

Reference Sheet

Fraction Arithmetic

$$\bullet \frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd} \qquad \bullet \frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c}$$

• To add and subtract fractions, you need a common denominator.

$$\frac{a}{c} + \frac{b}{c} = \frac{a+b}{c} \qquad \text{and} \qquad \frac{a}{c} - \frac{b}{c} = \frac{a-b}{c}$$

Miscellaneous

• To convert from a percentage to a decimal, divide the number by 100. This is equivalent to moving the decimal two places to the left. Do the opposite to convert from a decimal to a percentage.

• Distance between two points (x_1, y_1) , (x_2, y_2) is $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

• Midpoint between two points (x_1, y_1) , (x_2, y_2) is $(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$

• Distance = Rate \cdot Time (i.e. $d = rt$)

Relations and Functions

• The domain of a relation/function is the set of all x -values

• The range of a relation/function is the set of all y -values

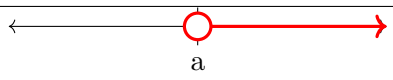
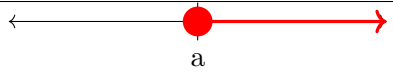
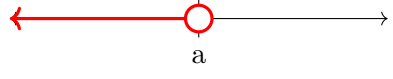
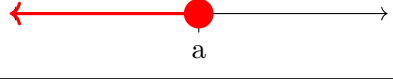




• To find x -intercepts, set $y = 0$ and solve. To find a y -intercept, set $x = 0$ and solve.

• Average rate of change of a function f from $x = a$ to $x = b$ is $\frac{f(b)-f(a)}{b-a}$

• Difference quotient of f is $\frac{f(x+h)-f(x)}{h}$

• Equation of a circle: $(x - h)^2 + (y - k)^2 = r^2$, where the center is (h, k) and the radius is r

Inequalities

Inequality	Number Line	Interval Notation
$x > a$		(a, ∞)
$x \geq a$		$[a, \infty)$
$x < a$		$(-\infty, a)$
$x \leq a$		$(-\infty, a]$
$a < x < b$		(a, b)
$a \leq x \leq b$		$[a, b]$
$a < x \leq b$		$(a, b]$
$a \leq x < b$		$[a, b)$

Reference Sheet Continued

Lines/Linear Functions

- Standard/General Form: $Ax + By + C = 0$, where A and B aren't both 0
- Slope-Intercept Form: $y = mx + b$, where m is the slope and b is the y -intercept
- Point-Slope Form: $y - y_1 = m(x - x_1)$, where m is the slope and the point (x_1, y_1) is on the line
- $m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$
- Parallel lines have the same slope. Perpendicular lines have slopes that are opposite reciprocals of each other.

Quadratic Functions

- Equation of a parabola: $f(x) = a(x - h)^2 + k$, where (h, k) is the vertex.
- The vertex of a parabola $f(x) = ax^2 + bx + c$ is located at $(\frac{-b}{2a}, f(\frac{-b}{2a}))$
- To complete the square for $x^2 + bx$: add $(\frac{b}{2})^2$. If there is a number in front of your x^2 , factor that out before completing the square.
- To factor $ax^2 + bx + c$ by grouping, find two numbers that multiply to $a \cdot c$ and add to b . Use these two numbers to split up the middle term bx .
- Difference of squares formula: $a^2 - b^2 = (a - b)(a + b)$
- Quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- $b^2 - 4ac$ is called the discriminant of a quadratic function.