Name: ______________________________________

For Students Entering Geometry

I. Simplify each expression. Show all work.

1. $3(4-5)-2^3$	2. $3-2(4+5)-2$
3. $\dfrac{3+4(6)}{2}$	4. $(4x^3)(3x^2)$
5. $\sqrt{18}$	6. $5a-2b-(3a-b)$
7. $\dfrac{3x^2}{6x^3}$	8. $(3x^2)^4$

II. Solve for each variable.

9. $4x - 3 = 2(x + 1)$	10. $\frac{x+4}{6} = \frac{3}{7}$
11. Solve for H: $V = L * W * H$	12. If $a + b = 16$, then $3a + 3b =$

FOR THE FOLLOWING SECTIONS PLEASE READ THE GIVEN INFORMATION BEFORE YOU WORK ON THE PRACTICE PROBLEMS.

Radicals

Tips:

- You will need to know all your perfect squares $1^2 = 1$ through $20^2 = 400$.
- $\sqrt[index]{radicand}$ Radical

Guided Practice: Simplify Radicals

Simplify: $-5\sqrt{128}$

$-5\sqrt{64 \cdot 2}$ ← split the radicand into a factor pair, one of which is a perfect square

$-5 \cdot \sqrt{64} \cdot \sqrt{2}$ ← put each factor under its own radical symbol

$-5 \cdot 8 \cdot \sqrt{2}$ ← find the square root of the perfect square factor

$-40\sqrt{2}$ ← simplify

Guided Practice: Add/Subtract Radicals

Tips:

- In order to add or subtract radicals, the index and the radicand must be the same!
- You combine radicals as if you were combining like-terms—add/subtract their coefficients **ONLY**.
- Sometimes it may be necessary to simplify the radicals before you add or subtract.

Simplify: $-\sqrt{99} + 6\sqrt{11} - 2\sqrt{3}$

$-\sqrt{9 \cdot 11} + 6\sqrt{11} - 2\sqrt{3}$ ← Simplify each radical separately, if necessary (as above)

$-\sqrt{9} \cdot \sqrt{11} + 6\sqrt{11} \quad -2\sqrt{3}$

$-3\sqrt{11} + 6\sqrt{11} - 2\sqrt{3}$

$3\sqrt{11} - 2\sqrt{3}$ ← Combine "like radicals"

Guided Practice: Multiplication of Radicals

Tips:

- **T**his is NOT the only way to simplify these problems

Simplify: $2\sqrt{5} \cdot 4\sqrt{8}$

$2\sqrt{5} \cdot 8\sqrt{2}$ ← Simplify each radical, if possible

$2 \cdot 8 \cdot \sqrt{5} \cdot \sqrt{2}$ ← Group coefficients together, group radicands together

$16\sqrt{10}$ ← Multiply coefficients and radicands

simplified ← Simplify radical, if possible

Guided Practice: Division of Radicals

Tips:

