

PREREQUISITES: GEOMETRY

Mathematics builds! To be successful in Geometry, there are certain skills that you are expected to already have mastered. These prerequisites are summarized on this sheet. Although some of the topics listed here may be reviewed in Geometry, you are expected to already have some familiarity with them, so that we can quickly move beyond the basics to higher-level discussions. Algebra I is a prerequisite to Geometry.

Each instructor has the option of giving a quiz over this prerequisite material during the first couple weeks of class.

“Sample Prerequisite Problems” (with solutions) are available on the web.

DON'T PANIC if you're rusty (or just haven't ever seen!) some of this material. The Math Department teachers are all available to help you. It's very important, however, that you get this material at your fingertips right away, because we'll be drawing on these skills frequently.

1. arithmetic skills, including: multiplication tables; base ten number system; arithmetic with whole numbers, decimals, and fractions; arithmetic with signed numbers
2. real number line concepts and terminology, including: order; average; the words “at least” and “at most”
3. absolute value: $|x|$ as distance from x to 0; $|x - y|$ as distance between x and y
4. order of operations concepts
5. exact versus approximate answers (particularly as related to π , $\sqrt{2}$, etc.)
6. working with whole number exponents; exponent laws
7. ratios and proportions
8. arithmetic with polynomials: combining like terms; FOIL; more advanced use of the distributive law
9. factoring: greatest common factor; factoring trinomials; difference of squares; the zero factor law
10. solving any linear equation/inequality in one variable, particularly those involving fractions, decimals, and radicals
11. graphing basics, including: coordinate plane terminology; plotting points; the midpoint and distance formulas
12. working with lines: writing equations and graphing; slope; parallel and perpendicular lines
13. basic calculator skills, including: keying in expressions correctly; graphing functions

SAMPLE PREREQUISITE PROBLEMS: GEOMETRY

(no calculators allowed)

PART 1: Multiplication Tables (through 12)

You will have two minutes to do the following 24 multiplication problems. Then, this sheet will be collected and you will be given the remainder of the Prerequisite Quiz.

$2 \times 6 =$

$3 \times 2 =$

$4 \times 9 =$

$5 \times 2 =$

$8 \times 8 =$

$9 \times 3 =$

$10 \times 7 =$

$2 \times 4 =$

$5 \times 1 =$

$6 \times 8 =$

$7 \times 9 =$

$8 \times 10 =$

$0 \times 10 =$

$1 \times 11 =$

$7 \times 3 =$

$11 \times 9 =$

$6 \times 4 =$

$7 \times 11 =$

$3 \times 7 =$

$4 \times 5 =$

$9 \times 5 =$

$10 \times 6 =$

$12 \times 10 =$

$9 \times 12 =$

SAMPLE PREREQUISITE PROBLEMS: GEOMETRY

(no calculators allowed)

PART 2: Arithmetic and Algebra I Skills

You will have 25 minutes to do the following problems. Neatly show all work leading to your answers on this sheet.

1. (arithmetic with whole numbers, decimals, fractions; arithmetic with signed numbers)

$$\frac{0}{7.2} =$$

$$- \frac{(6)(-2)}{-3} =$$

$$-3 - (-2) =$$

$$1,000 \times 3.47 =$$

$$\frac{248.36}{100} =$$

$$\frac{1}{3} - \frac{1}{5} =$$

$$\frac{1}{3} \cdot \frac{1}{5} =$$

$$\frac{1}{3} \div \frac{1}{5} =$$

$$126 \times 24 =$$

2. (base ten number system)

Fill in the blanks with the correct place value (for example: ones, tens, tenths, hundredths, etc).

In the decimal **3,479.016**, the digit 3 represents three _____ and the digit 1 represents one _____.

3. Suppose that 746 marbles are divided into piles of size 23 each. How many piles can be made, and how many marbles will be left over?

