The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

GEOMETRY (Common Core)

Thursday, January 28, 2016 — 9:15 a.m. to 12:15 p.m., only

Student Name: Answer Key ↓

School Name: MAP ↓

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

Print your name and the name of your school on the lines above.

A separate answer sheet for Part I has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet.

This examination has four parts, with a total of 36 questions. You must answer all questions in this examination. Record your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in Parts II, III, and IV directly in this booklet. All work should be written in pen, except for graphs and drawings, which should be done in pencil. 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.

The formulas that you may need to answer some questions in this examination are found at the end of the examination. This sheet is perforated so you may remove it from this booklet.

Scrap paper is not permitted for any part of this examination, but you may use the blank spaces in this booklet as scrap paper. A perforated sheet of scrap graph paper is provided at the end of this booklet for any question for which graphing may be helpful but is not required. You may remove this sheet from this booklet. Any work done on this sheet of scrap graph paper will *not* be scored.

When you have completed the examination, you must sign the statement printed at the end of the answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet cannot be accepted if you fail to sign this declaration.

Notice...
A graphing calculator, a straightedge (ruler), and a compass must be available for you to use while taking this examination.

DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

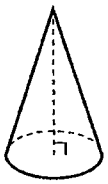
GEOMETRY (COMMON CORE)

Part I

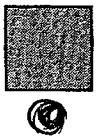
Answer all 24 questions in this part. Each correct answer will receive 2 credits. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. [48]

Use this space for computations.

1 William is drawing pictures of cross sections of the right circular cone below.



Which drawing can *not* be a cross section of a cone?



(1)

(3)

(2)

(4)

2 An equation of a line perpendicular to the line represented by the equation $y = -\frac{1}{2}x - 5$ and passing through $(6,-4)$ is

negative reciprocal slopes

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

(3) $y = 2x + 14$

X (2) $y = -\frac{1}{2}x - 1$

(4) $y = 2x - 16$

put each equation into the y= and look in the table for (6, -4)

Original line: $y = -\frac{1}{2}x - 5$

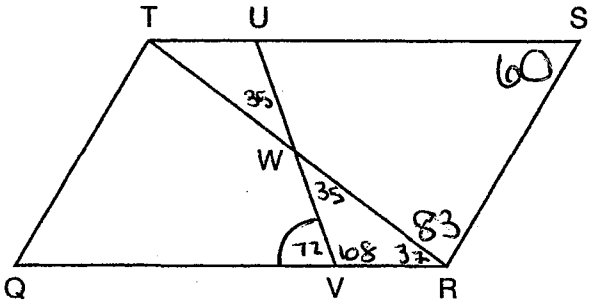
slope $= -\frac{1}{2}$ → slope of ⊥ line $= \frac{2}{1}$

↓

choices (1) & (2) are out

Use this space for computations.

3 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.



① ∠RWV = 35° b/c vertical angles are ≅
② ∠S + ∠R = 180°
60 + 83 = 143
180 − 143 = 37
③ △RWV = 180°
35 + 37 = 72
180 − 72 = 108
④ 180 − 108 = 72°

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

(1) 37°
(2) 60°
(3) 72°
(4) 83°

box

4 A fish tank in the shape of a rectangular prism has dimensions of 14 inches, 16 inches, and 10 inches. The tank contains 1680 cubic inches of water. What percent of the fish tank is empty?

(1) 10
(2) 25
(3) 50
(4) 75

V = l × w × h
V = 14 × 16 × 10 = 2240 in³
↑ volume of whole tank

2240
−1680
560 ← amount of fish tank that is empty
↳ to get the percent
560 ÷ 2240 = .25

5 Which transformation would result in the perimeter of a triangle being different from the perimeter of its image?

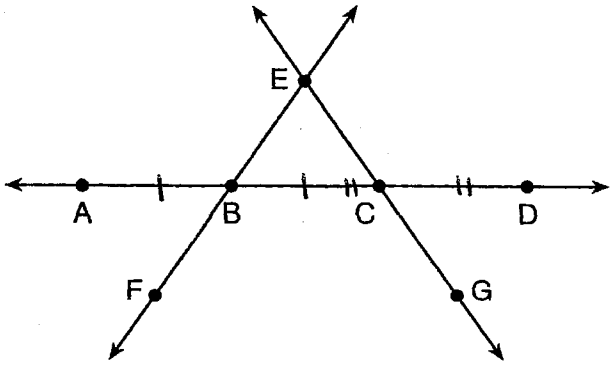
(1) $(x,y) \rightarrow (y,x)$
(2) $(x,y) \rightarrow (x,-y)$
(3) $(x,y) \rightarrow (4x,4y)$
(4) $(x,y) \rightarrow (x+2,y-5)$

this would have to be a dilation! A dilation means that we are multiplying

$\overline{AB} \cong \overline{BC}$ $\overline{BC} \cong \overline{CD}$

6 In the diagram below, $\overleftrightarrow{FE}$ bisects $\overline{AC}$ at B, and $\overleftrightarrow{GE}$ bisects $\overline{BD}$ at C.

