

Montini Catholic High School  
Basic Concepts needed to be successful in Algebra I

All students enrolled in Modern Algebra I, Algebra I, and Honors Algebra I for the fall of 2022 will take a diagnostic exam the first week of school to assess their retention of basic concepts necessary to be successful in Algebra I. When the student is given the results, they will also be given remediation work for any concepts the student struggled with, upon completion of this remediation work their grade for the diagnostic will be adjusted. This packet covers the same concepts that are on the diagnostic exam. If done properly, this will hopefully alleviate the need for any remediation in the fall.

As you go through each topic, check your answer. If you are having difficulty, we have included different avenues for help:

- MCHS videos in the *2022 Summer Mathematics* schoology group. You can create a free schoology account using any valid email address. Once in schoology, you can add the group using access code

**99WH-VP8Q-9RRH7** . Once in the group you will find video tutorials for the concepts covered in this packet.

**Class of 2026 students and transfer students, DO NOT use your montini email address to set up your Schoology account. Please use a personal email.**

- Videos, examples, and practice problems via [khanacademy.org](https://www.khanacademy.org) (a free website)
- Any search engine on the internet
- Local library

Concepts Covered:

- A) Compare & order numbers
- B) Graph Rational Numbers on a number line
- C) Simplify fractions
- D) Operations with integers
- E) Operations with fractions
- F) Rounding Numbers
- G) Express fractions and percentages as decimals
- H) Express decimals and percentages as fractions
- I) Order of Operations
- J) Percent Calculations
- K) Graph ordered pairs in a coordinate plane
- L) Graph solutions of inequalities on a number line
- M) Evaluate an algebraic expression
- N) Write an algebraic expression
- O) Solving linear equations

**All problems are intended to be completed without the use of a calculator.**

**NO CALCULATOR. Answers should be expressed as simplified fractions, when necessary.**

A) Compare & order numbers

<https://www.khanacademy.org/math/arithmetic-home/arith-review-decimals/decimals-number-line/v/decimals-on-a-number-line>

<https://www.khanacademy.org/math/arithmetic/fraction-arithmetic/arith-review-fractions-on-the-number-line/v/fractions-on-a-number-line>

<https://www.khanacademy.org/math/cc-seventh-grade-math/cc-7th-negative-numbers-add-and-subtract/cc-7th-add-negatives/v/number-line-3-exercise-example>

Order from least to greatest		
1) 22%, 0.3, $\frac{1}{5}$	2) 0.74, $\frac{3}{4}$ , 70%	3) $1\frac{3}{8}$ , $1\frac{3}{10}$ , $1\frac{4}{9}$
4) Your PE teacher asked you to run for specific time period. You ran 0.6 of the time. Two of your friends ran $\frac{7}{10}$ and 72% of the time. Order the amount of time you and your friends ran from least to greatest.	5) -2, 12, -8, 5, -6, 1, -3, -4	6) -3.87, -3.85, -2.53, -2.94, 4.05, 4.26
Replace $\bigcirc$ with <, >, or =		
7) $\frac{7}{12} \bigcirc 58\%$	8) $\frac{3}{4} \bigcirc 0.8$	9) $\sqrt{36} \bigcirc 3^2$
10) $-24 \bigcirc -26$	11) $\frac{3}{9} \bigcirc \frac{5}{15}$	12) According to the Pet Food Manufacturer's Association, 11 out of 25 people own large dogs and 13 out of 50 medium dogs. Do more people own large or medium dogs?

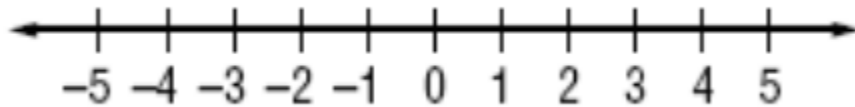
B. Graphing rational numbers on the number line

<https://www.khanacademy.org/math/arithmetric/fraction-arithmetric/arith-review-fractions-on-the-number-line/v/fractions-on-a-number-line>

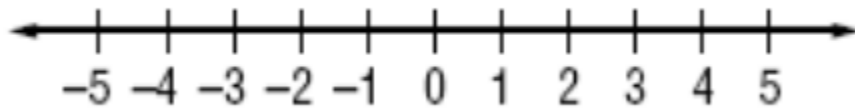
<https://www.khanacademy.org/math/arithmetric/fraction-arithmetric>

