GEOMETRY
Workbook
Common Core Standards
Edition

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Common Core High School Math Reference Sheet
(Algebra I, Geometry, Algebra II)

CONVERSIONS

1 inch = 2.54 centimeters	1 kilometer = 0.62 mile	1 cup = 8 fluid ounces
1 meter = 39.37 inches	1 pound = 16 ounces	1 pint = 2 cups
1 mile = 5280 feet	1 pound = 0.454 kilograms	1 quart = 2 pints
1 mile = 1760 yards	1 kilogram = 2.2 pounds	1 gallon = 4 quarts
1 mile = 1.609 kilometers	1 ton = 2000 pounds	1 gallon = 3.785 liters
		1 liter = 0.264 gallon
		1 liter = 1000 cubic centimeters

FORMULAS

|			
Triangle	$A = \dfrac{1}{2}bh$	Pythagorean Theorem	$a^2 + b^2 = c^2$
Parallelogram	$A = bh$	Quadratic Formula	$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Circle	$A = \pi r^2$	Arithmetic Sequence	$a_n = a_1 + (n-1)d$
Circle	$C = \pi d \text{ or } C = 2\pi r$	Geometric Sequence	$a_n = a_1 r^{n-1}$
General Prisms	$V = Bh$	Geometric Series	$S_n = \dfrac{a_1 - a_1 r^n}{1 - r} \text{ where } r \neq 1$
Cylinder	$V = \pi r^2 h$	Radians	$1 \text{ radian} = \dfrac{180}{\pi} \text{ degrees}$
Sphere	$V = \dfrac{4}{3}\pi r^3$	Degrees	$1 \text{ degree} = \dfrac{\pi}{180} \text{ radians}$
Cone	$V = \dfrac{1}{3}\pi r^2 h$	Exponential Growth/Decay	$A = A_0 e^{k(t - t_0)} + B_0$
Pyramid	$V = \dfrac{1}{3}Bh$		

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GEOMETRY
June 2016
Part I

Answer all 24 questions in this part. Each correct answer will receive 2 credits. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. [48]
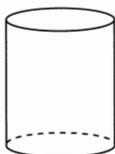
1. A student has a rectangular postcard that he folds in half lengthwise. Next, he rotates it continuously about the folded edge. Which three-dimensional object below is generated by this rotation?
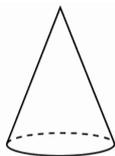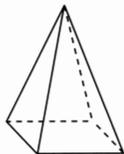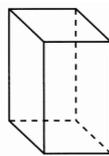

(1)   (2)   (3)   (4)   1 _____

2. A three-inch line segment is dilated by a scale factor of 6 and centered at its midpoint. What is the length of its image?
(1) 9 inches   (2) 2 inches   (3) 15 inches   (4) 18 inches   2 _____

3. Kevin's work for deriving the equation of a circle is shown below.

$$x^2 + 4x = -(y^2 - 20)$$

STEP 1 $x^2 + 4x = -y^2 + 20$

STEP 2 $x^2 + 4x + 4 = -y^2 + 20 - 4$

STEP 3 $(x + 2)^2 = -y^2 + 20 - 4$

STEP 4 $(x + 2)^2 + y^2 = 16$

In which step did he make an error in his work?
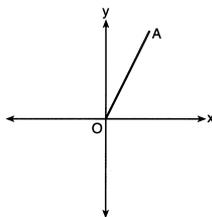(1) Step 1   (2) Step 2   (3) Step 3   (4) Step 4   3 _____

4. Which transformation of $\overline{OA}$ would result in an image parallel to $\overline{OA}$?
(1) a translation of two units down
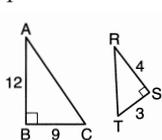(2) a reflection over the x-axis
(3) a reflection over the y-axis
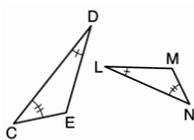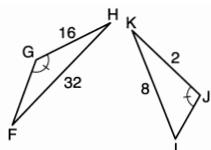(4) a clockwise rotation of 90° about the origin   4 _____

5. Using the information given below, which set of triangles can *not* be proven similar?
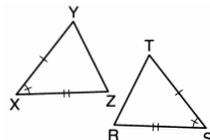

(1)   (2)   (3)   (4)   5 _____

June 2016

6. A company is creating an object from a wooden cube with an edge length of 8.5 cm. A right circular cone with a diameter of 8 cm and an altitude of 8 cm will be cut out of the cube. Which expression represents the volume of the remaining wood?