Use this space for computations.

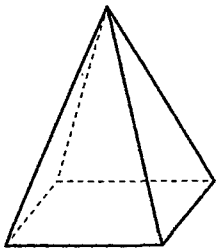


If $\overline{BC}$ is congruent to both $\overline{AB}$ and $\overline{CD}$, then $\overline{AB} \cong \overline{CD}$

Which statement is always true?

(1) $\overline{AB} \cong \overline{DC}$
(2) $\overline{FB} \cong \overline{EB}$
(3) $\overleftrightarrow{BD}$ bisects $\overline{GE}$ at C.
(4) $\overleftrightarrow{AC}$ bisects $\overline{FE}$ at B.

7 As shown in the diagram below, a regular pyramid has a square base whose side measures 6 inches.



height

$V = \frac{1}{3}Bh$ ← base area

★ the base is a square ★

Base area = $l \times w$
$= 6 \times 6$
$= 36 \text{ in}^2$

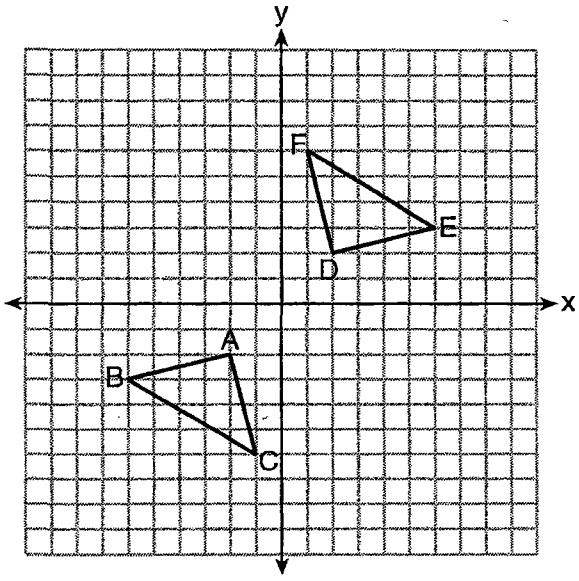
If the altitude of the pyramid measures 12 inches, its volume, in cubic inches, is

(1) 72
(2) 144
(3) 288
(4) 432

$V = \frac{1}{3}(36)(12)$
$= 144 \text{ in}^3$

Use this space for computations.

8 Triangle ABC and triangle DEF are graphed on the set of axes below.



Which sequence of transformations maps triangle ABC onto triangle DEF?

(1) a reflection over the x-axis followed by a reflection over the y-axis

(2) a 180° rotation about the origin followed by a reflection over the line $y = x$

(3) a 90° clockwise rotation about the origin followed by a reflection over the y-axis

(4) a translation 8 units to the right and 1 unit up followed by a 90° counterclockwise rotation about the origin

add up to 90°

Use this space for computations.

9 In $\triangle ABC$, the complement of $\angle B$ is $\angle A$. Which statement is always true?

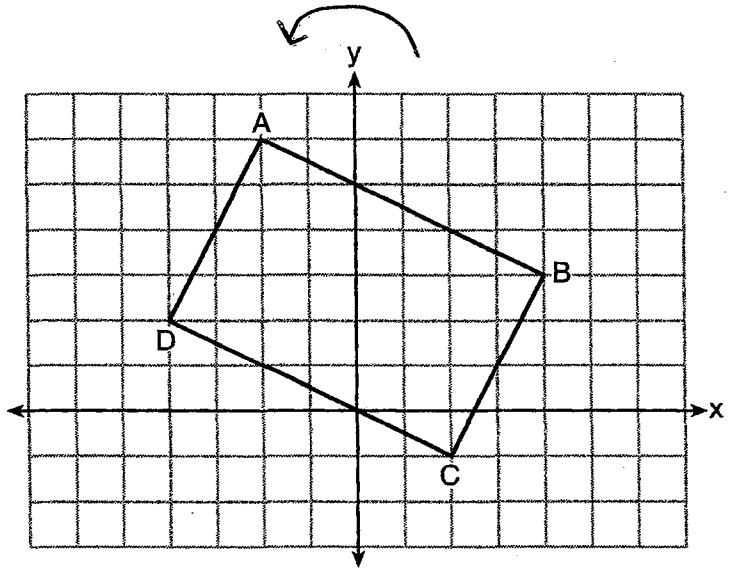
(1) $\tan \angle A = \tan \angle B$
(2) $\sin \angle A = \sin \angle B$
(3) $\cos \angle A = \tan \angle B$
(4) $\sin \angle A = \cos \angle B$

10 A line that passes through the points whose coordinates are (1,1) and (5,7) is dilated by a scale factor of 3 and centered at the origin. The image of the line

(1) is perpendicular to the original line
(2) is parallel to the original line
(3) passes through the origin
(4) is the original line

The slope is the same but the y-intercept changes

11 Quadrilateral $ABCD$ is graphed on the set of axes below.



counterclockwise ↺

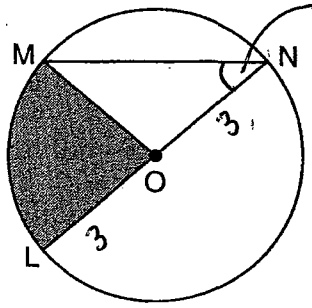
A rotation is a Rigid motion → size is preserved

When $ABCD$ is rotated 90° in a counterclockwise direction about the origin, its image is quadrilateral $A'B'C'D'$. Is distance preserved under this rotation, and which coordinates are correct for the given vertex?