Graph and label the following numbers on the number line

13) A.  $\frac{1}{2}$  B.  $4\frac{1}{4}$  C.  $-4.5$  D.  $2.5$



14) A.  $-\frac{8}{3}$  B.  $-1\frac{1}{2}$  C.  $\frac{9}{4}$  D.  $\frac{12}{3}$



C) Simplify fractions

<https://www.khanacademy.org/math/arithmetric/fraction-arithmetric/arith-review-visualizing-equiv-frac/v/equivalent-amount-of-pizza>

Leave answers in simplified improper form  $\frac{a}{b}$

15)  $\frac{15}{35}$

16)  $\frac{6}{18}$

17)  $-\frac{18}{8}$

18) Circle all fractions that are equivalent to  $\frac{1}{4}$

$$\frac{3}{12} \quad \frac{16}{4} \quad \frac{12}{48} \quad \frac{6}{24} \quad \frac{4}{8} \quad \frac{16}{64}$$

D) Operations with integers

<https://www.khanacademy.org/math/arithmetic/arith-review-negative-numbers/arith-review-sub-neg-intro/v/adding-and-subtracting-negative-number-examples>

<https://www.khanacademy.org/math/arithmetic/arith-review-negative-numbers/arith-review-add-and-sub-integers/v/adding-integers-with-different-signs>

<https://www.khanacademy.org/math/arithmetic-home/negative-numbers/mult-divide-negatives/v/multiplying-negative-real-numbers>

Evaluate (write the value of each expression)		
19) $-15 + 8$	20) $-10 - (-14)$	21) $7 - 18$
22) $-12 + (-23)$	23) $-13 + 53$	24) $3 - (-11) - 8$
25) $-60 \div -5$	26) $-9 \cdot 7$	27) $78 \div (-6)$
28) $(-4)(-8)$	29) $\frac{40}{-4}$	30) $\left(\frac{-30}{-10}\right)(-8)$

E) Operations with fractions

<https://www.khanacademy.org/math/arithmetric/fraction-arithmetric>

<https://www.khanacademy.org/math/algebra-basics/basic-alg-foundations/alg-basics-fractions/v/multiplying-negative-and-positive-fractions>

<https://www.khanacademy.org/math/arithmetric/fraction-arithmetric/arith-review-dividing-fractions/v/conceptual-understanding-of-dividing-fractions-by-fractions>

<https://www.khanacademy.org/math/arithmetric/fraction-arithmetric/arith-review-dividing-fractions/v/dividing-fractions-example>

<https://www.khanacademy.org/math/cc-fifth-grade-math/imp-fractions-3/imp-adding-and-subtracting-fractions-with-unlike-denominators/v/adding-fractions-with-unlike-denominators-introduction>

<https://www.khanacademy.org/math/arithmetric/fraction-arithmetric/arith-review-add-sub-fractions/v/adding-small-fractions-with-unlike-denominators>

<https://www.khanacademy.org/math/arithmetric/fraction-arithmetric/arith-review-add-sub-fractions/v/subtracting-small-fractions-with-unlike-denominators>

Evaluate – Leave answers in simplified improper form $\frac{a}{b}$		
31) $\frac{2}{11} + \frac{6}{11}$	32) $\frac{5}{6} + \frac{3}{4}$	33) $\frac{3}{5} - \frac{1}{4}$
34) $\frac{2}{5} \cdot \frac{3}{7}$	35) $\left(\frac{7}{10}\right)(-3)$	36) $\frac{6}{5} \cdot \frac{20}{9}$

37) $\frac{3}{17} \div -3$	38) $\frac{5}{8} \div \frac{15}{4}$	39) $4 - \frac{2}{5}$
40) $\frac{3}{2} - \frac{11}{4}$	41) $3\frac{1}{4} - (-5\frac{1}{4})$	42) $\frac{7}{3} \times 4\frac{1}{2}$

#### F. Rounding Numbers

<https://www.khanacademy.org/math/arithmetic/arith-decimals/arith-review-rounding-decimals/v/rounding-decimals>

