

FORMULAS AND EQUATIONS TO REMEMBER!

1) Simple Interest Formula: Interest = Principal \times rate \times time $I = Prt$

Example: If you deposit \$2,000 in a credit union savings account at 4% interest, how much interest will you receive at the end of 1 year?

$$I = Prt$$

$$I = (2,000) \cdot (0.04) \cdot 1$$

$$I = 80$$

You will receive \$80 in interest. ■

2) Motion Formula: distance = rate \times time $d = rt$

Example: If you travel 55 miles per hour for 6 hours, how far will you travel?

$$d = rt$$

$$d = (55) \cdot (6)$$

$$d = 330$$

You will travel 330 miles. ■

3) Perimeter of a Square: Perimeter = 4 \times side $P = 4s$

Example: What is the perimeter of a square which has a side of 10 inches?

$$P = 4s$$

$$P = 4 \cdot 10$$

$$P = 40$$

The perimeter of the square is 40 inches. ■

4) Perimeter of Rectangle: Perimeter = 2 \times width + 2 \times length $P = 2w + 2l$

Example: What is the perimeter of a rectangular swimming pool that has a width of 20 feet and a length of 50 feet?

$$P = 2w + 2l$$

$$P = 2 \cdot 20 + 2 \cdot 50$$

$$P = 140$$

The perimeter of the swimming pool is 140 feet. ■

5) Circumference of a Circle: Circumference = 2 \times π \times radius $C = 2\pi r$

Example: What is the circumference of a circle whose radius is 4 centimeters? .

$$C = 2\pi r$$

$$C = 2\pi(4)$$

$$C = 8\pi$$

$$C = 8 \times 3.14 \approx 25 \text{ centimeters}$$

The circumference of the circle is approximately 25 centimeters. ■

6) Area of a Triangle: $A = \frac{1}{2} \cdot \text{base} \cdot \text{height}$ $A = \frac{1}{2}bh$

Example: Find the area of a triangle whose base is 11 inches and whose height is 9 inches.

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

$$A = \frac{1}{2} \cdot 11 \cdot 9$$

$$A = \frac{99}{2}$$

$$A = 49.5$$

The area of the triangle is 49.5 square inches. ■

7) Area of a Square: Area = side² $A = s^2$

Example: If each side of a square is 10 inches, what is the area of the square?

$$A = s^2$$

$$A = 10^2$$

$$A = 100$$

The area of the square is 100 square inches. ■

8) Area of a Rectangle: Area = width × length $A = wl$

Example: A rectangular swimming pool has a width of 25 feet and an area of 1250 square feet. What is the pool's length?

$$A = wl$$

$$1,250 = 25l$$

$$25l = 1,250$$

$$\frac{25l}{25} = \frac{1250}{25}$$

$$l = 50$$

The pool's length is 50 feet. ■

9) Area of a Circle: Area = $\pi \times \text{radius}^2$ $A = \pi r^2$

Example: What is the area of a circle whose radius is 10 inches?

$$A = \pi r^2$$

$$A = \pi \cdot 10^2$$

$$A = 100\pi$$

$$A = 100 \cdot 3.14 = 314$$

The area of the circle is approximately 314 square inches. ■

10) Volume of a Cube: Volume = side³ $V = s^3$

Example: What is the volume of a cube whose side is 5 inches?

$$V = s^3$$

$$V = 5^3$$

$$V = 125$$

The volume of the cube is 125 cubic inches. ■

11) Volume of a Rectangular Solid: Volume = length \times width \times height

$$V = lwh$$

Example: What is the volume of a box that has a length of 11 inches, a width of 8 inches and a height of 16 inches?

$$V = lwh$$

$$V = 11 \cdot 8 \cdot 16$$

$$V = 1,408$$

The volume the box is 1,408 cubic inches. ■

12) The measure of the complement of an angle is $(90 - x)^\circ$.

Example: What is the complement of a 30 degree angle? $90 - 30 = 60^\circ$ ■

13) The measure of the supplement of an angle is $(180 - x)^\circ$.

Example: What is the supplement of a 45 degree angle? $180 - 45 = 135^\circ$ ■

14) The sum of the measures of the three angles of any triangle is 180° .

Example: One angle of a triangle is three times as large as another. The measure of the third angle is 30° greater than the smallest angle. What is the measure of each angle.

let x = the measure of the smallest angle

then $3x$ = the measure of the second angle

then $x + 30$ = the measure of the third angle

$$x + 3x + (x + 30) = 180$$

$$5x + 30 = 180$$

$$5x = 150$$

$$x = 30$$

The measure of the first angle is 30° , the measure of the second angle is 90° , and the measure of the third angle is 60° . ■

15) The General Form of a Linear Equation is $Ax + By = C$.

Example: Graph $x + 2y = 6$.

When the equation is in general form, find the intercepts and one insurance point and the graph the line through the three points. ■

<i>Points :</i>	<i>x</i>	<i>y</i>
<i>y-intercept</i>	0	3
<i>x-intercept</i>	6	0
<i>insurance point</i>	12	-3

16) The Slope-Intercept Form of a line is $y = mx + b$.

Example: Graph $y = \frac{1}{2}x + 3$.

When the equation is in slope-intercept form, first plot the y -intercept $(0, 3)$ and then run 2 and rise 1 to find a second point $(2, 4)$. Graph the line through the two points. ■

17) The equation of a horizontal line is $y = b$.

Example: Graph $y = 3$.

Graph the line through the points $(0, 3)$, $(1, 3)$, $(2, 3)$. ■

x	y
0	3
1	3
2	3

18) The equation of a vertical line is $x = a$.

Example: Graph $x = -2$.

Graph the line through the points $(-2, 0)$, $(-2, 1)$, $(-2, 2)$. ■

x	y
-2	0
-2	1
-2	2

19) The slope formula is $m = \frac{y_2 - y_1}{x_2 - x_1}$.

Example: Find the slope of the line passing through $(-4, 2)$ and $(3, -5)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-5 - 2}{3 - (-4)} = \frac{-5 + (-2)}{3 + 4} = \frac{-7}{7} = -1 \blacksquare$$

20) Point-Slope Form is $y - y_1 = m(x - x_1)$.

Example: What is the equation of a line that has a slope of -3 and passes through the point $(-5, -7)$? Write the answer in both point-slope form and slope-intercept form.

$$y - y_1 = m(x - x_1)$$

$$y - (-7) = -3(x - (-5))$$

$$y + 7 = -3(x + 5) \text{ (point - slope form)}$$

$$y + 7 = -3x - 15$$

$$y = -3x - 15 - 7$$

$$y = -3x - 22 \text{ (slope - intercept form)} \blacksquare$$

Check:

$$y = -3x - 22$$

$$-7 \stackrel{?}{=} -3 \cdot (-5) - 22$$

$$-7 = 15 - 22 \checkmark$$