

# Coordinate Algebra Formula Sheet

The formulas below are provided to students during testing in both the online testing platform and the printed test booklet. This page may be printed for instructional use during the school year, but it MAY NOT be used as scratch paper during test administration.

## Linear Formulas

### Slope Formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

### Linear Equations

Slope-intercept Form:  $y = mx + b$

Point-slope Form:  $y - y_1 = m(x - x_1)$

Standard Form:  $Ax + By = C$

### Arithmetic Sequence Formulas

Recursive:  $a_n = a_{n-1} + d$

Explicit:  $a_n = a_1 + d(n - 1)$

## Geometry Formulas

### Perimeter

The perimeter of a polygon is equal to the sum of the lengths of its sides.

### Area

Triangle  $A = \frac{1}{2}bh$

Rectangle  $A = bh$

### Distance Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

**Coordinates of point which partitions a directed line segment AB at the ratio of  $a:b$  from  $A(x_1, y_1)$  to  $B(x_2, y_2)$**

$$(x, y) = \left( \frac{bx_1 + ax_2}{b + a}, \frac{by_1 + ay_2}{b + a} \right)$$

**OR**

$$(x, y) = \left( x_1 + \frac{a}{a+b}(x_2 - x_1), y_1 + \frac{a}{a+b}(y_2 - y_1) \right)$$

## Average Rate of Change

The change in the  $y$ -value divided by the change in the  $x$ -value for two distinct points on a graph.

## Exponential Formulas

### Exponential Equation

$$y = ab^x$$

### Geometric Sequence Formulas

Recursive:  $a_n = r(a_{n-1})$

Explicit:  $a_n = a_1 \cdot r^{n-1}$

### Compound Interest Formula

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

## Statistics Formulas

### Mean

$$\bar{x} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

### Interquartile Range

$$IQR = Q_3 - Q_1$$

The difference between the first quartile and third quartile of a set of data.

### Mean Absolute Deviation

$$\frac{\sum_{i=1}^n |x_i - \bar{x}|}{n}$$

The sum of the distances between each data value and the mean, divided by the number of data values.