Rounds numbers to the specified place		
43) Given 17.8256, identify the number in the:  a) hundredths place      b) ones place      c) tenths place      d) thousandths place		
44) Round to the nearest tenth 54.374	45) Round to the nearest whole number: 31.498	46) Round to the 3 <sup>rd</sup> digit after the decimal: 87.91764

G. Express fractions and percentages as a decimal

<https://www.khanacademy.org/math/arithmetic/arith-decimals/arith-review-decimals-to-fractions/v/converting-fractions-to-decimals-example>

<https://www.khanacademy.org/math/arithmetic/arith-decimals/arith-review-decimals-to-fractions/v/converting-fractions-to-decimals-ex2>

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-ratios-rates/pre-algebra-percent-decimal-conversions/v/representing-a-number-as-a-decimal-percent-and-fraction>

Write each fraction or percentage as a decimal		
47) $\frac{3}{5}$	48) $\frac{7}{8}$	49) $\frac{23}{4}$
50) $\frac{4}{9}$	51) $\frac{5}{6}$	52) $4\frac{2}{9}$
53) 54%	54) 2.7%	55) 235%

H) Express decimals and percentages as fractions

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-ratios-rates/pre-algebra-percent-decimal-conversions/v/converting-decimals-to-percents-ex-1>

Write each decimal or percentage as a fraction - leave answers in simplified improper form $\frac{a}{b}$		
56) 0.35	57) 74%	58) A local retail store was having a sale and offered all their merchandise as a 25% discount. Write this percent as a fraction in simplest form.

## I) Order of Operations

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-arith-prop/pre-algebra-order-of-operations/v/introduction-to-order-of-operations>

Evaluate each expression		
59) $(6 + 5) \cdot (8 - 6)$	60) $14 + 3(7 - 2) - 2 \cdot 5$	61) $3 \cdot 14 \left( \frac{5}{4} - \frac{3}{4} \right) - 60$
62) $(2 + 8)^2 \div 4$	63) $6^2 + 8 \div 2$	64) $\frac{1}{2} \cdot 20 - 7 + 5$
65) $64 - 8(1 + 4)$	66) $\frac{10+18 \div 9 \cdot 2}{3+4}$	67) Without parentheses, the expression $8 + 30 \div 2 + 4$ equals 27. Place parentheses in the expression so that it equals 23.



J) Percent Calculations

<https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/taking-percentages>

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-ratios-rates/pre-algebra-percent-problems/v/finding-percentages-example>

Calculate the percent or value requested

68) What is 50% of 28?

69) What is 40% of 55?

70) What percent of 100 is 29?

71) What percent of 200 is 30?

72) 7 is 25% of what amount?

73) 12 is 30% of what amount?

K) Graph ordered pairs in a coordinate plane

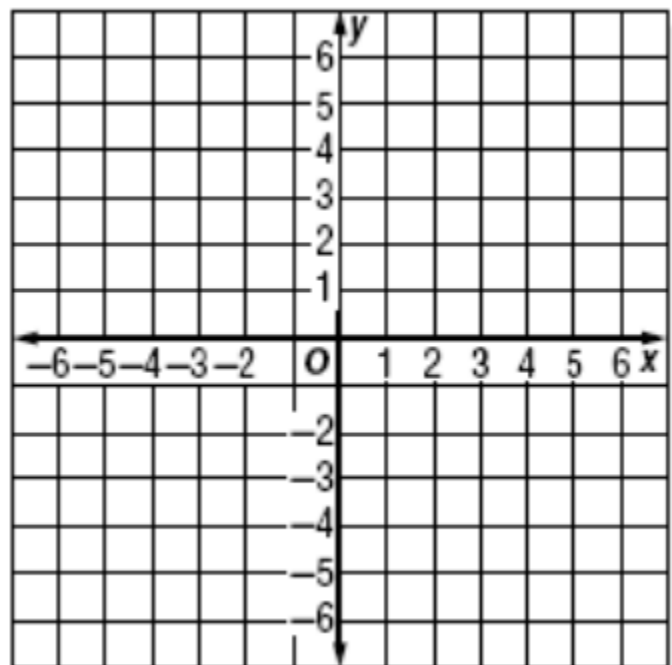
<https://www.khanacademy.org/math/basic-geo/basic-geo-coord-plane/coordinate-plane-4-quad/v/plot-ordered-pairs>

