# Amity Regional High School

## Entering Geometry Essential Skills

Welcome to your Geometry Success Problem-set! This packet is designed to help you review key concepts and strengthen your math skills before the next school year. It covers essential topics such as equations, angles, and triangles to reinforce what you've learned and preparing you for future lessons.

Complete each section carefully. Show all work and use the provided formulas when necessary. If you get stuck, you can look up the **bolded words** on the internet or ask for help. By working through this packet, you'll build confidence and stay sharp in geometry.

Let's get started—happy learning!

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**Part 1 – Algebra Skills**

I can simplify expressions using the **order of operations**. This helps me solve math problems accurately by following the correct sequence of steps.

a. $-93-(-84--41-(-56))$

b. $4x(2y-3z)$

c. $2x-[4-3(2^5+18y)]$

I can **solve proportions** by finding the missing value in equivalent ratios. This helps me compare quantities and solve real-world problems involving scaling.

a. $\frac{x-4}{3}=\frac{7}{8}$

b. $\frac{12}{30}=\frac{10}{x}$

c. A car travels 150 km on 12 liters of gas. How many liters are needed for 500km?

I can **solve equations** by isolating the variable using inverse operations. This helps me find unknown values and understand mathematical relationships.

a. $5x-7=2x+20$

b. $10-3x=2x-8x+20$

c. $\frac{2}{3}+\frac{1}{4}x=\frac{1}{3}$

I can **solve inequalities** by using inverse operations and following the rules for inequality signs. This helps me determine ranges of possible solutions in real-world situations.

a. $-2(x+4) < -16$

b. $6(z-5) < 5(7-2z)$

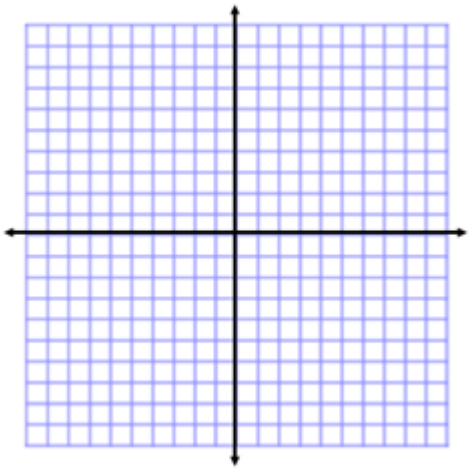
c. $\frac{x}{4} - \frac{1}{6} \leq 12$

I can **graph lines** using slope and y-intercept or a table of values. This helps me visually represent linear relationships and understand their patterns.

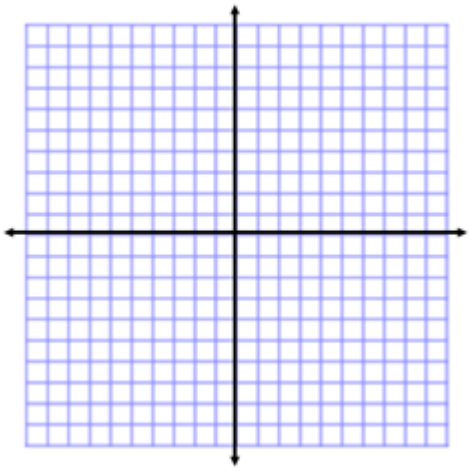
a. What is the slope of a horizontal line?

b. What is the slope of a vertical line?

c. Graph y = 3

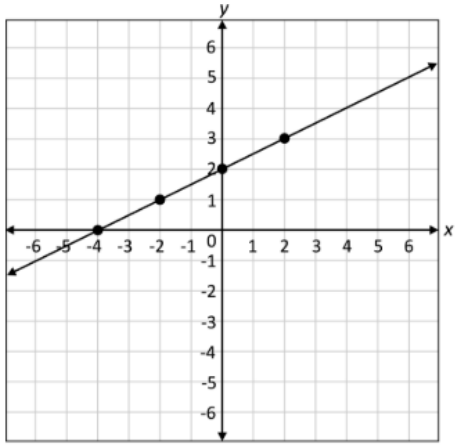


d. Graph x = -4

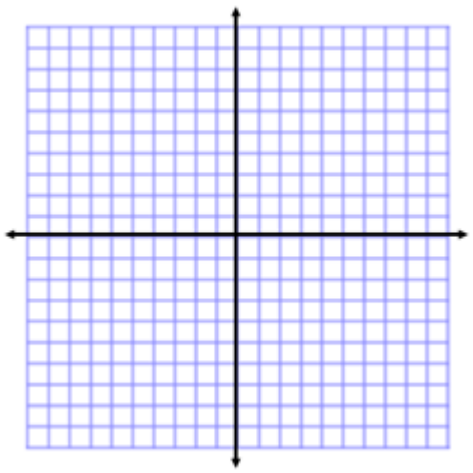


I can **write the equation of a line in slope-intercept** form (y = mx + b). This helps me understand the slope and y-intercept, making it easier to graph and analyze linear relationships.