(1) no and $C'(1,2)$
(2) no and $D'(2,4)$
(3) yes and $A'(6,2)$
(4) yes and $B'(-3,4)$

Use this space for computations.

12 In the diagram below of circle O, the area of the shaded sector LOM is 2π cm^2.



inscribed angle → ½ of its arc

Area sector $= \left(\frac{x}{360}\right)\pi r^2$

$\rightarrow 2\pi = \left(\frac{x}{360}\right)\pi(3)^2$

$\rightarrow \frac{2\pi}{9\pi} = \frac{\left(\frac{x}{360}\right)\pi(9)}{\pi 9}$

$\rightarrow \frac{2}{9} = \frac{x}{360} \rightarrow \frac{9x}{9} = \frac{720}{9}$

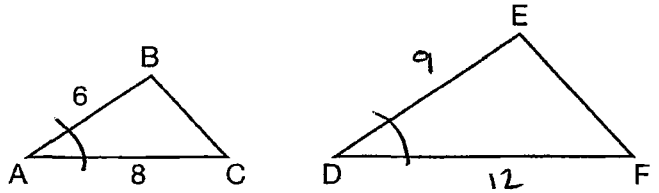
$x = 80$

$\frac{1}{2}(80) = 40$

If $\overline{NL}$ is 6 cm, what is $m\angle N$?

(1) 10°
(2) 20°
(3) 40°
(4) 80°

13 In the diagram below, $\triangle ABC \sim \triangle DEF$.



$\frac{6}{8} \stackrel{?}{=} \frac{9}{12}$

$72 = 72$ ✓

If $AB = 6$ and $AC = 8$, which statement will justify similarity by SAS?

(1) $DE = 9$, $DF = 12$, and $\angle A \cong \angle D$
(2) $DE = 8$, $DF = 10$, and $\angle A \cong \angle D$
(3) $DE = 36$, $DF = 64$, and $\angle C \cong \angle F$
(4) $DE = 15$, $DF = 20$, and $\angle C \cong \angle F$

check each one to see which proportion works

these are out b/c SAS has to be using $\angle A$ and $\angle D$

14 The diameter of a basketball is approximately 9.5 inches and the diameter of a tennis ball is approximately 2.5 inches. The volume of the basketball is about how many times greater than the volume of the tennis ball?

(1) 3591
(2) 65
(3) 55
(4) 4

Basketball

$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}\pi(4.75)^3 = 448.92$

Tennis ball

$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}\pi(1.25)^3 = 8.18$

$448.92 \div 8.18 = 54.88$ ←

all sides ≅ 5 sides

Use this space for computations.

15 The endpoints of one side of a regular pentagon are $(-1,4)$ and $(2,3)$. What is the perimeter of the pentagon?

(1) $\sqrt{10}$ (3) $5\sqrt{2}$

(2) $5\sqrt{10}$ (4) $25\sqrt{2}$

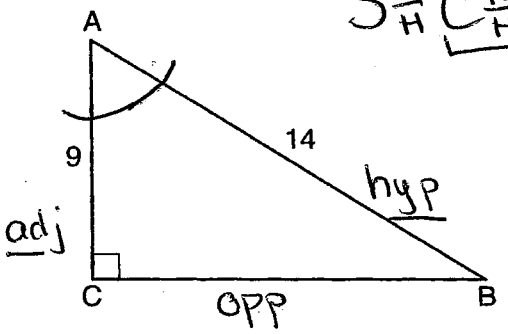
$x_1, y_1 \quad x_2, y_2$

$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$= \sqrt{(2 - -1)^2 + (3 - 4)^2}$

$= \sqrt{3^2 + (-1)^2} = \sqrt{9 + 1} = \sqrt{10}$

16 In the diagram of right triangle ABC shown below, $AB = 14$ and $AC = 9$.



SOH CAH TOA

$\cos A = \frac{9}{14}$

2nd $\cos^{-1}(9/14)$

What is the measure of $\angle A$, to the *nearest degree*?

(1) 33 (3) 50

(2) 40 (4) 57

17 What are the coordinates of the center and length of the radius of the circle whose equation is $x^2 + 6x + y^2 - 4y = 23$?