<https://www.khanacademy.org/math/basic-geo/basic-geo-coord-plane/coordinate-plane-4-quad/v/the-coordinate-plane>

Graph and label each point on the coordinate plane

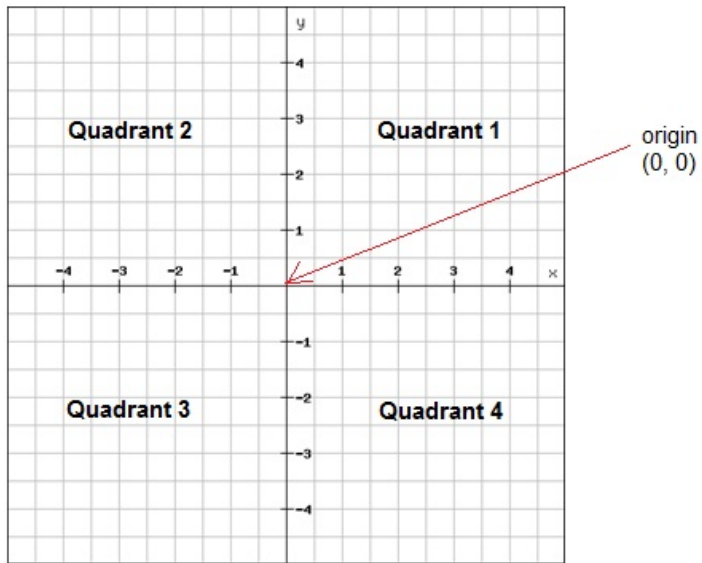
74)

- A) (0, 4)
- B) (5, 5)
- C) (-3, 0)
- D) (-6, -2)
- E) (0, -2)



Find each of the points below on the coordinate plane. Then identify the quadrant in which each point lies

Quadrants:

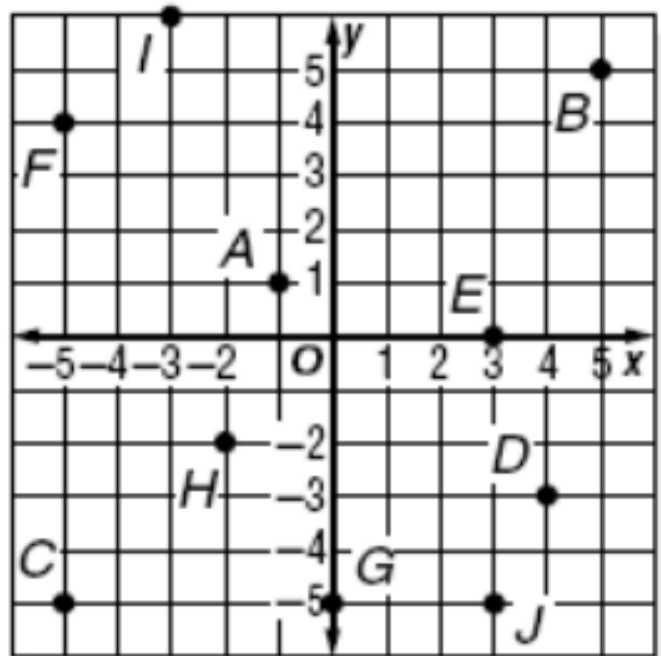


75)

Coordinates

Quadrant

- A
- B
- C
- D
- E
- F
- H
- I
- J



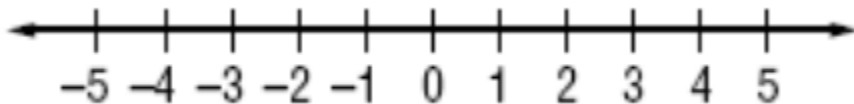
L) Graph solutions of inequalities on a number line

<https://www.khanacademy.org/math/pre-algebra/pre-algebra-equations-expressions/pre-algebra-greater-than-less-than/v/plotting-inequalities-on-a-number-line>

