Schedule for Independent Geometry Regents Review

The purpose of this packet is to provide you with a schedule of questions/topics to be reviewed over the course of this weekend/next week before the Regents on Friday, June 16th. On each day below, it is suggested that you complete the problems from each topic **without** checking the answers, then check your work and **study** the questions/concepts. You may have seen these questions before on previous Regents Reviews, but you should still **retry** them and go over the concept **again**.

Remember, it is important that you spend some time each night while we are not meeting in class studying independently!

Saturday, June 10th – Topic 1: Constructions, Topic 2: Lines & Angles

Sunday, June 11th – Topic 3: Triangles, Topic 4: Quadrilaterals

Monday, June 12th – Topic 5: Circles, Topic 6: 2D & 3D Figures

Tuesday, June 13th – Topic 7: Transformations, Topic 8: Trigonometry

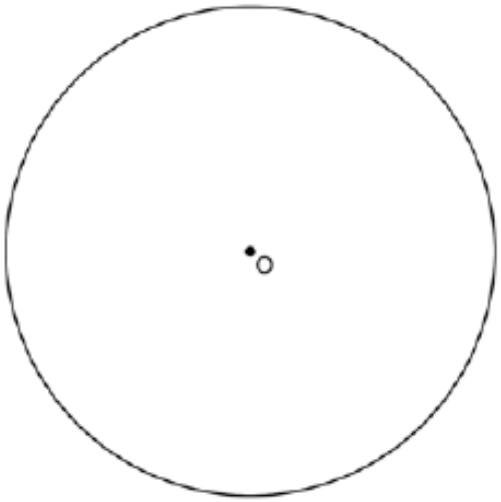
Wednesday, June 14th – Topic 9: Similarity, Topic 10: Proofs

Thursday, June 15th – Wrap up your studying!

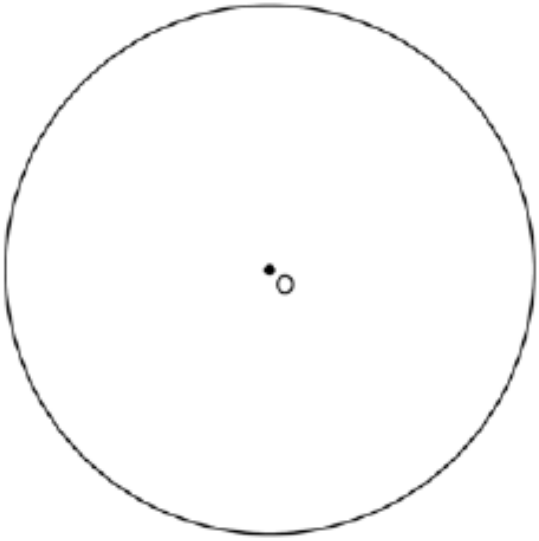
Friday, June 16th – REGENTS EXAM

Topic 1: Constructions

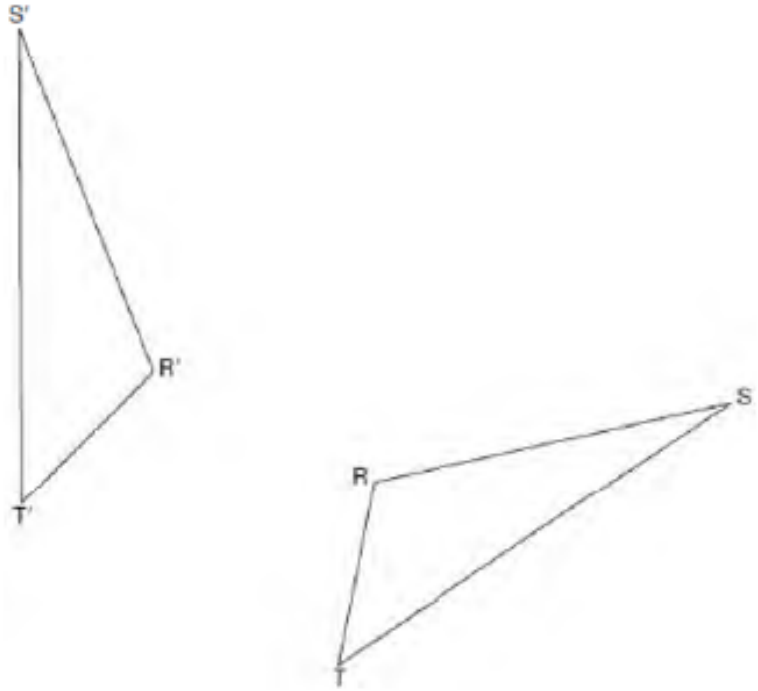
1. Using a straightedge and compass, construct a square inscribed in circle O below. [Leave all construction marks.]