a. Write the equation of the line shown below in slope-intercept form




b. Graph the linear function $y - 2 = 3(x-1)$



c. Write the equation in slope-intercept form of the line that passes through (1, -12) and (10, 6)
the line goes through (1,-12) and (10,6).

I can identify and write equations for **parallel and perpendicular lines**. This helps me understand how slopes determine the relationship between lines in a coordinate plane.

a. Given the line $y = \frac{2}{11}x - 3$

1) What is the slope of a line that is parallel to this line?

2) What is the slope of a line that is perpendicular to this line?

b. Write the equation of a line that is parallel to $2x - 4y = 10$ and passes through (-8, 7)

c. Write the equation of a line that is perpendicular to $y = \frac{2}{5}x - 4$ and passes through (4, 0)

I can **solve systems of equations** using substitution, elimination, or graphing. This helps me find the point where two equations intersect and solve real-world problems involving multiple variables.

a. Solve by graphing.

$y = -x + 5$

$y = \frac{1}{2}x + 2$

b. Solve by substitution.

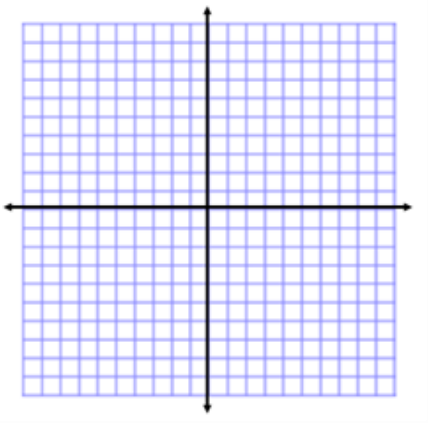
$x = y + 2$

$3x + y = 6$

c. Solve by Elimination

$x + 2y = 0$

$x + y = -3$



I can **simplify radicals** by factoring out perfect squares, cubes, or higher powers. This helps me express square roots and other roots in their simplest form for easier calculations

a. $\sqrt{121}$ b. $\sqrt{32}$ c. $\sqrt{162}$

I can **solve equations using the square root method** and express answers in simplest radical form. This helps me find exact solutions for quadratic equations without factoring or using the quadratic formula.

a. $x^2 = 72$ b. $x^2 + 16 = 97$ c. $(x-2)^2 = 64$

I can use the **distributive property** to simplify expressions and multiply binomials. This helps me expand expressions correctly and solve algebraic problems efficiently.

a. $2x(x+1)$ b. $(4x+7)(5x-2)$ c. $(2x-3)^2$

I can **factor expressions** by finding common factors or applying special factoring formulas. This helps me simplify expressions and solve quadratic equations more easily.

a. $6x^2 + 9x$ b. $x^2 - 14x + 49$ c. $x^2 + 8x + 15$

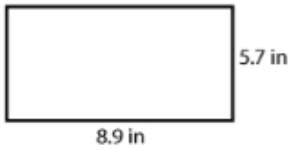
I can **solve quadratic equations by factoring** when the leading coefficient (a) is 1. This helps me find the solutions by setting each factor equal to zero and solving for the variable.

a. $x^2 - 6x - 16 = 0$ b. $x^2 - x = 42$ c. $x^2 = -7x + 60$

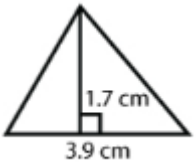
**Middle School Geometry Topics**

I can find **the area of 2D shapes** using the appropriate formulas. This helps me measure surface space in real-world applications like design and construction.

a. Find the area of the rectangle.

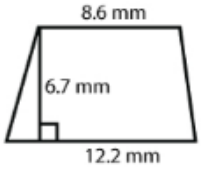



b. Find the area of the triangle.