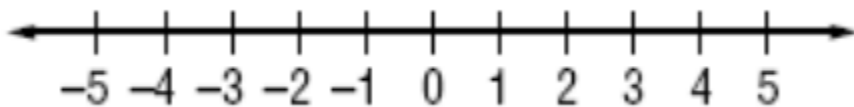
<https://www.khanacademy.org/math/pre-algebra/pre-algebra-equations-expressions/pre-algebra-greater-than-less-than/v/inequalities-on-a-number-line>

Graph the Inequality

76)  $b \geq -1$



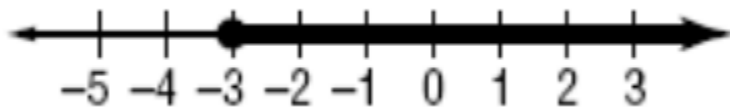
77)  $3 > z$



Write the inequality for the given graphs

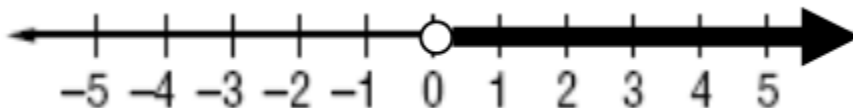
78)

Inequality



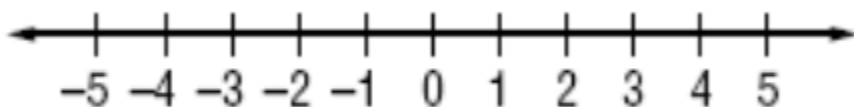
79)

Inequality



Solve the inequality and then graph the solution

80)  $y + 9 \leq 13$



M) Evaluate an algebraic expression

<https://www.khanacademy.org/math/ab-sixth-grade-math/ab-patterns-relations/in-variables-and-equations/v/expressions-with-two-variables>

Evaluate the following expressions using the given values of a,b, & c

81)  $6 + 3b$  given  $b = 7$

82)  $5(6) - c$  given  $c = 14$

83)  $\frac{(\frac{1}{2}a)}{4}$  given  $a = 28$

84)  $6b^2$  given  $b = -2$

N) Write an algebraic expression

<https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-expressions-and-variables/cc-6th-writing-expressions/v/writing-expressions-2>

<https://www.khanacademy.org/math/cc-fifth-grade-math/imp-algebraic-thinking/imp-writing-expressions/v/translating-expressions-with-parentheses>

Write each phrase as an algebraic expression

85) 12 less than m

86) The quotient of 5 and r

87) one half a number is subtracted from 16

88) 4 times the square of a number

O) Solving linear equations

<https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/algebra-linear-equations-1>

<https://www.khanacademy.org/math/algebra-home/alg-basic-eq-ineq/alg-old-school-equations/v/algebra-linear-equations-2>

Solve the equations for the given variable

89)  $p - 9 = -12$

90)  $48 = -8c$

91)  $8 = 5 - k$

92)  $x + 4x = 15$

93)  $\frac{a}{3} = 8$

**The only way to  
learn mathematics  
is to  
do mathematics!**

-Paul Halmos

**ANSWERS:**

**Part A:**

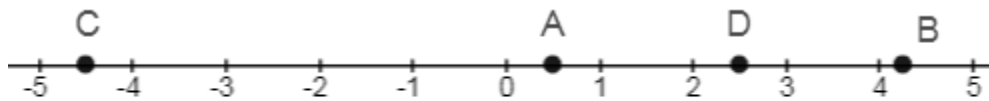
1.  $\frac{1}{5}$ , 22%, 0.3      2. 70%, 0.74,  $\frac{3}{4}$       3.  $1\frac{3}{10}$ ,  $1\frac{3}{8}$ ,  $1\frac{4}{9}$       4.  $0.6$ ,  $\frac{7}{10}$ , 72%

5. -8, -6, -4, -3, -2, 1, 5, 12      6. -3.87, -3.85, -2.94, -2.53, 4.05, 4.26      7. >

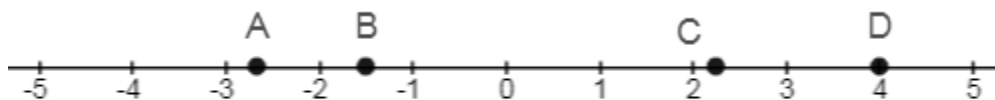
8. <    9. <    10. >    11. =    12. Medium dogs

**Part B:**

13.



