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?
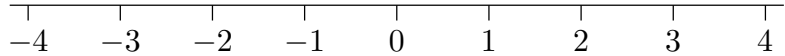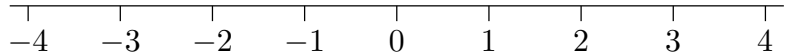
Number of piles:

Number of marbles left over:

Sample Prerequisite Problems: Geometry—page 2

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:
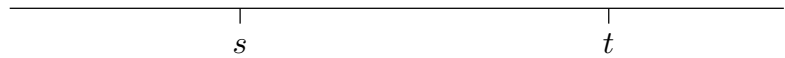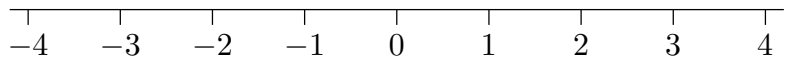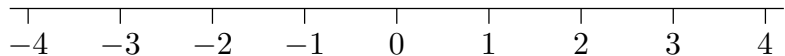
x is at least -1

$$-4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4$$

x is at most 2

$$-4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4$$

x is the average of s and t

$$s \qquad\qquad t$$

$x \le 2$

$$-4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4$$

$x > 0$

$$-4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4$$

$|x| = 3$

$$-4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4$$

$|x - 3| = 1$

$$-4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4$$
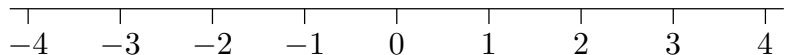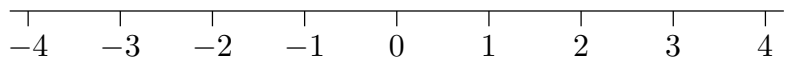
5. (arithmetic with signed numbers; order of operations)
$$\frac{1 - 2 \cdot 3 - 5(-4 + 1)}{-1 - (-3)} =$$

6. (whole number exponents; exponent laws)
Simplify $\dfrac{6x^2 x^3}{(2x)^2}$.

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?

Sample Prerequisite Problems: Geometry—page 3

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:

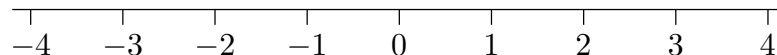   (a) $3xy^3 - 15x^2y$

    (b) $x^2 - 4$

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

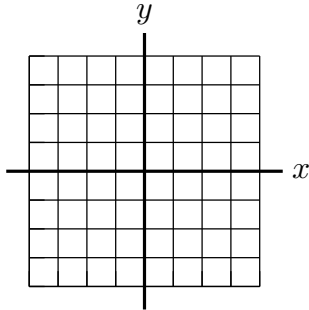11. (solving linear equations)
    Solve the equation $2x + 3 = 5 - 7x$.

12. (solving linear inequalities)
    Solve the inequality $3 - 2x < 5$ for x and graph the solution set on the number line.

$$-4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4$$

Sample Prerequisite Problems: Geometry—page 4

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 $\dfrac{\sqrt{2} - 3 \cdot 5^7}{100\sqrt{3} + 1}$; 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 $\qquad$ $3{,}470$, 2.4836, $\frac{2}{15}$ $\qquad$ $\frac{1}{15}$, $\frac{5}{3}$, $3{,}024$
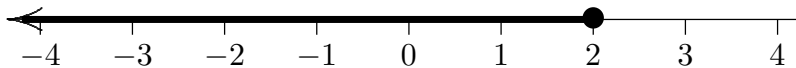
2. thousands, hundredths
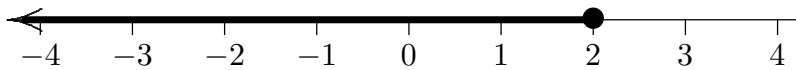
3. 32 piles, 10 left over
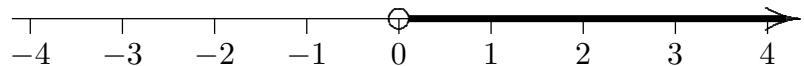
4.
x is at least -1
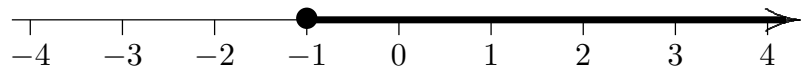
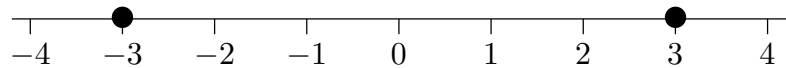x is at most 2

x is the average of s and t

$x \le 2$
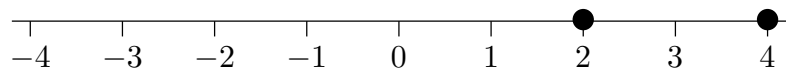

$x > 0$

$|x| = 3$

$|x - 3| = 1$

5. 5

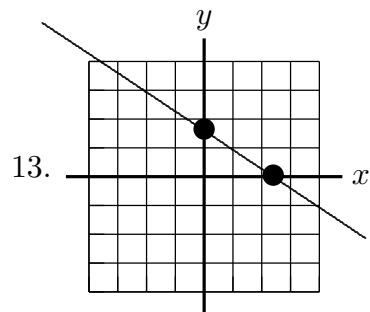6. $\frac{3}{2}x^3$

7. 18 oranges

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

Sample Prerequisite Problems: Geometry—page 7
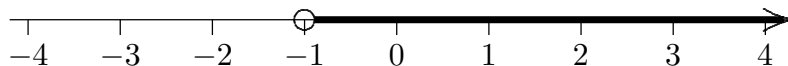
9. $4x^2 - 4x + 1$

10. (a) $3xy(y^2 - 5x)$ (b) $(x-2)(x+2)$ (c) $(x+4)(x+1)$

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

12. $x > -1$

13.

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

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

Calculator Skills:

1. EXACT VALUE OF x is $\sqrt{3}$.
APPROXIMATE VALUE OF x (rounded to the thousandths place) is 1.732.

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