2. Using a compass and straightedge, construct a regular hexagon inscribed in circle O below. Label it $ABCDEF$. [Leave all construction marks.]

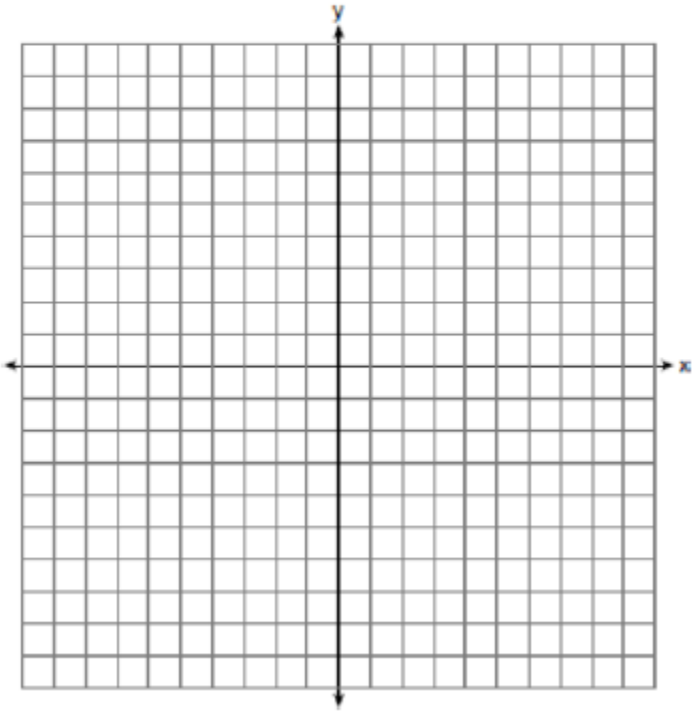


3. Using a compass and straightedge, construct the line of reflection over which triangle *RST* reflects onto triangle R'S'T'. [Leave all construction marks.]



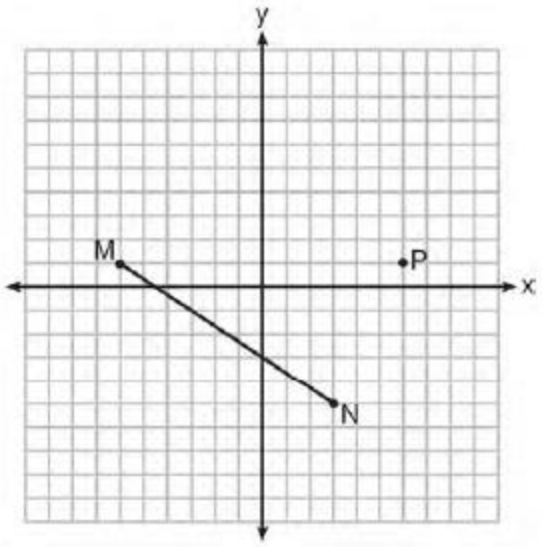
1. The endpoints of $\overline{DEF}$ are $D(1,4)$ and $F(16,14)$. Determine and state the coordinates of point E, if $DE:EF = 2:3$.

2. Directed line segment PT has endpoints whose coordinates are $P(-2,1)$ and $T(4,7)$. Determine the coordinates of point J that divides the segment in the ratio 2 to 1. [The use of the set of axes below is optional.]



3. Segment CD is the perpendicular bisector of $\overline{AB}$ at E. Which pair of segments does *not* have to be congruent?
   1 $\overline{AD}, \overline{BD}$
   2 $\overline{AC}, \overline{BC}$
   3 $\overline{AE}, \overline{BE}$
   4 $\overline{DE}, \overline{CE}$

4. Given $\overline{MN}$ shown below, with $M(-6,1)$ and $N(3,-5)$, what is an equation of the line that passes through point $P(6,1)$ and is parallel to $\overline{MN}$?



1 $y = -\frac{2}{3}x + 5$

2 $y = -\frac{2}{3}x - 3$

3 $y = \frac{3}{2}x + 7$

4 $y = \frac{3}{2}x - 8$

5. Line segment NY has endpoints $N(-11,5)$ and $Y(5,-7)$. What is the equation of the perpendicular bisector of $\overline{NY}$?

