

ACT Formulas & Properties to Remember

- Distance formula

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

- Midpoint formula

$$MP = \left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2} \right)$$

- Slope formula

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

- triangle special properties

* 30°-60°-90° right triangles always have a ratio of $x : x\sqrt{3} : 2x$

* 45°-45°-90° right triangles always have a ratio of $x : x : x\sqrt{2}$

* special side ratios:

3:4:5

5:12:13

8:15:17

7:24:25

parent functions & transformations

* ex: $ax^2 + bx + c$ is the parent function of a parabola. The coefficients of a , b , and c in a parabola equation can tell us certain things about how that graph is transformed (changed from the original parent function):

- the sign of a (+/-) tells us if the parabola is facing up (U) or down (∩)
- the sign of c (representing the y -intercept) tells us if the parabola's vertex is above or below the origin $(0, 0)$
- if the sign of b (+/-) is different from the sign of a , the graph is shifted to the right. if the signs are the same, the graph is shifted to the left

* ex: $(x-h)^2 + (y-k)^2 = r^2$ is the parent function of a circle.

- (h, k) is the center point
- r is the radius

* ex: $y = mx + b$ is the parent function of a line.

- m is the slope
- b is the y -intercept

■ geometry formulas

[*area:]

- rectangle: $A = LW$

- triangle: $A = \frac{1}{2} BH$

- circle: $A = \pi r^2$

- trapezoid: $A = \frac{A+B}{2} H$

- square: $A = S^2$

[*perimeter:]

- rectangle: $P = 2L + 2W$

- circle (circumference): $C = 2\pi r$

- square: $P = 4S$

[*volume:]

- box: $V = LWH$

- pyramid: $V = \frac{1}{3} BH$

- sphere: $V = \frac{4}{3} \pi r^3$

- cylinder: $V = \pi r^2 h$

■ trig functions: SOH CAH TOA

$$\sin = \frac{O}{H} \quad \cos = \frac{A}{H} \quad \tan = \frac{O}{A}$$

■ pythagorean theorem:

$$a^2 + b^2 = c^2$$

■ logarithms

$$\text{if } \log_a b = c, \text{ then } b = a^c$$

■ quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$