Large-Type Edition

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

GEOMETRY

Wednesday, August 20, 2025 — 12:30 to 3:30 p.m., only

Student Name: _____

School Name: _____

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 35 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.

Part I

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 on your separate answer sheet. [48]

Use this space for computations.

1 An equilateral triangle is continuously rotated around one of its altitudes. The three-dimensional object formed is a

(1) cone

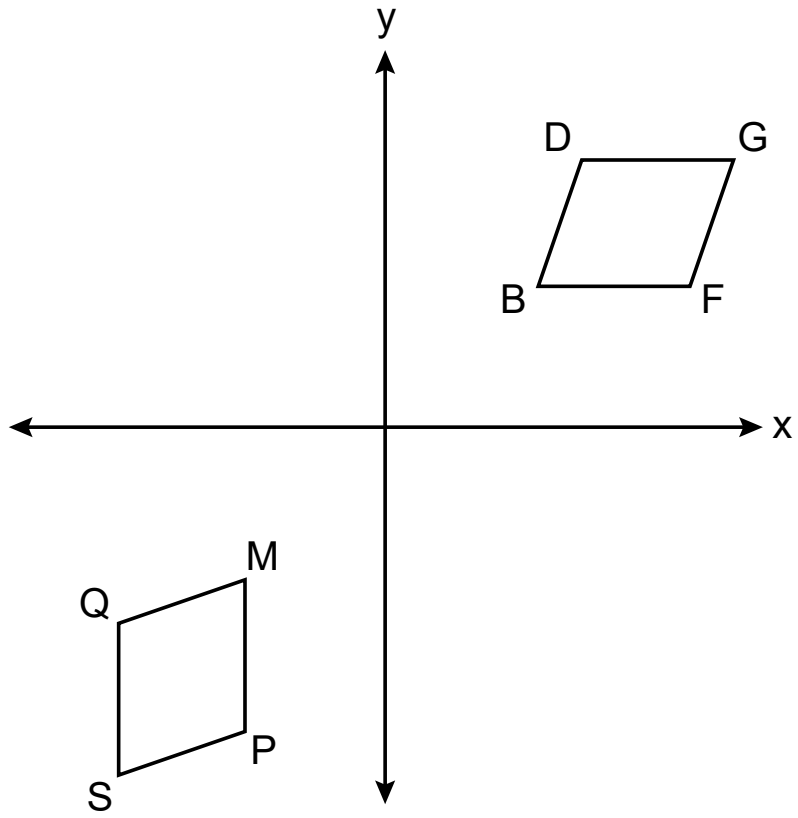
(2) sphere

(3) cylinder

(4) pyramid

Use this space for computations.

2 On the set of axes below, quadrilateral *BDGF* is rotated 90 degrees clockwise about the origin and then reflected over the y-axis. The image of quadrilateral *BDGF* is quadrilateral *MQSP*.



Side $\overline{BD}$ will always map onto

(1) $\overline{MP}$

(2) $\overline{PS}$

(3) $\overline{MQ}$

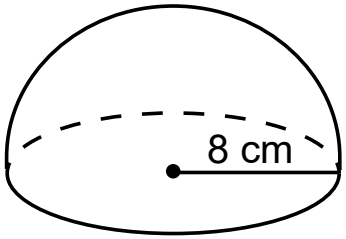
(4) $\overline{SQ}$

Use this space for computations.

3 In right triangle JOE, hypotenuse $JO = 31.8$ and $m\angle J = 38°$. To the *nearest tenth*, the length of $\overline{EJ}$ is

(1) 19.6
(2) 25.1
(3) 40.4
(4) 51.7

4 The hemisphere below has a radius of 8 cm.



To the *nearest cubic centimeter*, the volume of the hemisphere is

(1) 201
(2) 268
(3) 1072
(4) 2145

Use this space for computations.

5 In parallelogram $ABCD$, diagonals $\overline{AC}$ and $\overline{BD}$ intersect at E. Which information is sufficient to prove $ABCD$ is a rhombus?

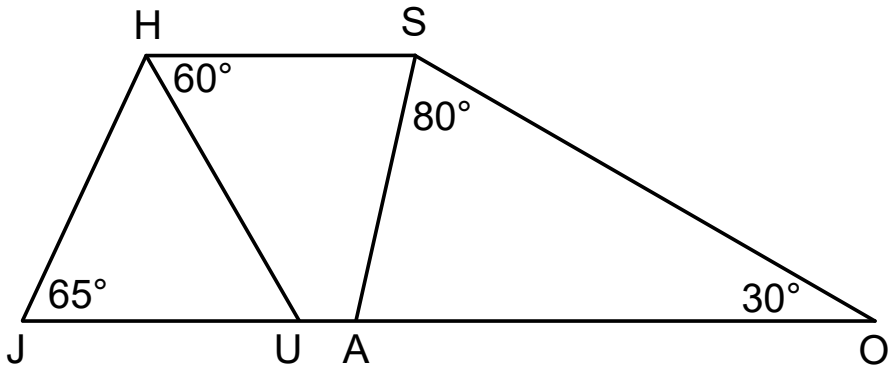
(1) $\overline{AE} \cong \overline{EC}$

(2) $\overline{AC} \cong \overline{BD}$

(3) $\overline{AB} \perp \overline{BC}$

(4) $\overline{AC} \perp \overline{BD}$

6 Trapezoid $JOSH$, shown below, has non-parallel sides $\overline{JH}$ and $\overline{OS}$, $m\angle J = 65°$, $m\angle O = 30°$, $m\angle OSA = 80°$, and $m\angle SHU = 60°$.



