New York Geometry Regents Exam Review

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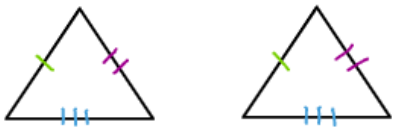
Review Topics for Today

Topic	Points on Recent Exams
Triangle Congruence/Transformations	10-14
Similarity	6-10
Trigonometry	8-12
Volume and Measurement	12-16
Quadrilateral Proofs	8-14

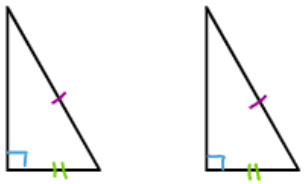
Theorems to Prove Triangles Congruent

Side - Side - Side (SSS)



Angle -Side - Angle (ASA)

Hypotenuse - Leg (HL)

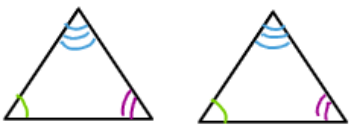


Side - Angle - Side (SAS)

Angle - Angle - Side (AAS)

Insufficient to Prove Triangles Congruent

Angle - Angle - Angle (AAA)

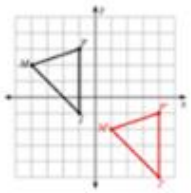


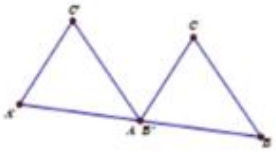
Side - Side - Angle (SSA)

Transformations

Translation:

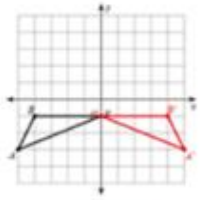
Slide

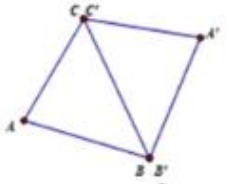




Reflection:

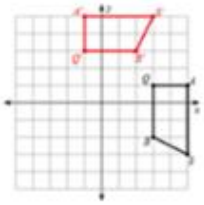
Flip

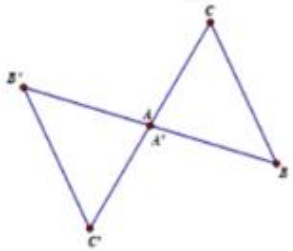




Rotation:

Turn
(counterclockwise)



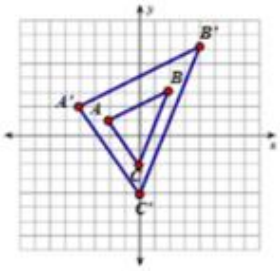


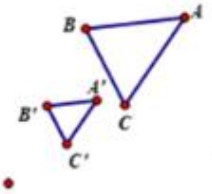
Dilation:

Changes size

Scale factor:

$$\frac{image}{pre-image}$$



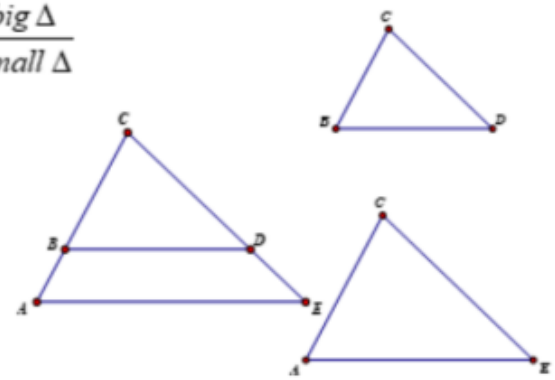


Performing Transformations			
	Notation	How to/Mapping	Rigid Motion?
Translation	$T_{a,b}$	Add the first value to the x and the second value to the y $(x, y) \rightarrow (x + a, y + b)$	**Rigid Motion—Makes CONGRUENT Triangles**
Reflections	r_{x-axis} $r_{y=\#}$	Count # of blocks up/down to the line, go same # of blocks up/down on the other side x-axis: $(x, y) \rightarrow (x, -y)$	**Rigid Motion—Makes CONGRUENT Triangles**
	r_{y-axis} $r_{x=\#}$	Count # of blocks left/right to the line, go same # of blocks left/right on the other side y-axis: $(x, y) \rightarrow (-x, y)$	
	$r_{y=x}$	Reverse the x and y coordinates $(x, y) \rightarrow (y, x)$	
Rotations	R_{90}	Turn paper to the RIGHT 90° and plot the points $(x, y) \rightarrow (-y, x)$	**Rigid Motion—Makes CONGRUENT Triangles**
	R_{180}	Turn paper upside down and plot the points $(x, y) \rightarrow (-x, -y)$	
Dilation	D_k	Multiply both coordinates by the scale factor $(x, y) \rightarrow (kx, ky)$ Scale factors less than 1 shrink the figure, greater than 1 increase the figure	**NOT a Rigid Motion—Makes SIMILAR Triangles**

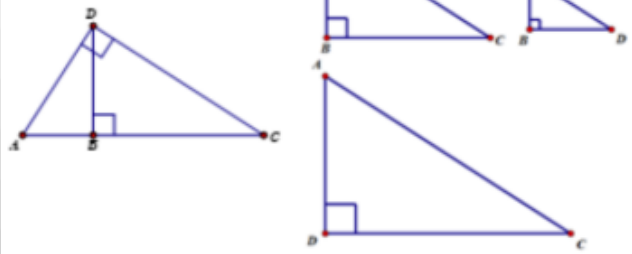
Similar Triangles

$\frac{big\ \Delta}{small\ \Delta} = \frac{big\ \Delta}{small\ \Delta}$

If $\overline{AE} \parallel \overline{BD}$ ...