(1) $(3,-2)$ and 36 (3) $(-3,2)$ and 36

(2) $(3,-2)$ and 6 (4) $(-3,2)$ and 6

$x^2 + 6x + ? + y^2 - 4y + ? = 23 + ? + ?$

$6 \div 2 = 3 \qquad -4 \div 2 = -2$

$3^2 = 9 \qquad (-2)^2 = 4$

$x^2 + 6x + 9 + y^2 - 4y + 4 = 23 + 9$

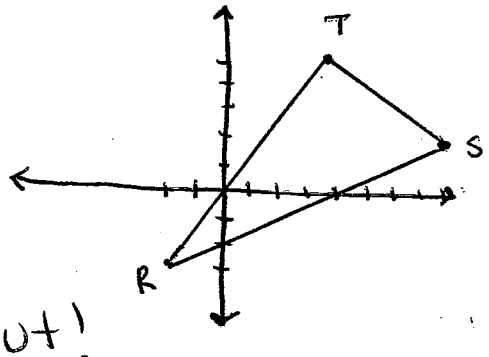
$(x+3)(x+3) + (y-2)(y-2) = 36$

$(x+3)^2 + (y-2)^2 = 36$

18 The coordinates of the vertices of $\triangle RST$ are $R(-2,-3)$, $S(8,2)$, and $T(4,5)$. Which type of triangle is $\triangle RST$?

(1) right (3) obtuse

(2) acute (4) equiangular



When in doubt...

sketch it out!

Use this space for computations.

19 Molly wishes to make a lawn ornament in the form of a solid sphere. The clay being used to make the sphere weighs .075 pound per cubic inch. If the sphere's radius is 4 inches, what is the weight of the sphere, to the *nearest pound*?

(1) 34 (3) 15

(2) 20 (4) 4

$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}\pi(4)^3$

$V = 268.0825731$

$\times .075$

20.10619298

20 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 (3) 10

(2) 7 (4) 20

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

$3x-1 = 2x+6$

$-2x \quad -2x$

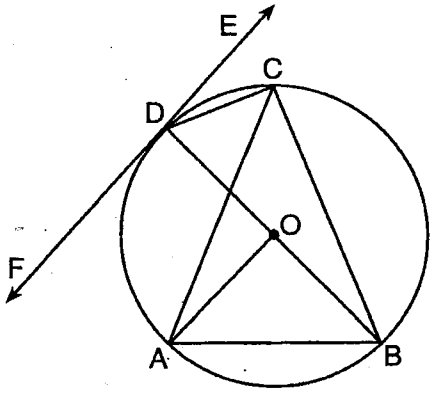
$x-1 = 6$

$+1 \quad +1$

$x = 7$

$GR = 3(7)-1 = 20$

21 In the diagram below, $\overline{DC}$, $\overline{AC}$, $\overline{DOB}$, $\overline{CB}$, and $\overline{AB}$ are chords of circle O, $\overleftrightarrow{FDE}$ is tangent at point D, and radius $\overline{AO}$ is drawn. Sam decides to apply this theorem to the diagram: "An angle inscribed in a semi-circle is a right angle."



vertex of the angle sits ON the circle

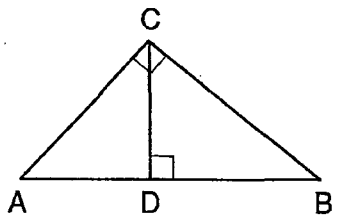
Which angle is Sam referring to?

(1) $\angle AOB$ (3) $\angle DCB$

(2) $\angle BAC$ (4) $\angle FDB$

Use this space for computations.

22 In the diagram below, $\overline{CD}$ is the altitude drawn to the hypotenuse $\overline{AB}$ of right triangle ABC.



Which lengths would *not* produce an altitude that measures $6\sqrt{2}$?

(1) $AD = 2$ and $DB = 36$
(3) $AD = 6$ and $DB = 12$
(2) $AD = 3$ and $AB = 24$
(4) $AD = 8$ and $AB = 17$

alt^2 = piece × piece

* check each multiple choice option *

(1) $x^2 = 2(36)$
$\sqrt{x^2} = \sqrt{72}$
$x = \sqrt{72} = 6\sqrt{2}$

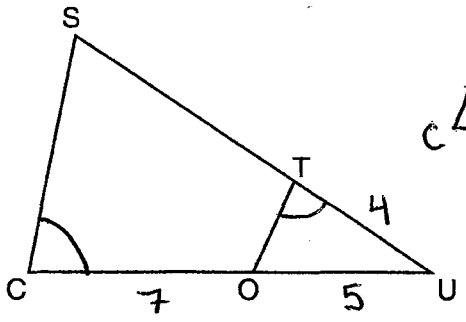
(2) $x^2 = 3(21)$
$\sqrt{x^2} = \sqrt{63}$
$x = \sqrt{63} \neq 6\sqrt{2}$

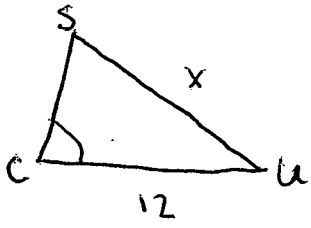
23 A designer needs to create perfectly circular necklaces. The necklaces each need to have a radius of 10 cm. What is the largest number of necklaces that can be made from 1000 cm of wire?