What is $m\angle HSA$?

(1) 55°

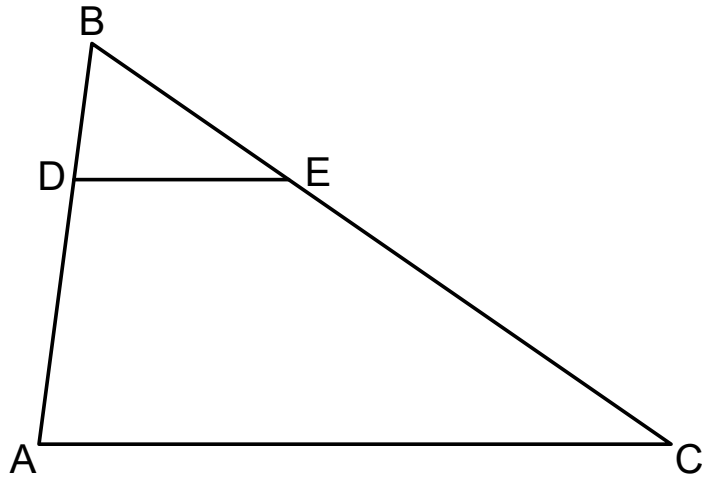
(2) 60°

(3) 65°

(4) 70°

Use this space for computations.

7 In $\triangle ABC$ below, points D and E are on $\overline{AB}$ and $\overline{CB}$, respectively, such that $\overline{DE} \parallel \overline{AC}$.



If $AD = 8$, $DB = 4$, and $DE = 6$, what is the length of $\overline{AC}$?

(1) 24

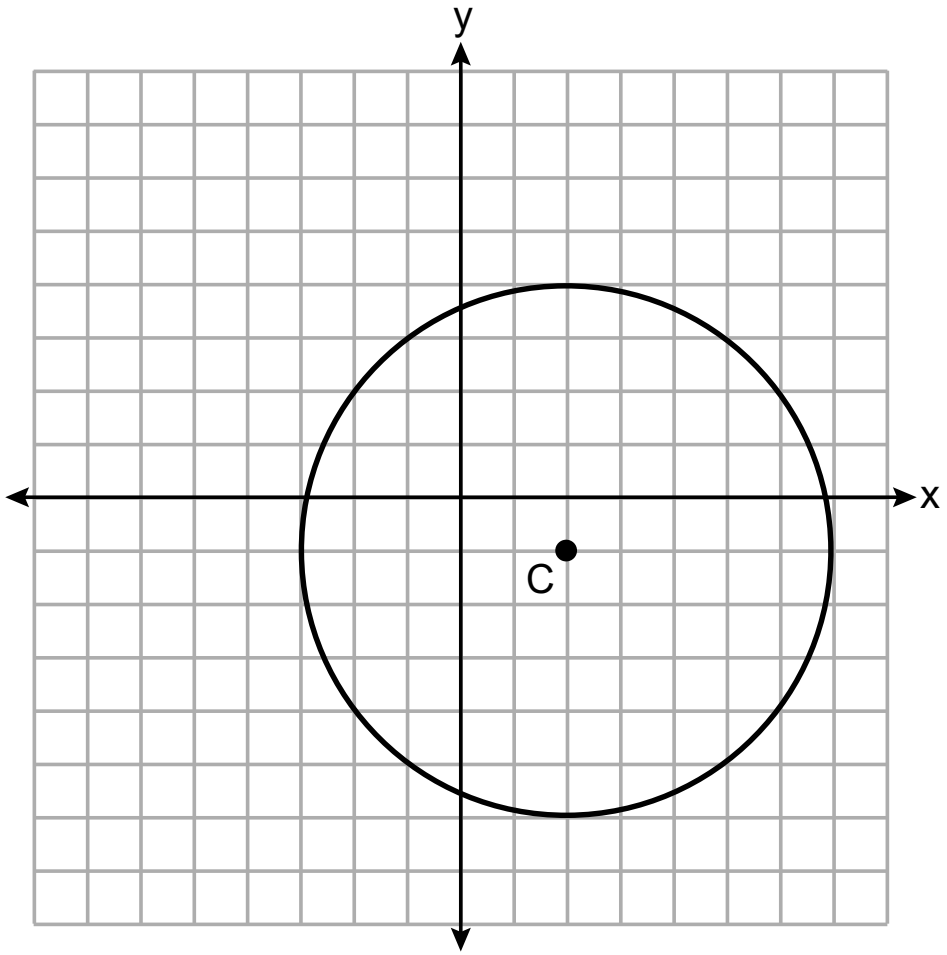
(2) 18

(3) 12

(4) 10

Use this space for computations.