14.



**Part C:**

15.  $\frac{3}{7}$       16.  $\frac{1}{3}$       17.  $-\frac{9}{4}$       18. Circle  $\frac{3}{12}$ ,  $\frac{12}{48}$ ,  $\frac{6}{24}$ ,  $\frac{16}{64}$

**Part D:**

19. -7      20. 4      21. -11      22. -35      23. 40      24. 6  
25. 12      26. -63      27. -13      28. 32      29. -10      30. -24

**Part E:**

31.  $\frac{8}{11}$       32.  $\frac{19}{12}$       33.  $\frac{7}{20}$       34.  $\frac{6}{35}$       35.  $-\frac{21}{10}$       36.  $\frac{8}{3}$   
37.  $-\frac{1}{17}$       38.  $\frac{1}{6}$       39.  $\frac{18}{5}$       40.  $-\frac{5}{4}$       41.  $\frac{17}{2}$       42.  $\frac{21}{2}$

**Part F:**

- 43a. 2                      43b. 7                      43c. 8                      43d. 5
44. 54.4                    45. 32                      46. 87.918

**Part G:**

47. 0.6                    48. 0.875                    49. 5.75                    50.  $0.\bar{4}$                     51.  $0.8\bar{3}$
52.  $4.\bar{2}$                     53. 0.54                    54. 0.027                    55. 2.35

**Part H:**

56.  $\frac{7}{20}$                     57.  $\frac{37}{50}$                     58.  $\frac{1}{4}$

**Part I:**

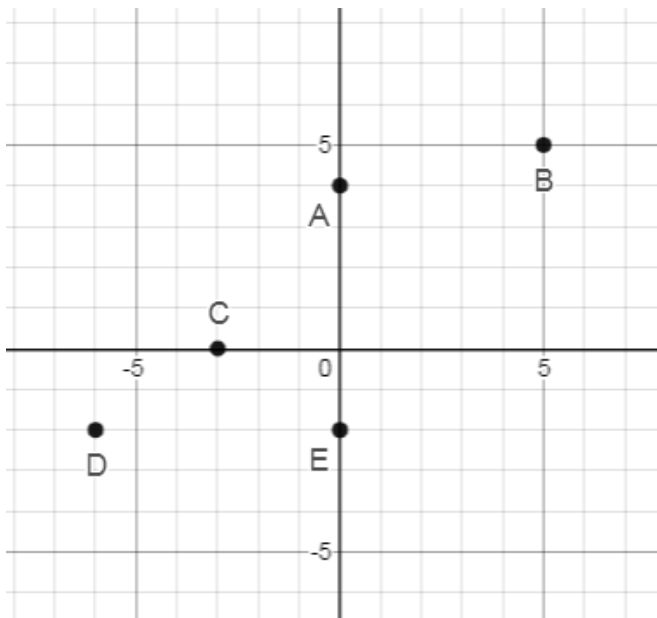
59. 22                    60. 19                    61. -39                    62. 25                    63. 40
64. 8                    65. 24                    66. 2                    67.  $(8 + 30) \div 2 + 4$

**Part J:**

68. 14                    69. 22                    70. 29%
71. 15%                    72. 28                    73. 40

**Part K:**

74.



75.

- |            |     |
|------------|-----|
| A (-1,1)   | II  |
| B (5, 5)   | I   |
| C (-5, -5) | III |
| D (4, -3)  | IV  |
| F (-5, 4)  | II  |
| H (-2, -2) | III |
| I (-3, 6)  | II  |
| J (3, -5)  | IV  |

**Part L:**

76.



77.



78.  $x \geq -3$

79.  $x > 0$

80.



**Part M:**

81. 27

82. 16

83.  $\frac{7}{2}$

84. 24

**Part N:**

85.  $m - 12$

86.  $\frac{5}{r}$

87.  $16 - \frac{1}{2}n$

88.  $4n^2$

**Part O:**

89.  $p = -3$

90.  $c = -6$

91.  $k = -3$

92.  $x = 3$

93.  $a = 24$