1 $y + 1 = \frac{4}{3}(x + 3)$

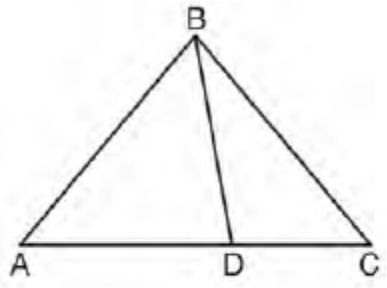
2 $y + 1 = -\frac{3}{4}(x + 3)$

3 $y - 6 = \frac{4}{3}(x - 8)$

4 $y - 6 = -\frac{3}{4}(x - 8)$

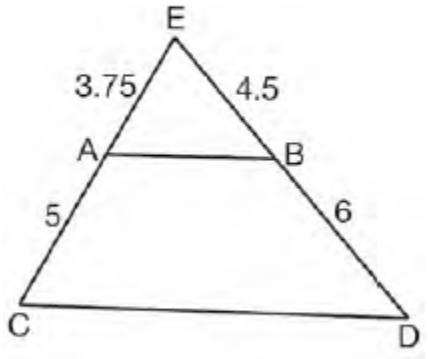
1. An equilateral triangle has sides of length 20. To the *nearest tenth*, what is the height of the equilateral triangle?
   1 10.0
   2 11.5
   3 17.3
   4 23.1

2. In the diagram below, $m\angle BDC = 100°$, $m\angle A = 50°$, and $m\angle DBC = 30°$.



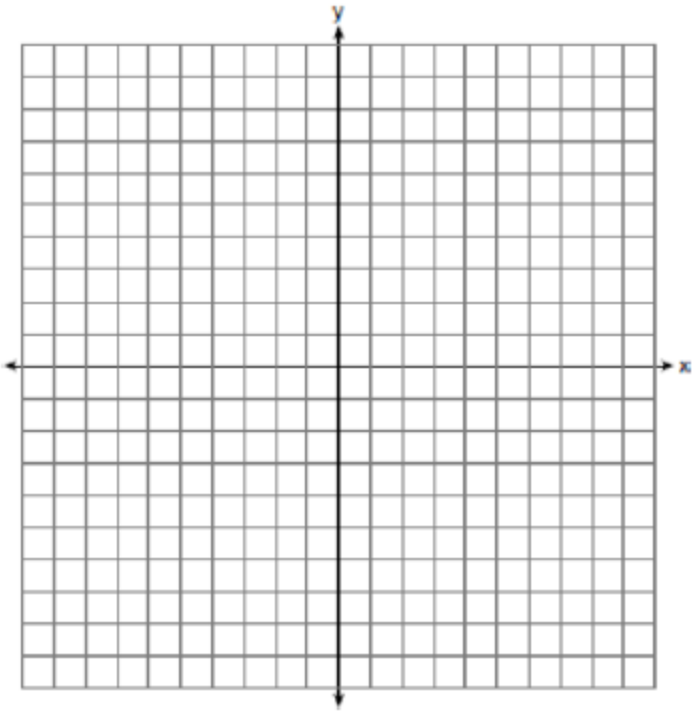
Which statement is true?
   1 $\triangle ABD$ is obtuse.
   2 $\triangle ABC$ is isosceles.
   3 $m\angle ABD = 80°$
   4 $\triangle ABD$ is scalene.

3. In $\triangle CED$ as shown below, points A and B are located on sides $\overline{CE}$ and $\overline{ED}$, respectively. Line segment AB is drawn such that $AE = 3.75$, $AC = 5$, $EB = 4.5$, and $BD = 6$.

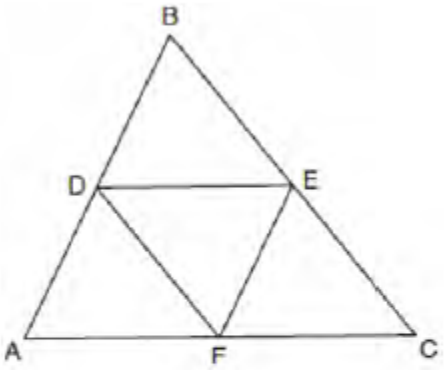


Explain why $\overline{AB}$ is parallel to $\overline{CD}$.

4. Triangle ABC has vertices with $A(x,3)$, $B(-3,-1)$, and $C(-1,-4)$. Determine and state a value of x that would make triangle ABC a right triangle. Justify why $\triangle ABC$ is a right triangle. [The use of the set of axes below is optional.]