(1) $(8.5)^3 - \pi(8)^2(8)$ (3) $(8.5)^3 - \frac{1}{3}\pi(8)^2(8)$

(2) $(8.5)^3 - \pi(4)^2(8)$ (4) $(8.5)^3 - \frac{1}{3}\pi(4)^2(8)$ 6 _____

7. 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
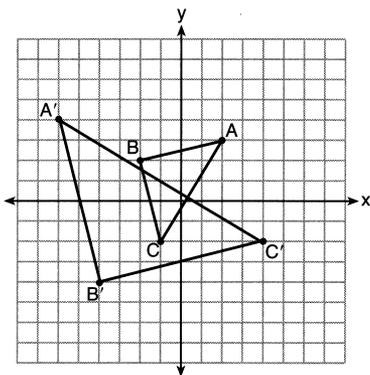(4) the areas are equal   7 _____

8. Which sequence of transformations will map $\triangle ABC$ onto $\triangle A'B'C'$?
(1) reflection and translation
(2) rotation and reflection
(3) translation and dilation
(4) dilation and rotation

8 _____

9. In parallelogram $ABCD$, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E. Which statement does *not* prove parallelogram $ABCD$ is a rhombus?

(1) $\overline{AC} \cong \overline{DB}$ (3) $\overline{AC} \perp \overline{DB}$

(2) $\overline{AB} \cong \overline{BC}$ (4) $\overline{AC}$ bisects $\angle DCB$.   9 _____
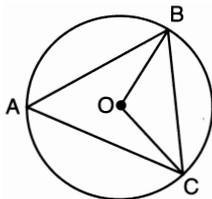
10. In the accompanying diagram of circle O, $\overline{OB}$ and $\overline{OC}$ are radii, and chords $\overline{AB}$, $\overline{BC}$, and $\overline{AC}$ are drawn. Which statement must always be true?

(1) $\angle BAC \cong \angle BOC$
(2) $m\angle BAC = \frac{1}{2}m\angle BOC$
(3) $\triangle BAC$ and $\triangle BOC$ are isosceles.
(4) The area of $\triangle BAC$ is twice the area of $\triangle BOC$.   10 _____

11. A 20-foot support post leans against a wall, making a 70° angle with the ground. To the *nearest tenth of a foot*, how far up the wall will the support post reach?
(1) 6.8   (2) 6.9   (3) 18.7   (4) 18.8   11 _____

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

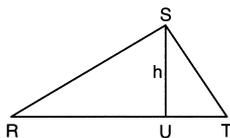(1) $y + 1 = \dfrac{4}{3}(x + 3)$ (3) $y - 6 = \dfrac{4}{3}(x - 8)$

(2) $y + 1 = -\dfrac{3}{4}(x + 3)$ (4) $y - 6 = -\dfrac{3}{4}(x - 8)$ 12 ____
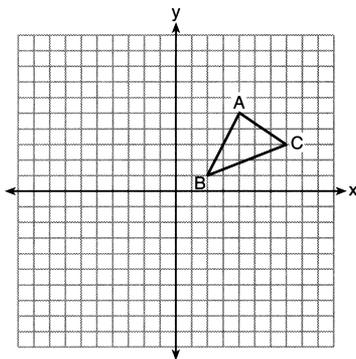
13. In $\triangle RST$ shown below, altitude $\overline{SU}$ is drawn to $\overline{RT}$ at *U*. If *SU* = *h*, *UT* = 12, and *RT* = 42, which value of *h* will make $\triangle RST$ a right triangle with $\angle RST$ as a right angle?

