 6$ Examples: two-thirds of a number minus six, the difference of two-thirds a number and six, six subtracted from two-thirds of a number

7.) $\frac{1}{2}x^2$ Examples: One-half of a number squared, the product of one-half and a number squared, one-half multiplied by the square of a number,
8.) $\frac{5}{11-x}$ Examples: The quotient of five and eleven minus a number, The ratio of five and the difference of eleven and a number, five divided by a eleven less a number

Section 8:

1.) $3x + x - 11x$ $-7x$	**2.)** $4c^2 + 3c - 9c^2$ $-5c^2 + 3c$	**3.)** $8y + 7x^2 + x^2 - 2y$ $8x^2 + 6y$
4.) $10 - 3gh + 7h + 9gh$ $10 + 7h + 6gh$	**5.)** $-5 + 3a + b + b + 7$ $2 + 3a + 2b$	**6.)** $-3x - 7xy + 13 + 9x - xy$ $6x - 8xy + 13$

Section 9:

1.) $3(4x + 2)$ $12x + 6$	**2.)** $-2(2x + 6y - 7)$ $-4x - 12y + 14$	**3.)** $(x + 7)10$ $10x + 70$
4.) $-5(4g - 8)$ $-20g + 40$	**5.)** $9(2m + n - 1)$ $18m + 9n - 9$	**6.)** $6(x + 3y)$ $6x + 18y$

Section 10:

1.) $14 + x = 26$ **x= 12**	**2.)** $c - 8 = 17$ **c= 25**	**3.)** $\frac{x}{5} = -6$ **x= -30**
4.) $-3y = -27$ **y = 9**	**5.)** $4x + 13 = 33$ **x= 5**	**6.)** $7 - 2x = 17$ **x = -5**
7.) $\frac{m}{4} + 9 = 12$ **m= 12**	**8.)** $2y - 15 = 19$ **y= 17**	**9.)** $10 - \frac{h}{4} = 3$ **h= 28**

Section 11:

1.) $2(3x - 1) = 16$ **x=3**	**2.)** $\frac{4-x}{3} = 5$ **x = -11**
3.) $3x + 4 = 5x - 8$ **x= 6**	**4.)** $-4x - (3x + 8) = 2 + 2(x + 4)$ **x= -2**

5.) $2 + 3(5 - x) = 4(2x + 1) + 2$ **x= 1**	**6.)** $2(5 + 2x) =- 2(1 - 3x) - 4$ **x= 8**

Section 12:

1.) After paying 9 dollars for a pie, Joan has 77 dollars left. How much money did she have before buying the pie ?

x - 9 = 77

x= $86.00

2.) Keith bought 8 new baseball trading cards to add to his collection. The next day his dog ate half of his collection. There are now only 34 cards left. How many cards did Keith start with ?

$\frac{1}{2}(x + 8) = 34$

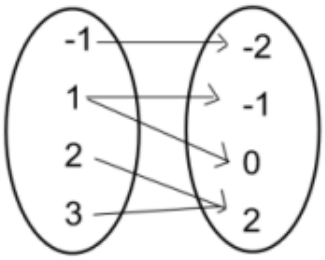
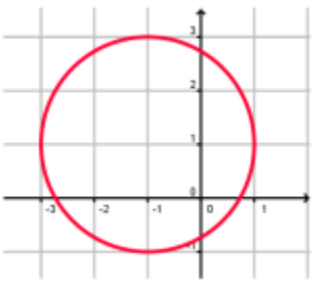
x = 60 cards

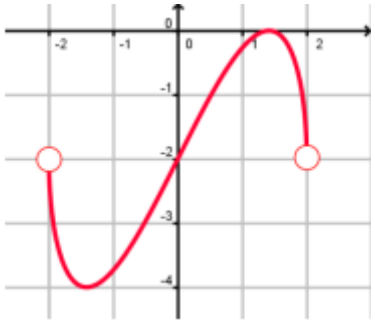
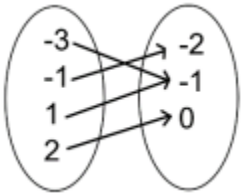
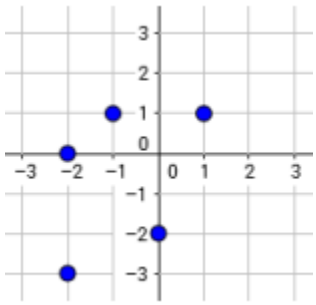
3.) Oceanside Bike Rental Shop charges 17 dollars plus 6 dollars an hour for renting a bike. Sam paid 65 dollars to rent a bike. How many hours did he pay to have the bike checked out ?

17+6h=65

h= 8 hours

Section 13:

1. No  	**2. No**	**3. No** 

4. **yes** 	**5.** **yes** {(-2, 3), (1, 4), (2, 1), (-3, 3)}	**6.** **yes** 
7. **No** 	**8.** **Yes**	**9.** **No** {(-5, 6), (0, 2), (0, -3), (4, 2)}

x	y
1	-2
-3	-1
1	0
2	2
0	3

x	y
-3	3
-1	1
0	0
1	1