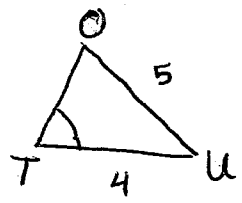
(2) 15
(3) 31
(1) 16
(4) 32

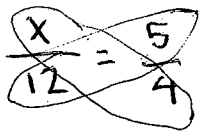
$C = 2\pi r$
$C = 2\pi(10) = 20\pi$
$1000 \div 20\pi$

24 In $\triangle SCU$ shown below, points T and O are on $\overline{SU}$ and $\overline{CU}$, respectively. Segment OT is drawn so that $\angle C \cong \angle OTU$.









If $TU = 4$, $OU = 5$, and $OC = 7$, what is the length of $\overline{ST}$?

(1) 5.6
(2) 11
(2) 8.75
(4) 15

$\frac{4x}{4} = \frac{60}{4}$

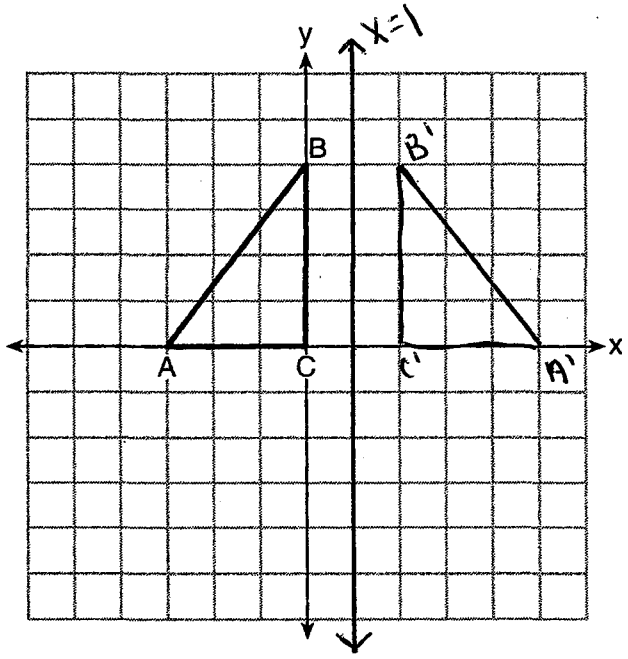
$x = 15$

$15 - 4 = 11$

Part II

Answer all 7 questions in this part. Each correct answer will receive 2 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. For all questions in this part, 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. [14]

25 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 $x = 1$.

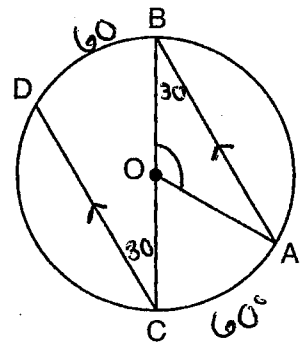


A'(5,0)

B'(2,4)

C'(2,0)

26 In the diagram below of circle O with diameter $\overline{BC}$ and radius $\overline{OA}$, chord $\overline{DC}$ is parallel to chord $\overline{BA}$.



If $m\angle BCD = 30°$, determine and state $m\angle AOB$.

∡BCD is an inscribed angle. If m∡BCD = 30°, then $m\overset{\frown}{DB} = 60°$ (B/c inscribed angles measure ½ of their intercepted arcs)

Since $\overline{DC} \parallel \overline{BA}$, $m\overset{\frown}{DB} = m\overset{\frown}{AC}$

$m\overset{\frown}{AC} = 60°$ (parallel chords make $\cong$ arcs)

$m\overset{\frown}{AB} = 180 - 60 = 120°$

$m\angle AOB = 120°$ b/c ∡AOB is a central angle and central angles are equal to their arcs

27 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.]

Step #1 : 2+1 = 3 (3 ≅ sections)

x-distance

-2 − 4 = −6 → (6)

★ distance can't be negative ★

y-distance

1 − 7 = −6 → (6)