5. In the diagram below, $\overline{DE}$, $\overline{DF}$, and $\overline{EF}$ are midsegments of $\triangle ABC$.



The perimeter of quadrilateral $ADEF$ is equivalent to

1 $AB + BC + AC$

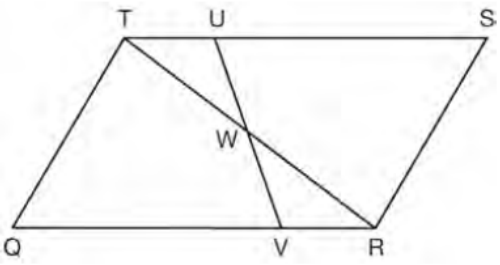
2 $\frac{1}{2}AB + \frac{1}{2}AC$

3 $2AB + 2AC$

4 $AB + AC$

Topic 4: Quadrilaterals

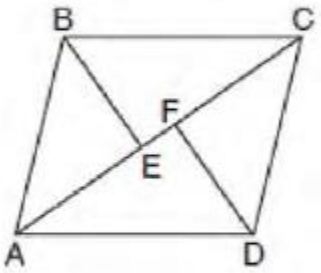
1. In parallelogram $QRST$ shown below, diagonal $\overline{TR}$ is drawn, U and V are points on $\overline{TS}$ and $\overline{QR}$, respectively, and $\overline{UV}$ intersects $\overline{TR}$ at W.



If $m\angle S = 60°$, $m\angle SRT = 83°$, and $m\angle TWU = 35°$, what is $m\angle WVQ$?

1 37°
2 60°
3 72°
4 83°

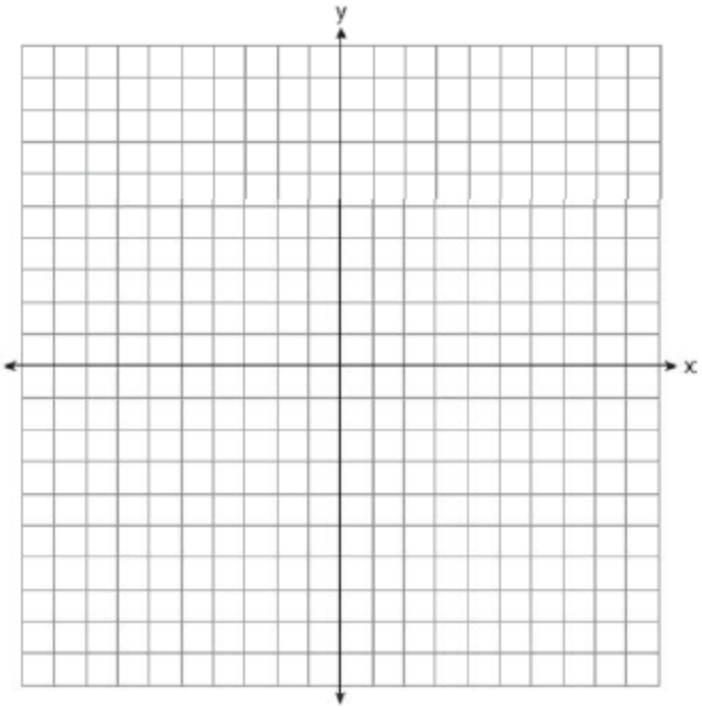
2. In the diagram below, if $\triangle ABE \cong \triangle CDF$ and $\overline{AEFC}$ is drawn, then it could be proven that quadrilateral $ABCD$ is a



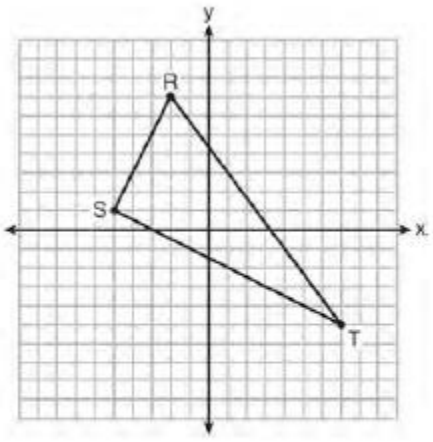
1 square
2 rhombus
3 rectangle
4 parallelogram

3. A parallelogram must be a rectangle when its
1 diagonals are perpendicular
2 diagonals are congruent
3 opposite sides are parallel
4 opposite sides are congruent

4. In square $GEOM$, the coordinates of G are $(2,-2)$ and the coordinates of O are $(-4,2)$. Determine and state the coordinates of vertices E and M. [The use of the set of axes below is optional.]



5. Triangle RST is graphed on the set of axes below.



How many square units are in the area of $\triangle RST$?