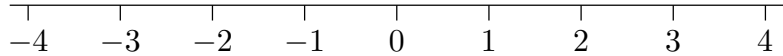
Number of piles:

Number of marbles left over:

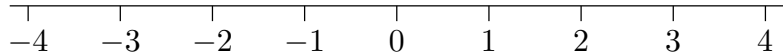
4. (real number line concepts; $|x|$ as distance from x to 0; $|x - y|$ as distance between x and y)

On each number line, clearly shade the requested value(s) of x :

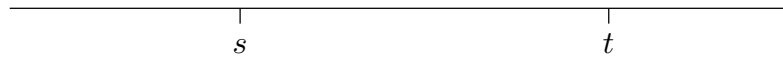
x is at least -1



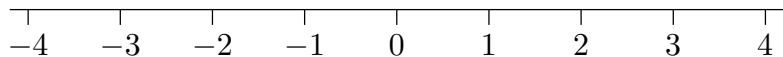
x is at most 2



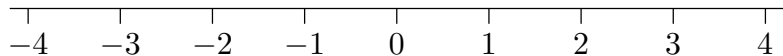
x is the average of s and t



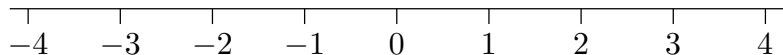
$x \leq 2$



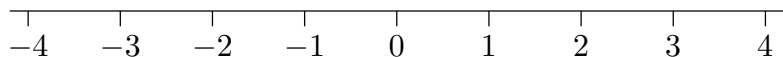
$x > 0$



$|x| = 3$



$|x - 3| = 1$



5. (arithmetic with signed numbers; order of operations)

$$\frac{1 - 2 \cdot 3 - 5(-4 + 1)}{-1 - (-3)} =$$

6. (whole number exponents; exponent laws)

Simplify $\frac{6x^2x^3}{(2x)^2}$.

7. (ratios and proportions)

Three apples cost the same amount as two oranges. If Carol has enough money to buy 27 apples, then how many oranges would she be able to buy?

8. (combining like terms; the distributive law)

Simplify as much as possible: $5(x - 2) - 3x(1 - x)$

9. (FOIL)

Expand and simplify $(2x - 1)^2$.

10. (factoring: greatest common factor; factoring trinomials; difference of squares)

FACTOR each of the following:

(a) $3xy^3 - 15x^2y$

(b) $x^2 - 4$

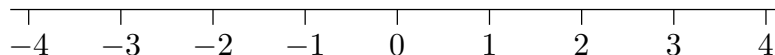
(c) $x^2 + 5x + 4$

11. (solving linear equations)

Solve the equation $2x + 3 = 5 - 7x$.

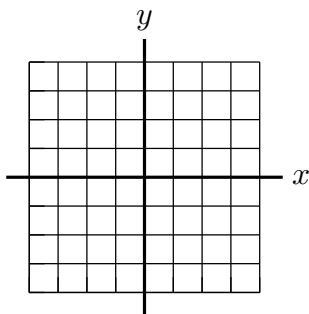
12. (solving linear inequalities)

Solve the inequality $3 - 2x < 5$ for x and graph the solution set on the number line.



13. (graphing lines)

Graph $2x + 3y - 6 = 0$.



14. (working with lines: writing equations; slope; parallel and perpendicular lines)

Find the equation of the line that is perpendicular to $y = -\frac{2}{3}x + 7$ and passes through the point $(-2, 1)$. Write the equation in the form $ax + by + c = 0$, where a , b and c are whole numbers.

15. (midpoint and distance formulas)

Here are two points: $P_1 = (1, -4)$ and $P_2 = (-3, 6)$.

Find the midpoint of the line segment connecting P_1 and P_2 .

MIDPOINT = (,)

Find the distance between P_1 and P_2 . Do NOT approximate your answer.