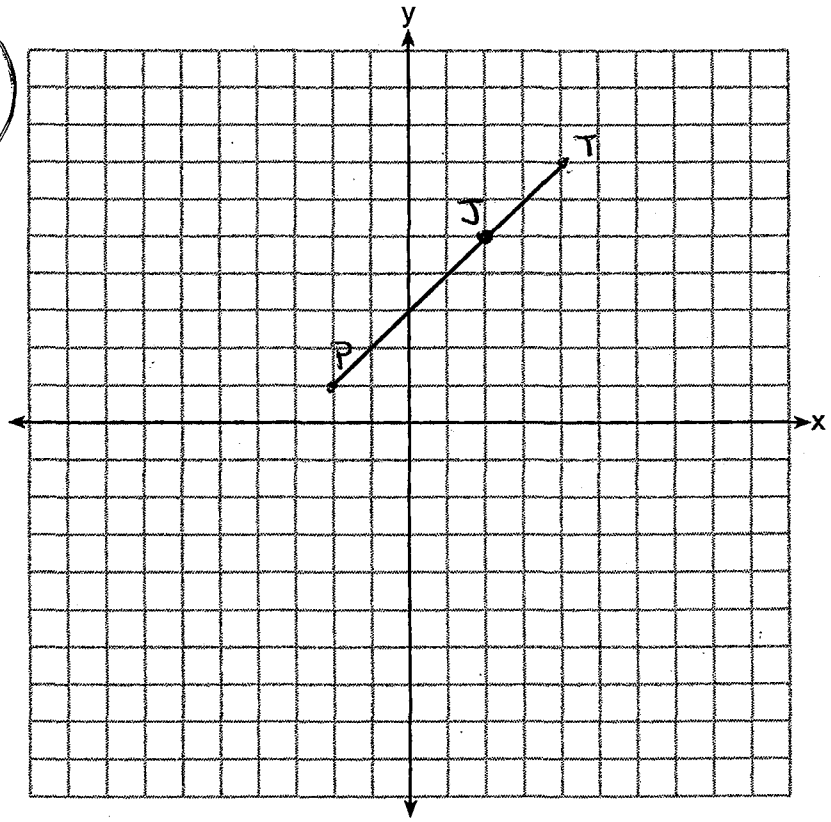
x-coordinate

$-2 + \frac{2}{3}(6) = 2$

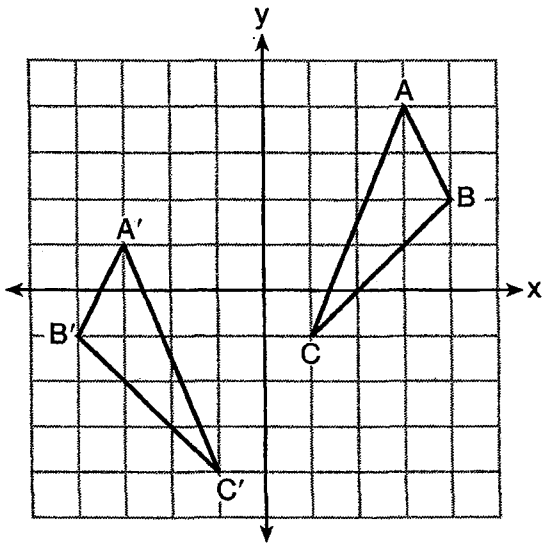
y-coordinate

$1 + \frac{2}{3}(6) = 5$

J(2,5)



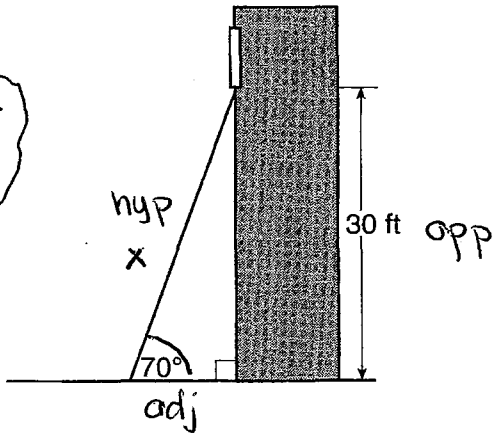
28 As graphed on the set of axes below, $\triangle A'B'C'$ is the image of $\triangle ABC$ after a sequence of transformations.



Is $\triangle A'B'C'$ congruent to $\triangle ABC$? Use the properties of rigid motion to explain your answer.

Yes b/c we can translate $\triangle ABC$ down 3 units and then reflect over the y-axis to map to $\triangle A'B'C'$. Since both a translation and a reflection are Rigid motions, the two triangles are congruent.

29 A carpenter leans an extension ladder against a house to reach the bottom of a window 30 feet above the ground. As shown in the diagram below, the ladder makes a 70° angle with the ground. To the *nearest foot*, determine and state the length of the ladder.