1 $9\sqrt{3}+15$

2 $9\sqrt{5}+15$

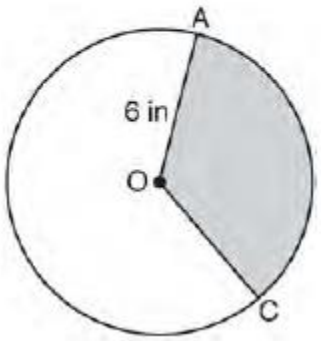
3 45

4 90

Topic 5: Circles

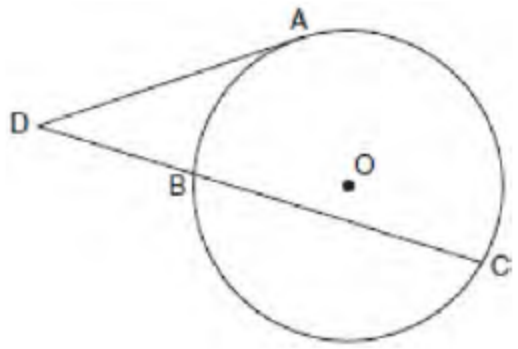
1. A designer needs to create perfectly circular necklaces. The necklaces each need to have a radius of 10 cm. What is the largest number of necklaces that can be made from 1000 cm of wire?
   1 15
   2 16
   3 31
   4 32

2. In the diagram below of circle O, the area of the shaded sector AOC is 12π in^2 and the length of $\overline{OA}$ is 6 inches. Determine and state $m\angle AOC$.



3. In circle O, secants $\overline{ADB}$ and $\overline{AEC}$ are drawn from external point A such that points D, B, E, and C are on circle O. If $AD = 8$, $AE = 6$, and EC is 12 more than BD, the length of $\overline{BD}$ is
   1 6
   2 22
   3 36
   4 48

4. In the diagram below, tangent $\overline{DA}$ and secant $\overline{DBC}$ are drawn to circle O from external point D, such that $\overset{\frown}{AC} \cong \overset{\frown}{BC}$.



If $m\overset{\frown}{BC} = 152°$, determine and state $m\angle D$.

5. The equation of a circle is $x^2 + y^2 - 6y + 1 = 0$. What are the coordinates of the center and the length of the radius of this circle?

1 center $(0,3)$ and radius $= 2\sqrt{2}$

2 center $(0,-3)$ and radius $= 2\sqrt{2}$

3 center $(0,6)$ and radius $= \sqrt{35}$

4 center $(0,-6)$ and radius $= \sqrt{35}$

6. A circle has a center at $(1,-2)$ and radius of 4. Does the point $(3.4,1.2)$ lie on the circle? Justify your answer.

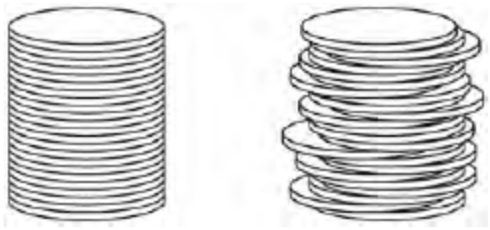
Topic 6: 2D & 3D Figures

1. A farmer has 64 feet of fence to enclose a rectangular vegetable garden. Which dimensions would result in the biggest area for this garden?
   1 the length and the width are equal
   2 the length is 2 more than the width
   3 the length is 4 more than the width
   4 the length is 6 more than the width

2. If an equilateral triangle is continuously rotated around one of its medians, which 3-dimensional object is generated?
   1 cone
   2 pyramid
   3 prism
   4 sphere

3. The cross section of a regular pyramid contains the altitude of the pyramid. The shape of this cross section is a
   1 circle
   2 square
   3 triangle
   4 rectangle

4. Two stacks of 23 quarters each are shown below. One stack forms a cylinder but the other stack does not form a cylinder.



Use Cavelieri's principle to explain why the volumes of these two stacks of quarters are equal.

5. A water cup in the shape of a cone has a height of 4 inches and a maximum diameter of 3 inches. What is the volume of the water in the cup, to the *nearest tenth of a cubic inch*, when the cup is filled to half its height?

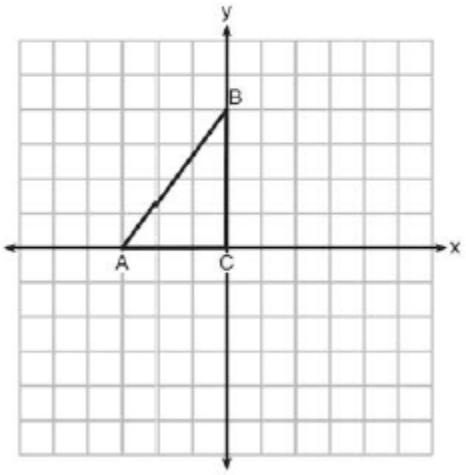
1 1.2
2 3.5
3 4.7
4 14.1

6. A contractor needs to purchase 500 bricks. The dimensions of each brick are 5.1 cm by 10.2 cm by 20.3 cm, and the density of each brick is $1920\ kg/m^3$. The maximum capacity of the contractor's trailer is 900 kg. Can the trailer hold the weight of 500 bricks? Justify your answer.