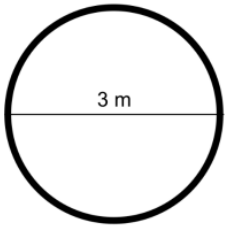

c. Find the area of the trapezoid using

$$A = \frac{1}{2}h(b_1 + b_2)$$

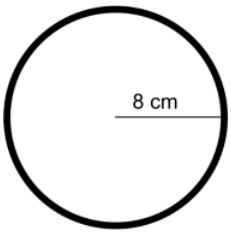



I can find the **area and circumference of circles** using the appropriate formulas. This helps me solve problems involving circular shapes in real life. (Leave your answer in terms of pi or round to the nearest hundredth)

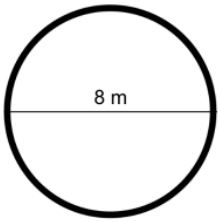
a. What is the radius of the circle?




b. Find the circumference of the circle using the formula. $C = d\pi$

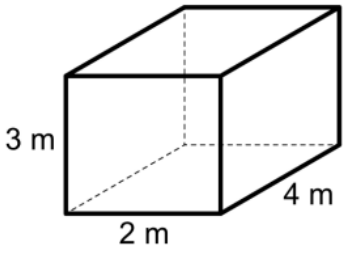



c. Find the area of the circle using the formula. $A = r^2\pi$

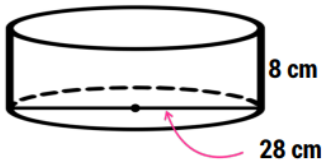



I can find the **volume of 3D shapes** using the appropriate formulas. This helps me measure the space inside objects like boxes, cylinders, and spheres. (Leave your answer in terms of pi or round to the nearest hundredth)

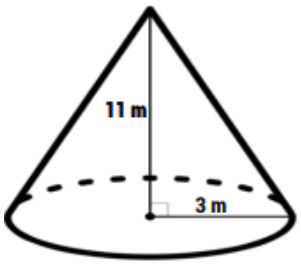
a. Find the volume of the rectangular prism using $V = w \cdot h \cdot l$




b. Find the volume of the cylinder using $V = \pi r^2 h$

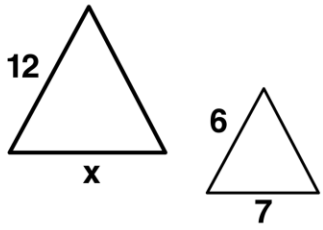



c. Find the volume of the cone using $V = \frac{1}{3}\pi r^2 h$

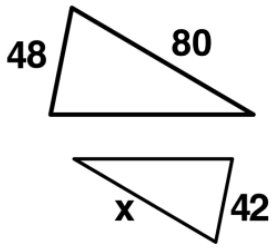


I can identify and use properties of **similar triangles** to solve problems involving proportional relationships. This helps me find missing side lengths and apply similarity in real-world situations

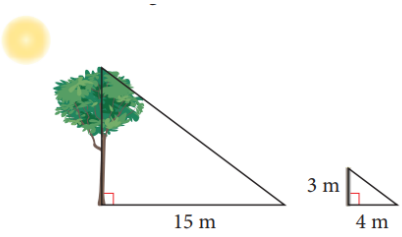
a. Find the value of $x$ in similar triangles.




b. Find the value of $x$ in similar triangles.




c. A pole 3 m tall casts a Shadow 4 m long. A nearby tree casts a 15 m shadow. What is the height of the tree?

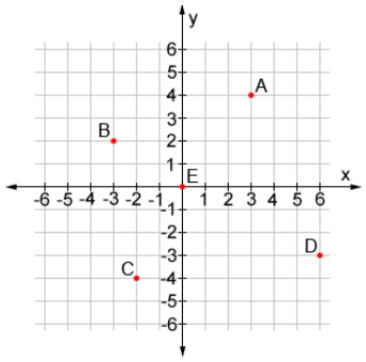



I can find the midpoint of a line segment using the **midpoint formula**. This helps me determine the exact center between two points on a coordinate plane. $(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$

a. (8, 4) and (12, 2)

b. (-2, -7) and (6, -5)

c. Find the midpoint of AB.

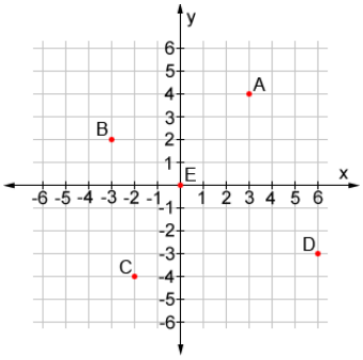



I can find the distance between two points using the **distance formula**. This helps me measure the length of a line segment on a coordinate plane. $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

a. (3, 7) and (-2, -5)

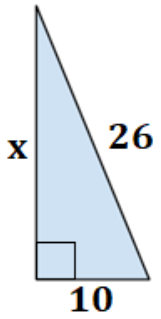
b. (3, 4) and (6, 8)

c. Find the distance of AD.