when we have a right Δ, and the question includes an angle, we use SOH CAH TOA

we know the opposite and we are looking for the hypotenuse

SOH CAH TOA

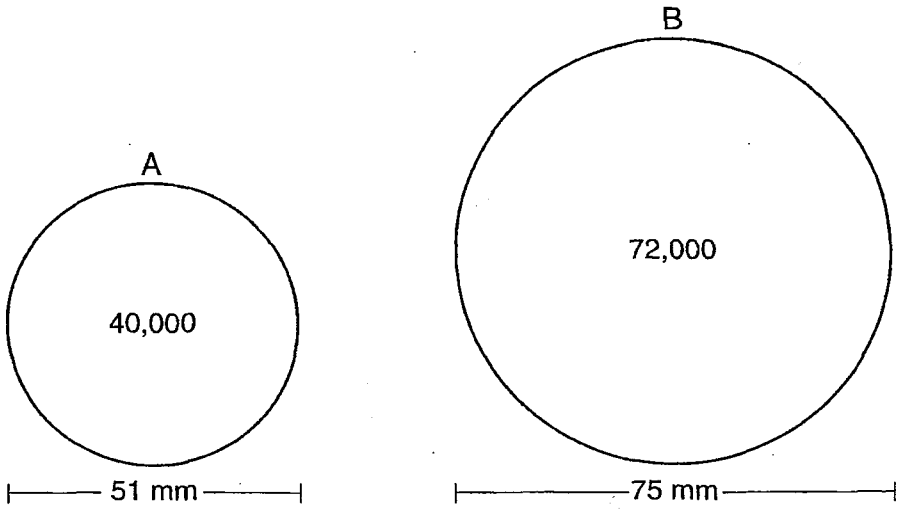
$$\frac{\sin 70}{1} = \frac{30}{x}$$

$$\frac{x \sin 70}{\sin 70} = \frac{30}{\sin 70}$$

$$x = 31.9253$$

$$x = 32 \text{ feet}$$

30 During an experiment, the same type of bacteria is grown in two petri dishes. Petri dish *A* has a diameter of 51 mm and has approximately 40,000 bacteria after 1 hour. Petri dish *B* has a diameter of 75 mm and has approximately 72,000 bacteria after 1 hour.



Determine and state which petri dish has the greater population density of bacteria at the end of the first hour.

$A = \pi r^2$

radius = $\frac{1}{2}$ diameter

$r = \frac{1}{2}(51)$

$r = 25.5$

$A = \pi(25.5)^2$

$A = 650.25\pi$

population density = $\frac{40000}{650.25\pi}$

$= 19.6$

$A = \pi r^2$

radius = $\frac{1}{2}$ diameter

$r = \frac{1}{2}(75)$

$r = 37.5$

$A = \pi r^2$

$A = \pi(37.5)^2$

$A = 1406.25\pi$

population density = $\frac{72000}{1406.25\pi}$

$= 16.3$

Petri Dish A

31 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.

dilation of a line centered at the origin → the slope remains the same → the y-intercept gets multiplied by the scale factor

↑

IMPORTANT!

$3x - y = 4$

$-3x \quad -3x$

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

$y = 3x - 4$

→ Dilate by a factor of 2

$y = 3x - (2 \cdot 4)$

$\boxed{y = 3x - 8}$

Part III

Answer all 3 questions in this part. Each correct answer will receive 4 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. For all questions in this part, 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. [12]

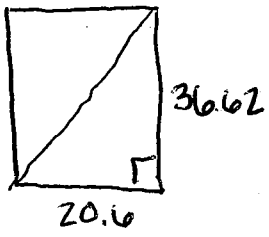
32 The aspect ratio (the ratio of screen width to height) of a rectangular flat-screen television is 16:9. The length of the diagonal of the screen is the television's screen size. Determine and state, to the *nearest inch*, the screen size (diagonal) of this flat-screen television with a screen height of 20.6 inches.

$\frac{\text{screen height}}{\text{width}} = \frac{16}{9}$

$\frac{16}{9} = \frac{x}{20.6}$

$\frac{9x}{9} = \frac{329.6}{9}$

$x = 36.62$



Right triangle $\rightarrow a^2 + b^2 = c^2$

$36.62^2 + 20.6^2 = c^2$

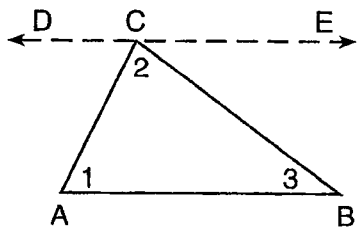
$1341.0244 + 424.36 = c^2$

$\sqrt{1765.3844} = \sqrt{c^2}$

$c = 42.01647772$

$c = 42$ in

33 Given the theorem, "The sum of the measures of the interior angles of a triangle is 180°," complete the proof for this theorem.



* DON'T WORRY ABOUT THIS QUESTION *

Given: $\triangle ABC$

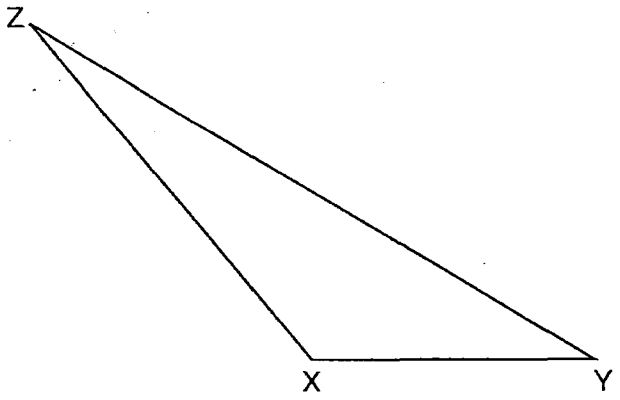
Prove: $m\angle 1 + m\angle 2 + m\angle 3 = 180°$

Fill in the missing reasons below.

Statements	Reasons
(1) $\triangle ABC$	(1) Given
(2) Through point C, draw $\overleftrightarrow{DCE}$ parallel to $\overline{AB}$.	(2) _____
(3) $m\angle 1 = m\angle ACD$, $m\angle 3 = m\angle BCE$	(3) _____
(4) $m\angle ACD + m\angle 2 + m\angle BCE = 180°$	(4) _____
(5) $m\angle 1 + m\angle 2 + m\angle 3 = 180°$	(5) _____

34 Triangle XYZ is shown below. Using a compass and straightedge, on the line below, construct and label $\triangle ABC$, such that $\triangle ABC \cong \triangle XYZ$. [Leave all construction marks.]