DISTANCE BETWEEN P_1 and P_2 is:

SAMPLE PREREQUISITE PROBLEMS: GEOMETRY

(you may use your calculator on this page)

PART 3: Calculator Skills

1. (exact versus approximate answers)

Suppose that x is a positive number which, when squared, equals 3.

EXACT VALUE OF x : _____

APPROXIMATE VALUE OF x , rounded to the thousandths place: _____

2. Approximate $\frac{\sqrt{2} - 3 \cdot 5^7}{100\sqrt{3} + 1}$; round to the thousandths place.

SOLUTIONS: All solutions are given left to right, top to bottom

Multiplication Tables:

12, 6, 36, 10

64, 27, 70, 8

5, 48, 63, 80

0, 11, 21, 99

24, 77, 21, 20

45, 60, 120, 108

Arithmetic and Algebra I Skills:

1. 0, -4 , -1

3,470, 2.4836, $\frac{2}{15}$

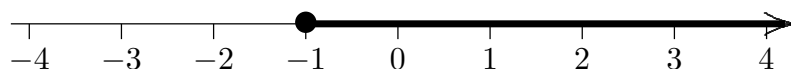
$\frac{1}{15}$, $\frac{5}{3}$, 3,024

2. thousands, hundredths

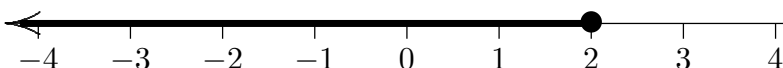
3. 32 piles, 10 left over

4.

x is at least -1



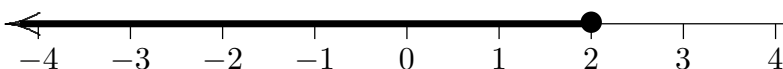
x is at most 2



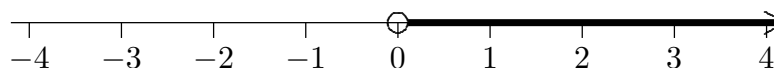
x is the average of s and t



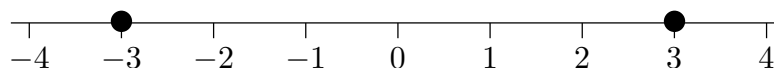
$x \leq 2$



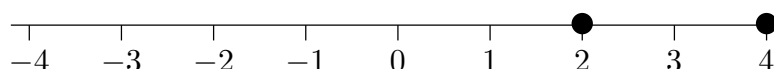
$x > 0$



$|x| = 3$



$|x - 3| = 1$



5. 5

6. $\frac{3}{2}x^3$

7. 18 oranges

8. $3x^2 + 2x - 10$

9. $4x^2 - 4x + 1$

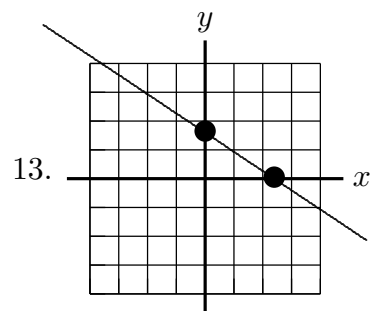
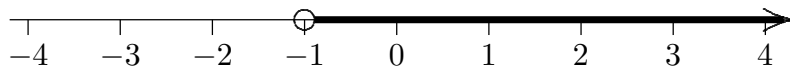
10. (a) $3xy(y^2 - 5x)$

(b) $(x - 2)(x + 2)$

(c) $(x + 4)(x + 1)$

11. $x = \frac{2}{9}$

12. $x > -1$



14. $-3x + 2y - 8 = 0$

15. midpoint = $(-1, 1)$, distance = $\sqrt{116}$

Calculator Skills:

1. EXACT VALUE OF x is $\sqrt{3}$.

APPROXIMATE VALUE OF x (rounded to the thousandths place) is 1.732.

2. $\frac{\sqrt{2} - 3 \cdot 5^7}{100\sqrt{3} + 1} \approx -1,345.389$