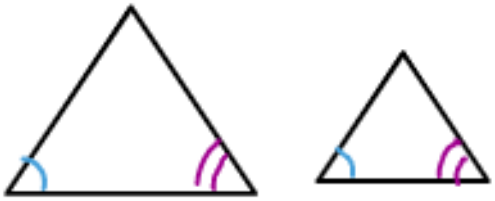


$\frac{big\ \Delta}{small\ \Delta} = \frac{big\ \Delta}{small\ \Delta}$

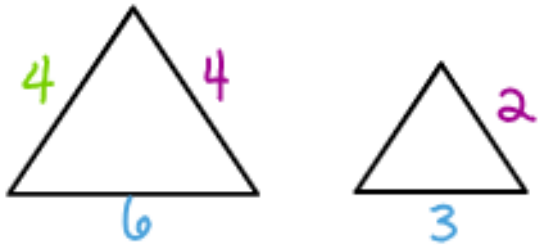


Theorems to Prove Triangles Similar

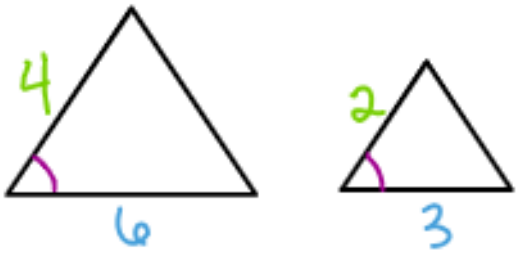
Angle - Angle (AA)



Side - Side - Side (SSS)



Side - Angle - Side (SAS)



Right Triangles and Trigonometry

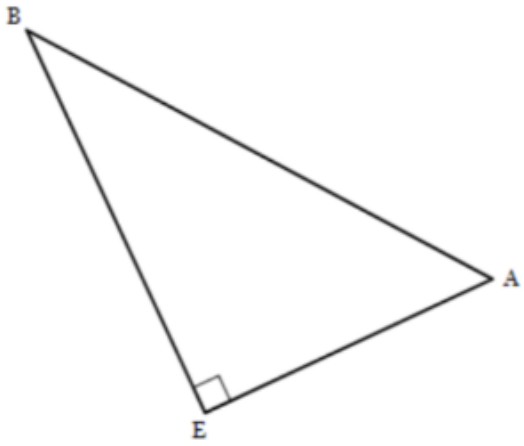
$\sin A = \frac{opp}{hyp}$ $\cos A = \frac{adj}{hyp}$ $\tan A = \frac{opp}{adj}$

- Cross multiply to find a missing side
- Use inverse to find a missing angle

Co-functions: $\sin A = \cos B$ if $A + B = 90$

If you know 2 sides and you need to find the 3rd side

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



High School Math Reference Sheet

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 5280 feet
1 mile = 1760 yards
1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
1 pound = 16 ounces
1 pound = 0.454 kilogram
1 kilogram = 2.2 pounds
1 ton = 2000 pounds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallon
1 liter = 1000 cubic centimeters

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$
Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pyramid	$V = \frac{1}{3}Bh$

Pythagorean Theorem	$a^2 + b^2 = c^2$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Arithmetic Sequence	$a_n = a_1 + (n-1)d$
Geometric Sequence	$a_n = a_1 r^{n-1}$
Geometric Series	$S_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$
Radians	1 radian = $\frac{180}{\pi}$ degrees
Degrees	1 degree = $\frac{\pi}{180}$ radians
Exponential Growth/Decay	$A = A_0 e^{k(t - t_0)} + B_0$

To Prove:	Need to Show:	Needed Formula:
≅ segments	Same Distance	$a^2 + b^2 = c^2$ or $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
// segments	Same Slopes	$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$
A right angle (⊥ segments)	Negative Reciprocal Slopes	$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Quadrilateral	Ways to Prove
Parallelogram	Both pairs of opposite sides parallel
	Both pairs of opposite sides congruent
	One pair of opposite sides parallel and congruent
	Diagonals bisect each other
Rhombus	4 congruent sides
	Parallelogram with adjacent sides congruent
	Parallelogram with diagonals that bisect the angles
	Parallelogram with perpendicular diagonals
Rectangle	4 congruent right angles
	Parallelogram with a right angle
	Parallelogram with congruent diagonals
Square	4 congruent sides and a right angle
	Show it is both a rectangle and a rhombus
Trapezoid	One pair of opposite sides parallel
Isosceles Trapezoid	Trapezoid with congruent legs
	Trapezoid with congruent base angles
	Trapezoid with congruent diagonals