Based on your construction, state the theorem that justifies why $\triangle ABC$ is congruent to $\triangle XYZ$.



watch construction video on youtube

WeinsteinMAPMATH

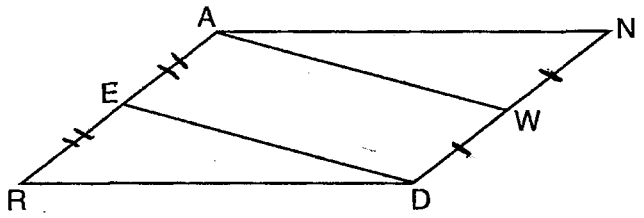
SAS ≅ SAS

* 56) $\triangle ANW \cong \triangle DRE$ | 56) SAS $\cong$ SAS

Part IV

Answer the 2 questions in this part. Each 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. For all questions in this part, 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. [12]

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



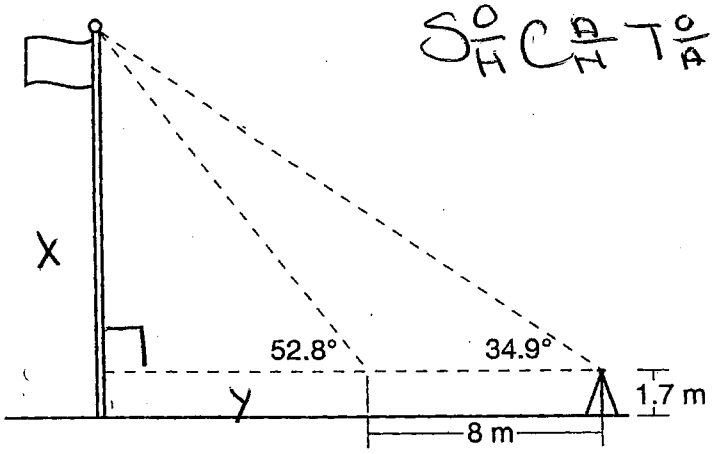
Prove that $\triangle ANW \cong \triangle DRE$.

Prove that quadrilateral $AWDE$ is a parallelogram.

Statements	Reasons
① Parallelogram ANDR with $\overline{AW}$ & $\overline{DE}$ bisecting $\overline{NWD}$ and $\overline{REA}$ at points W and E	① given
② $\overline{AN} \cong \overline{RD}$, $\overline{RA} \cong \overline{DN}$	② opposite sides of a parallelogram are $\cong$
③ $WN = \frac{1}{2}DN$, $RE = \frac{1}{2}RA$	③ Definition of segment bisector
④ $\overline{WN} \cong \overline{RE}$	④ Halves of congruent segments are $\cong$
⑤ $\angle ANW \cong \angle ERD$	⑤ opposite $\angle$'s of a parallelogram are $\cong$
* ⑥ $\overline{AW} \cong \overline{ED}$	* ⑥ CPCTC
⑦ $AE = \frac{1}{2}RA$, $WD = \frac{1}{2}DN$	⑦ Definition of segment bisector
⑧ $\overline{AE} \cong \overline{WD}$	⑧ Halves of $\cong$ segments are $\cong$
⑨ ANDE is a parallelogram	⑨ Definition of a parallelogram

36 Cathy wants to determine the height of the flagpole shown in the diagram below. She uses a survey instrument to measure the angle of elevation to the top of the flagpole, and determines it to be 34.9°. She walks 8 meters closer and determines the new measure of the angle of elevation to be 52.8°. At each measurement, the survey instrument is 1.7 meters above the ground.

$SOH\ CAH\ TOA$



Determine and state, to the *nearest tenth of a meter*, the height of the flagpole.

$\frac{\tan 34.9}{1} = \frac{x}{y+8}$ $\qquad$ $\frac{\tan 52.8}{1} = \frac{x}{y}$

$x = (y+8)\tan 34.9$ $\qquad$ $x = y \tan 52.8$

* since both expressions are equal to x, we can then set the 2 expressions equal to each other *

$(y+8)\tan 34.9 = y\tan 52.8$

$y\tan 34.9 + 8\tan 34.9 = y\tan 52.8$

$-y\tan 34.9 \qquad\qquad -y\tan 34.9$

$8\tan 34.9 = y\tan 52.8 - y\tan 34.9$

$8\tan 34.9 = y(\tan 52.8 - \tan 34.9)$

$y = \frac{8\tan 34.9}{(\tan 52.8 - \tan 34.9)}$ $\qquad$ $y = 9.0037$

$x = y\tan 52.8$

$x = 9.0037 \tan 52.8$

$x = 11.9 \rightsquigarrow 11.9 + 1.7 = \boxed{13.6\text{ m}}$