- **T**his is NOT the only way to simplify these problems

Simplify: $\frac{\sqrt{192}}{2\sqrt{3}}$

$\frac{\sqrt{64 \cdot 3}}{2\sqrt{3}}$ ← Simplify each radical, if possible

$\frac{\sqrt{64} \cdot \sqrt{3}}{2\sqrt{3}}$

$\frac{8\sqrt{3}}{2\sqrt{3}}$

$\frac{4\sqrt{3}}{\sqrt{3}}$ ← Divide numbers outside the radical

4 ← Divide numbers under the radical

no radical remaining ← Simplify radical, if possible

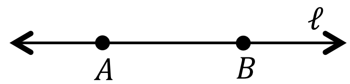
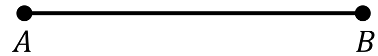
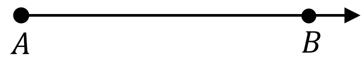
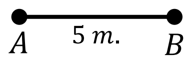
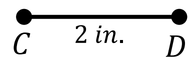
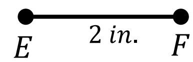
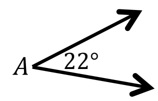
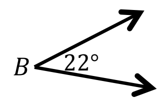
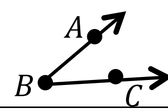
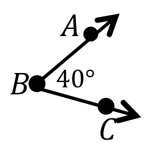
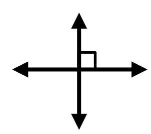
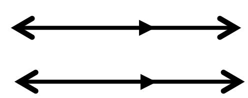
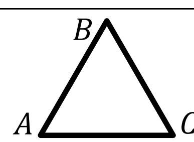
RADICALS

IV. Simplify. Express your answer in simplified radical form.

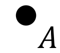
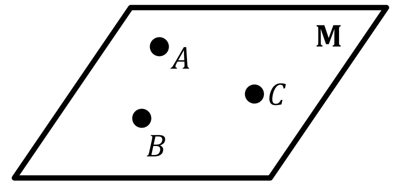
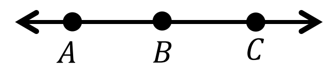
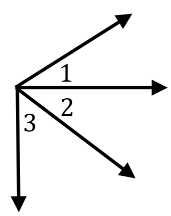
13) $-\sqrt{169}$	*14)* $\sqrt{80} - 14\sqrt{5}$
15) $-3\sqrt{2} \cdot \sqrt{50}$	*16)* $\frac{\sqrt{120}}{\sqrt{8}}$
17) $\sqrt{\frac{72}{9}}$	*18)* $5\sqrt{2} + 2\sqrt{128}$

Geometric Notation and Definitions

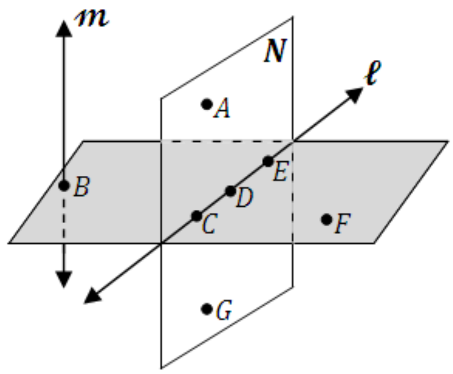
The following set of notation and definitions will be used throughout the entire course.

Notation	Meaning	Diagram
$\overleftrightarrow{AB}$ or $\overleftrightarrow{BA}$ or Line ℓ	Line AB or Line ℓ *Has one dimension. Through any two points, there is exactly one line.*	
$\overline{AB}$ or $\overline{BA}$	Segment AB *Consists of two endpoints A and B and all of the points on $\overleftrightarrow{AB}$ between A and B*	
$\overrightarrow{AB}$ *Can't switch order!!*	Ray AB *Consists of one endpoint A and all the points on $\overleftrightarrow{AB}$ that are on the same side as B*	
AB or BA	The length of segment AB (has no segment bar on top)	 $AB = 5\ m.$
$=$	Equal to **Lengths and angle measures are equal*	  **Equal** $CD = EF$ $2 = 2$ **Congruent** $\overline{CD} \cong \overline{EF}$
$\cong$	Congruent (has the same measure) **Segments and angles are congruent*	  **Equal** $m\measuredangle A = m\measuredangle B$ **Congruent** $\measuredangle A \cong \measuredangle B$
$\measuredangle ABC$ or $\angle ABC$	Angle ABC has a vertex of B The vertex should be the middle letter	
$m\measuredangle ABC$ or $m\angle ABC$	The measure of angle ABC	 $m\measuredangle ABC = 40°$
°	Degree(s), a unit measure for angles	100°
$\perp$	Perpendicular *Two lines that intersect to form a right angle.*	
$\parallel$	Parallel *Two coplanar lines that never intersect. They have the same slope.*	
ΔABC ΔCBA	Triangle ABC	