(1) $6\sqrt{3}$ (2) $6\sqrt{10}$ (3) $6\sqrt{14}$ (4) $6\sqrt{35}$ 13 ____

14. In the accompanying diagram, $\triangle ABC$ has vertices *A*(4, 5), *B*(2, l), and *C*(7, 3).What is the slope of the altitude drawn from *A* to $\overline{BC}$?
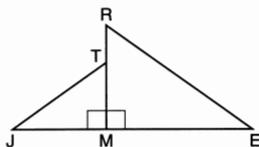
(1) $\dfrac{2}{5}$ (3) $-\dfrac{1}{2}$

(2) $\dfrac{3}{2}$ (4) $-\dfrac{5}{2}$ 14 ____

15. In the diagram, $\triangle ERM \sim \triangle JTM$. Which statement is always true?
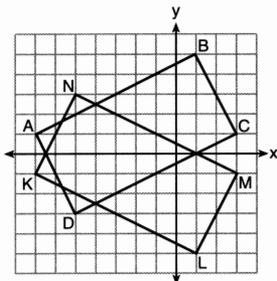
(1) $\cos J = \dfrac{RM}{RE}$ (3) $\tan T = \dfrac{RM}{EM}$

(2) $\cos R = \dfrac{JM}{JT}$ (4) $\tan E = \dfrac{TM}{JM}$ 15 ____

16. On the set of axes, rectangle *ABCD* can be proven congruent to rectangle *KLMN* using which transformation?
(1) rotation
(2) translation
(3) reflection over the *x*-axis
(4) reflection over the *y*-axis   16 ____

Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers in the space provided [48]

1. In the diagram, a sequence of rigid motions maps *ABCD* onto *JKLM*. If m∠*A* = 82°, m∠*B* = 104°, and m∠*L* = 121°, the measure of ∠*M* is
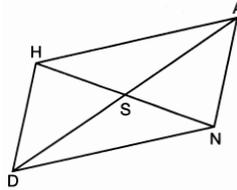(1) 53°
(2) 82°
(3) 104°
(4) 121°
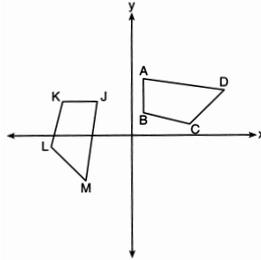
1 _____

2. Parallelogram *HAND* is drawn with diagonals $\overline{HN}$ and $\overline{AD}$ intersecting at *S*. Which statement is always true?
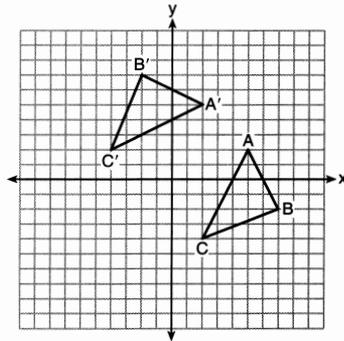(1) $HN = \dfrac{1}{2}AD$
(2) $AS = \dfrac{1}{2}AD$
(3) $\angle AHS \cong \angle ANS$
(4) $\angle HDS \cong \angle NDS$

2 _____

3. The graph shows two congruent triangles, *ABC* and *A'B'C'*. Which rigid motion would map △*ABC* onto △*A'B'C'*?
(1) a rotation of 90 degrees counterclockwise about the origin
(2) a translation of three units to the left and three units up
(3) a rotation of 180 degrees about the origin
(4) a reflection over the line *y* = *x*

3 _____

4. A man was parasailing above a lake at an angle of elevation of 32°from a boat, as modeled in the diagram. If 129.5 meters of cable connected the boat to the parasail, approximately how many meters above the lake was the man?
(1) 68.6
(2) 80.9
(3) 109.8
(4) 244.4