Topic 7: Transformations

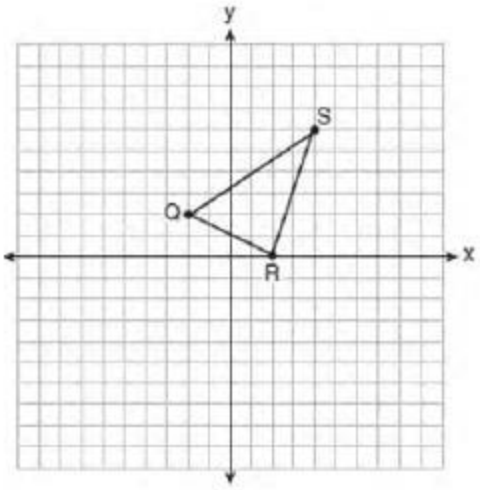
1. Line ℓ is mapped onto line m by a dilation centered at the origin with a scale factor of 2. The equation of line ℓ is $3x - y = 4$. Determine and state an equation for line m.

2. Triangle ABC is graphed on the set of axes below. Graph and label $\triangle A'B'C'$, the image of $\triangle ABC$ after a reflection over the line $x = 1$.



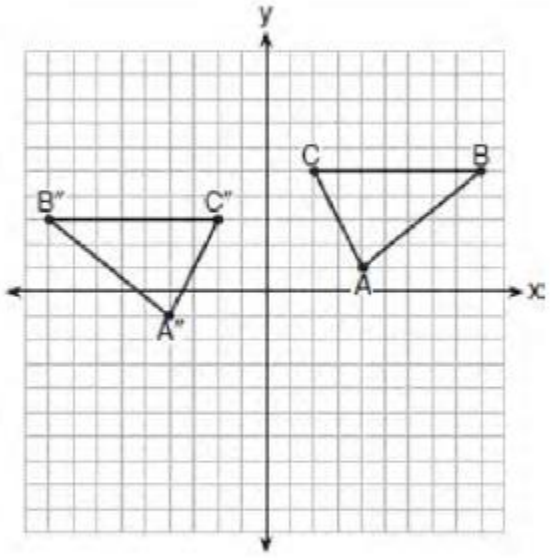
3. A regular hexagon is rotated in a counterclockwise direction about its center. Determine and state the minimum number of degrees in the rotation such that the hexagon will coincide with itself.

4. Triangle QRS is graphed on the set of axes below.



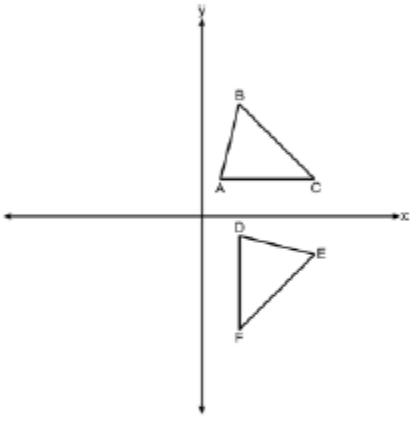
On the same set of axes, graph and label $\triangle Q'R'S'$, the image of $\triangle QRS$ after a dilation with a scale factor of $\frac{3}{2}$ centered at the origin. Use slopes to explain why $Q'R' \parallel QR$.

5. The graph below shows $\triangle ABC$ and its image, $\triangle A''B''C''$.



Describe a sequence of rigid motions which would map $\triangle ABC$ onto $\triangle A''B''C''$.

6. The image of $\triangle ABC$ after a rotation of 90° clockwise about the origin is $\triangle DEF$, as shown below.



Which statement is true?

1 $\overline{BC} \cong \overline{DE}$

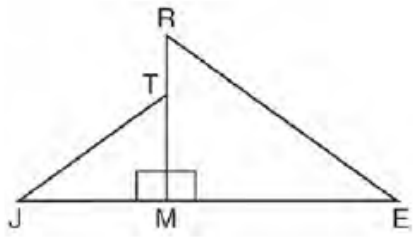
2 $\overline{AB} \cong \overline{DF}$

3 $\angle C \cong \angle E$

4 $\angle A \cong \angle D$

Topic 8: Trigonometry

1. In the diagram below, $\triangle ERM \sim \triangle JTM$.



Which statement is always true?