Other Definitions

Point Point A A	*A point has no dimension.* *It is represented by a dot.*	
Plane Plane ABC Plane M	*A plane has two dimensions. It is represented by a shape that looks like a floor or a wall and extends without end.* *Through any three points not on the same line, there is exactly one plane.* *You can use three points, not all on the same line, to name it.* *Sometimes, you can use a capital letter without a point, if it is provided.*	 Plane ABC or Plane M
Opposite Rays	Two rays with a common end point that go in opposite directions. The first letter is the endpoint.	 $\overrightarrow{BA}$ and $\overrightarrow{BC}$ are opposite rays
Collinear Points	Points that are on the same line.	See diagram above for OPPOSITE RAYS. A, B, C are collinear points.
Coplanar Points	Points that are on the same plane.	See diagram for PLANE above. A, B, C are coplanar points
Adjacent Angles	Angles that share a common vertex and a common side that do not overlap each other. Angles must be coplanar.	 $\measuredangle 1$ and $\measuredangle 2$ are adjacent angles. $\measuredangle 2$ and $\measuredangle 3$ are adjacent angles. $\measuredangle 1$ and $\measuredangle 3$ are **NOT** adjacent angles.

POINTS, LINES, & PLANES



V. Determine if the statement is true or false.

19) C, D, A are collinear …………………………………………….…….. True False

20) A and F are collinear ………………………………………………. True False

21) B, C, and F are coplanar …………………………………………. True False

22) I can form exactly one plane with points C, D, and E …………….. True False

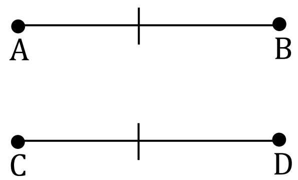
23) Plane N and Plane BCF intersect at line l ……………………….….. True False

24) Give another name for $\overline{CE}$	*25) Give another name for ℓ*
26) Give another name for $\overrightarrow{CE}$	*27) Give another name for Plane BCF*
28) Given that D is the midpoint of $\overline{CE}$, what can you conclude?	*29) Name a pair of opposite rays.*

Segments

Congruent Segments - Line segments that have the same **length**.

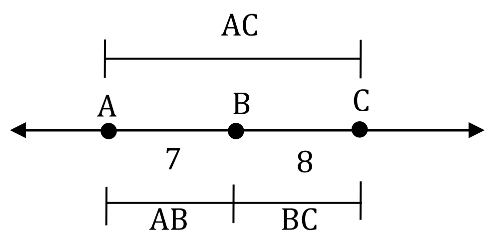
A "tick mark" is used on each segment to show that they are congruent.



Lengths are equal
AB = CD

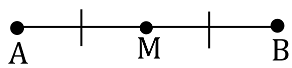
Segments are congruent
$\overline{AB} \cong \overline{CD}$

Segment Addition Postulate - If point B is **between** A and C, then AB + BC = AC. Also, if AB + BC = AC, then point B is **between** point A and C.



AB + BC = AC
7 + 8 = AC
15 = AC

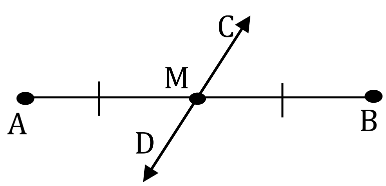
Midpoint - the point that **divides** a segment into two congruent segments.



M is the midpoint of $\overline{AB}$.
$\overline{AM} \cong \overline{MB}$ and AM = MB

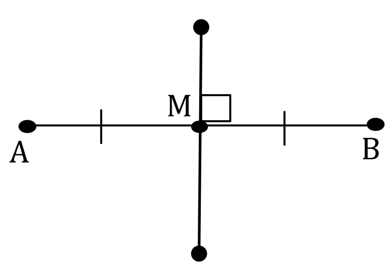
Bisect - to cut a segment into **2** congruent segments

Segment Bisector - a point, ray, line, line segment, or plane that intersects the segment as its **midpoint**.