129.5 m

32°

4 _____

GEOMETRY
January 2018
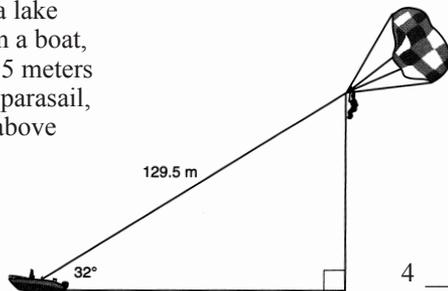
5. A right hexagonal prism is shown. A two-dimensional cross section that is perpendicular to the base is taken from the prism.
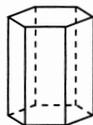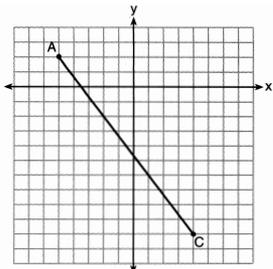
Which figure describes the two-dimensional cross section?
(1) triangle   (2) rectangle   (3) pentagon   (4) hexagon   5 _____

6. In the diagram, $\overline{AC}$ has endpoints with coordinates $A(-5, 2)$ and $C(4, -10)$.

If B is a point on $\overline{AC}$ and $AB:BC = 1:2$, what are the coordinates of B?

(1) $(-2, -2)$ (3) $(0,-\frac{14}{3})$

(2) $(-\frac{1}{2}, -4)$ (4) $(1, -6)$

6 _____

7. An ice cream waffle cone can be modeled by a right circular cone with a base diameter of 6.6 centimeters and a volume of 54.45π cubic centimeters. What is the number of centimeters in the height of the waffle cone?

(1) $3\frac{3}{4}$ (2) 5   (3) 15   (4) $24\frac{3}{4}$ 7 _____

8. The vertices of $\triangle PQR$ have coordinates $P(2, 3)$, $Q(3, 8)$, and $R(7, 3)$. Under which transformation of $\triangle PQR$ are distance and angle measure preserved?
(1) $(x, y) \rightarrow (2x, 3y)$ (3) $(x, y) \rightarrow (2x, y + 3)$
(2) $(x, y) \rightarrow (x + 2, 3y)$ (4) $(x, y) \rightarrow (x + 2, y + 3)$ 8 _____

9. In $\triangle ABC$ shown below, side $\overline{AC}$ is extended to point D with $m\angle DAB = (180 - 3x)°$, $m\angle B = (6x - 40)°$, and $m\angle C = (x + 20)°$.
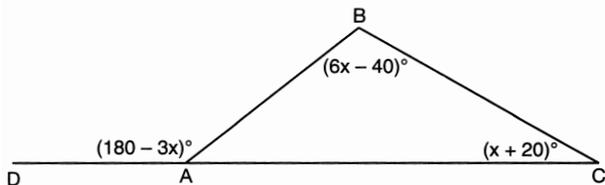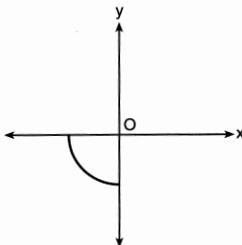
What is $m\angle BAC$?
(1) $20°$ (2) $40°$ (3) $60°$ (4) $80°$ 9 _____

10. Circle O is centered at the origin. In the diagram, a quarter of circle O is graphed.

Which three-dimensional figure is generated when the quarter circle is continuously rotated about the y-axis?
(1) cone   (3) cylinder
(2) sphere   (4) hemisphere   10 _____

GEOMETRY
January 2018
Part IV

Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. A correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [6]

35. In the coordinate plane, the vertices of triangle PAT are $P(-1, -6)$, $A(-4, 5)$, and $T(5, -2)$. Prove that $\triangle PAT$ is an isosceles triangle. [The use of the set of axes is optional.]

State the coordinates of R so that quadrilateral $PART$ is a parallelogram.

Prove that quadrilateral $PART$ is a parallelogram.