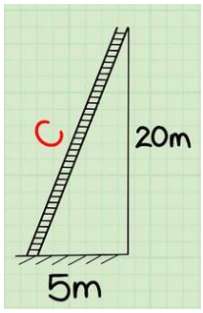


I can use the Pythagorean Theorem to find missing side lengths in right triangles. This helps me solve real-world problems involving distance and right-angle relationships. (Leave answers in simplest radical form)

a. Find the value of $x$.



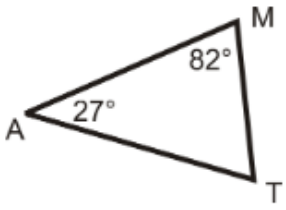

b. Find the length of the ladder.



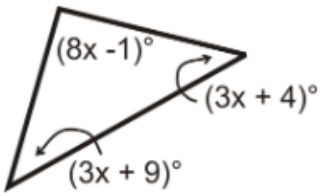

c. Find the length of the diagonal of a rectangle whose length is 12 inches and width 7 inches.

I can use the **Triangle Angle Sum Theorem** to find missing angles in a triangle. This helps me understand that the sum of a triangle's interior angles is always 180°.

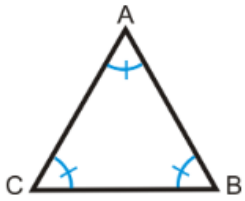
a. Find the measure of angle T.




b. Solve for x.

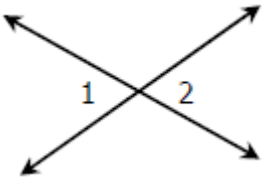


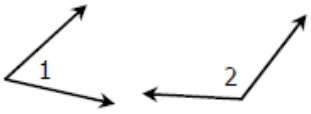

c. What is the measure of one angle if the triangle is equilateral?



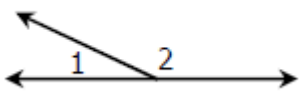

I can identify and describe **complementary, supplementary, vertical, and adjacent angles**.
This will help me when I need to solve for missing angles in more complex figures, including triangles and polygons.

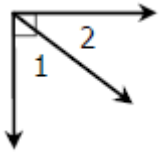
Identify.



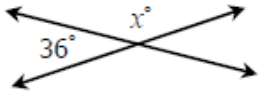




$m\angle 1 = 68°;\ m\angle 2 = 112°$

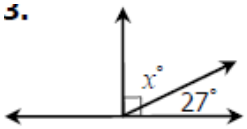


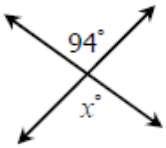



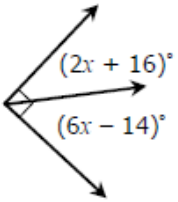
Solve for the variable.

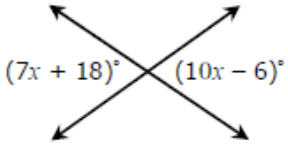



3.



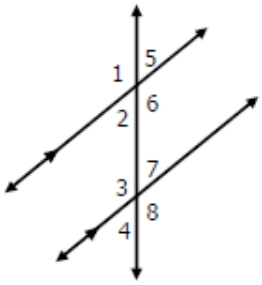




I can identify and describe angle relationships when a **transversal crosses parallel lines**, including corresponding, alternate interior, alternate exterior, and same-side interior angles. This will help me when proving lines are parallel, working with angle proofs, and solving problems involving polygons and parallel lines.

Use the diagram below to classify each pair of angles.



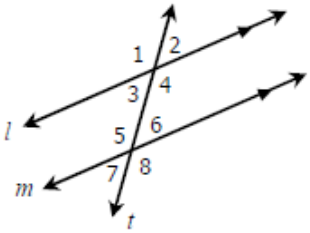

**a.** ∠1 and ∠3 _____

**b.** ∠5 and ∠4 _____

**c.** ∠6 and ∠7 _____

**d.** ∠3 and ∠6 _____

In the diagram below, if $m\angle 5 = 118^\circ$, find each angle measure.




| | |
|---|---|
| $m\angle 1 =$ | $m\angle 6 =$ |
| $m\angle 2 =$ | $m\angle 7 =$ |
| $m\angle 3 =$ | $m\angle 8 =$ |
| $m\angle 4 =$ | |