$\overleftrightarrow{CD}$ is a segment bisector of $\overline{AB}$
$\overline{AM} \cong \overline{MB}$ and AM = MB

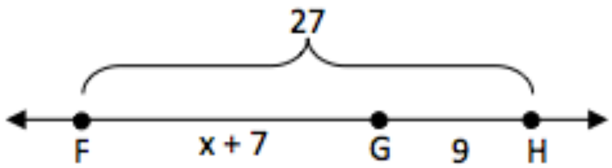
Perpendicular Bisector – a **segment bisector** that is perpendicular to the original segment.



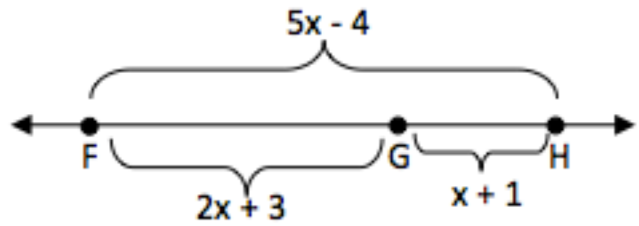
SEGMENTS

VI. Use the segment addition postulate.

30) Solve for x:



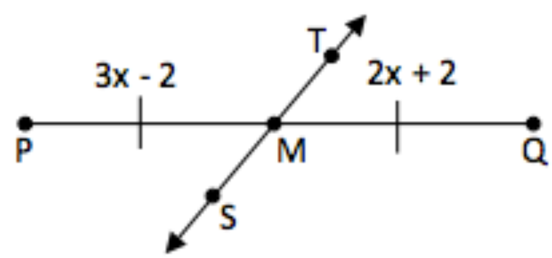
31) Solve for x, then find $\overline{FG}$.



Identify the segment bisector of $\overline{PQ}$ then find PQ.

32)

33)



Area and Perimeter

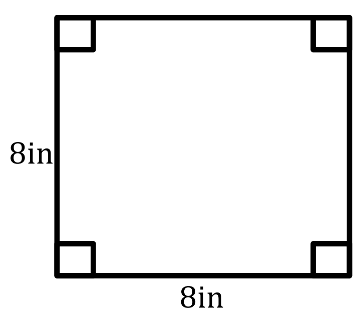
Terms to know:

- *Area*: how much is contained within a 2-dimensional, contained shape
- *Perimeter*: the distance around a 2-dimensional, contained shape
  - for a circle, called *circumference*
- Base and Height: one must be a side length. they must be perpendicular to each other
- Area of a square (b•h), rectangle (b•h), triangle(½b•h) , circle (πr^2)
- Perimeter of polygons (sum of all the sides)
- Circumference of a circle ($2\pi r$)
- Pythagorean Theorem: the relationship between the sides of a right triangle
  - $\mathbf{a^2 + b^2 = c^2}$, where c is the hypotenuse

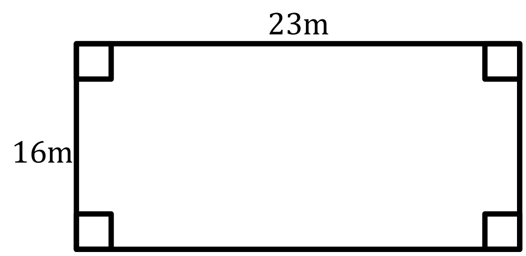
Area and Perimeter

VIII. Find the area <u>AND</u> perimeter/circumference of each shape.

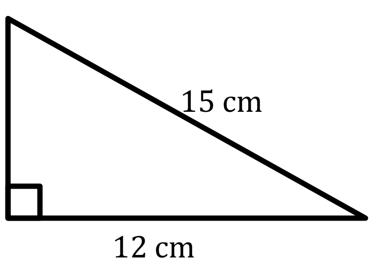
34)



35)



36)



37)