1 $\cos J = \frac{RM}{RE}$

2 $\cos R = \frac{JM}{JT}$

3 $\tan T = \frac{RM}{EM}$

4 $\tan E = \frac{TM}{JM}$

2. In $\triangle ABC$, where $\angle C$ is a right angle, $\cos A = \frac{\sqrt{21}}{5}$. What is $\sin B$?

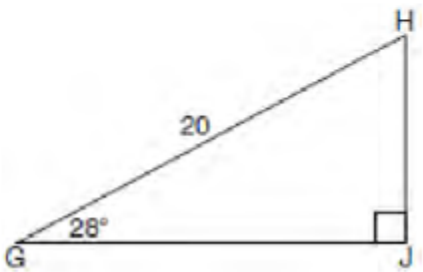
1 $\frac{\sqrt{21}}{5}$

2 $\frac{\sqrt{21}}{2}$

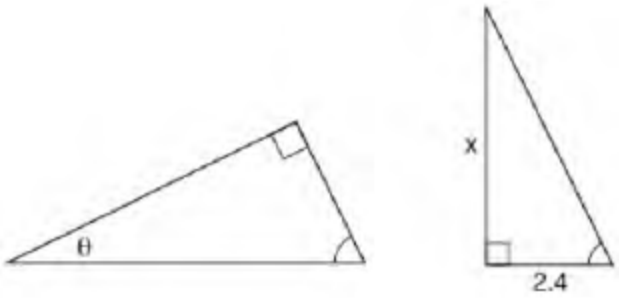
3 $\frac{2}{5}$

4 $\frac{5}{\sqrt{21}}$

3. When instructed to find the length of $\overline{HJ}$ in right triangle HJG, Alex wrote the equation $\sin 28° = \frac{HJ}{20}$ while Marlene wrote $\cos 62° = \frac{HJ}{20}$. Are both students' equations correct? Explain why.



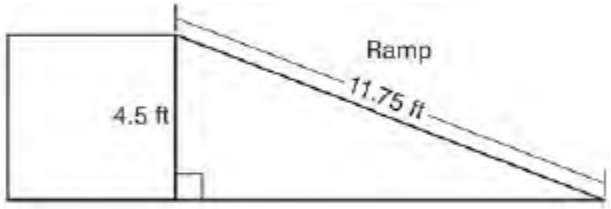
4. The diagram below shows two similar triangles.



If $\tan\theta = \frac{3}{7}$, what is the value of x, to the *nearest tenth*?

1 1.2
2 5.6
3 7.6
4 8.8

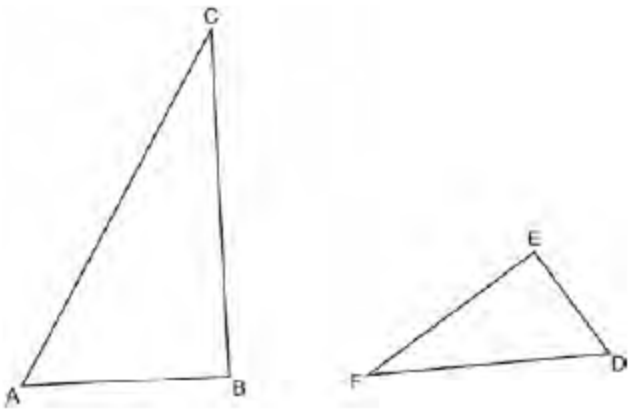
5. The diagram below shows a ramp connecting the ground to a loading platform 4.5 feet above the ground. The ramp measures 11.75 feet from the ground to the top of the loading platform.



Determine and state, to the *nearest degree*, the angle of elevation formed by the ramp and the ground.

Topic 9: Similarity

1. Triangles ABC and DEF are drawn below.



If $AB = 9$, $BC = 15$, $DE = 6$, $EF = 10$, and $\angle B \cong \angle E$, which statement is true?

1 $\angle CAB \cong \angle DEF$

2 $\frac{AB}{CB} = \frac{FE}{DE}$

3 $\triangle ABC \sim \triangle DEF$

4 $\frac{AB}{DE} = \frac{FE}{CB}$

2. The ratio of similarity of $\triangle BOY$ to $\triangle GRL$ is 1:2. If $BO = x + 3$ and $GR = 3x - 1$, then the length of $\overline{GR}$ is

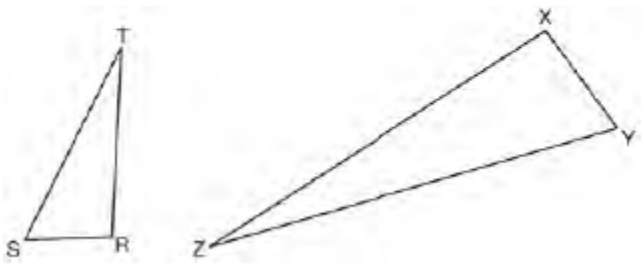
1 5

2 7

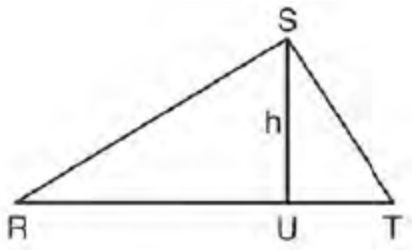
3 10

4 20

3. Triangles RST and XYZ are drawn below. If $RS = 6$, $ST = 14$, $XY = 9$, $YZ = 21$, and $\angle S \cong \angle Y$, is $\triangle RST$ similar to $\triangle XYZ$? Justify your answer.



4. In $\triangle RST$ shown below, altitude $\overline{SU}$ is drawn to $\overline{RT}$ at U.



If $SU = h$, $UT = 12$, and $RT = 42$, which value of h will make $\triangle RST$ a right triangle with $\angle RST$ as a right angle?

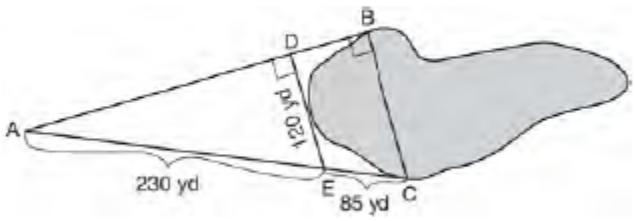
1 $6\sqrt{3}$

2 $6\sqrt{10}$

3 $6\sqrt{14}$

4 $6\sqrt{35}$

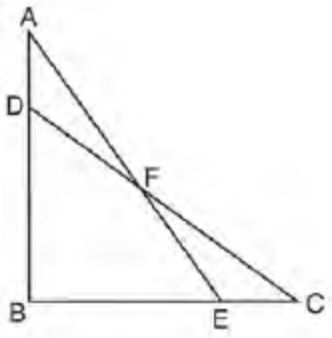
5. To find the distance across a pond from point B to point C, a surveyor drew the diagram below. The measurements he made are indicated on his diagram.



Use the surveyor's information to determine and state the distance from point B to point C, to the *nearest yard*.

Topic 10: Proofs/Congruency

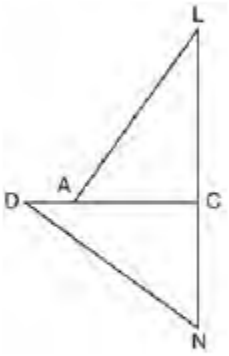
1. Given: $\triangle ABE$ and $\triangle CBD$ shown in the diagram below with $\overline{DB} \cong \overline{BE}$



Which statement is needed to prove $\triangle ABE \cong \triangle CBD$ using only SAS $\cong$ SAS?

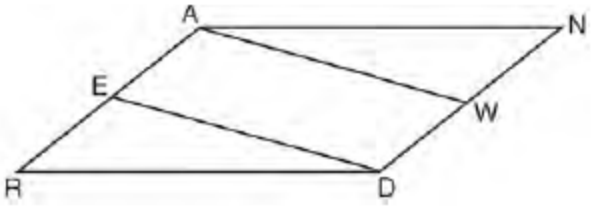
1 $\angle CDB \cong \angle AEB$
2 $\angle AFD \cong \angle EFC$
3 $\overline{AD} \cong \overline{CE}$
4 $\overline{AE} \cong \overline{CD}$

2. In the diagram of $\triangle LAC$ and $\triangle DNC$ below, $\overline{LA} \cong \overline{DN}$, $\overline{CA} \cong \overline{CN}$, and $\overline{DAC} \perp \overline{LCN}$.



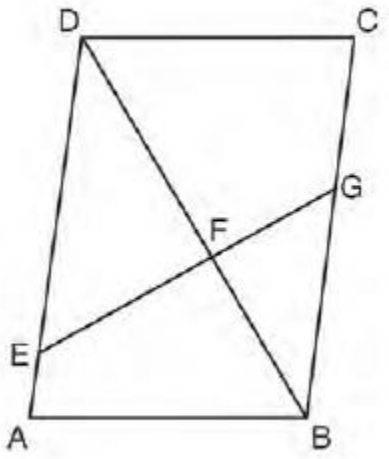
a) Prove that $\triangle LAC \cong \triangle DNC$.
b) Describe a sequence of rigid motions that will map $\triangle LAC$ onto $\triangle DNC$.

3. Given: Parallelogram $ANDR$ with $\overline{AW}$ and $\overline{DE}$ bisecting $\overline{NWD}$ and $\overline{REA}$ at points W and E, respectively



Prove that $\triangle ANW \cong \triangle DRE$. Prove that quadrilateral $AWDE$ is a parallelogram.

4. Given: Parallelogram $ABCD$, $\overline{EFG}$, and diagonal $\overline{DFB}$



Prove: $\triangle DEF \sim \triangle BGF$

5. Two right triangles must be congruent if
   1 an acute angle in each triangle is congruent
   2 the lengths of the hypotenuses are equal
   3 the corresponding legs are congruent
   4 the areas are equal