8 On the set of axes below, circle C has a center with coordinates (2,–1).



Which equation represents circle C?

(1) $(x-2)^2 + (y+1)^2 = 25$

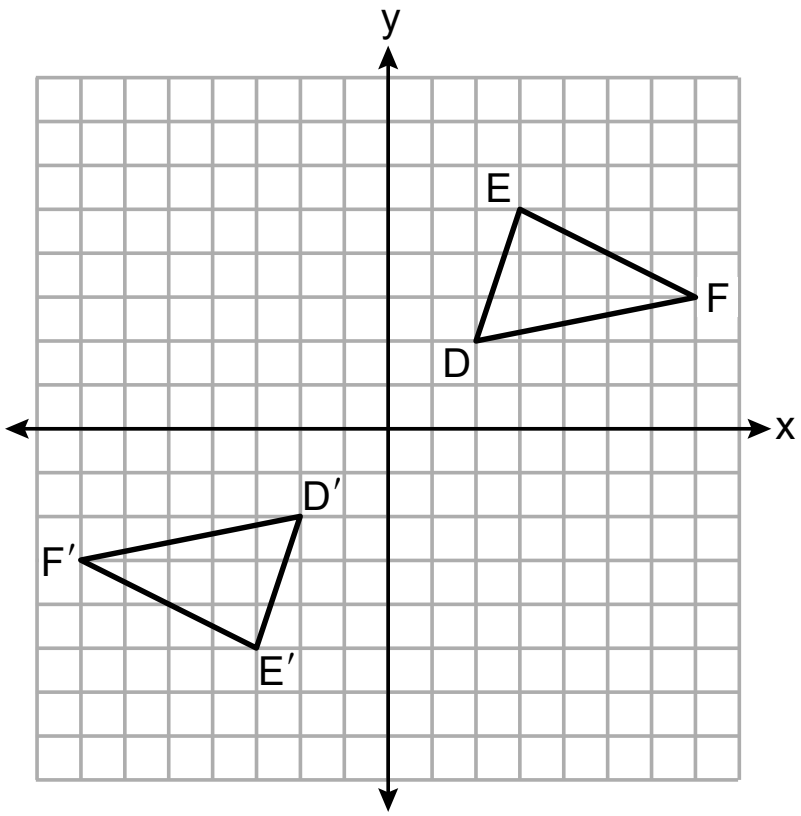
(2) $(x-2)^2 + (y+1)^2 = 16$

(3) $(x+2)^2 + (y-1)^2 = 25$

(4) $(x+2)^2 + (y-1)^2 = 16$

Use this space for computations.

9 On the set of axes below, $\triangle D'E'F'$ is the image of $\triangle DEF$.



A transformation that maps $\triangle DEF$ onto $\triangle D'E'F'$ is a

(1) reflection over the line $y = x$

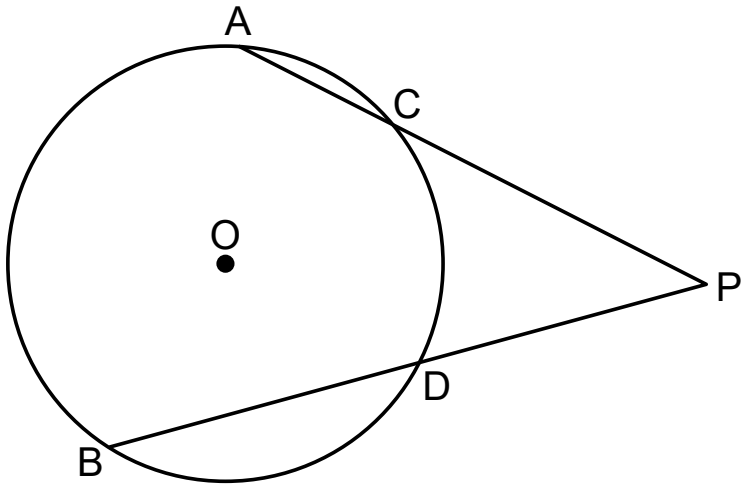
(2) reflection over the line $y = -x$

(3) point reflection through the origin

(4) translation 4 units left and 4 units down

Use this space for computations.

10 In circle O below, secants $\overline{PCA}$ and $\overline{PDB}$ are drawn from external point P.



If $PA = 17$, $PD = 10$, and $BD = 12$, what is the length of $\overline{PC}$, to the *nearest tenth*?

(1) 7.1

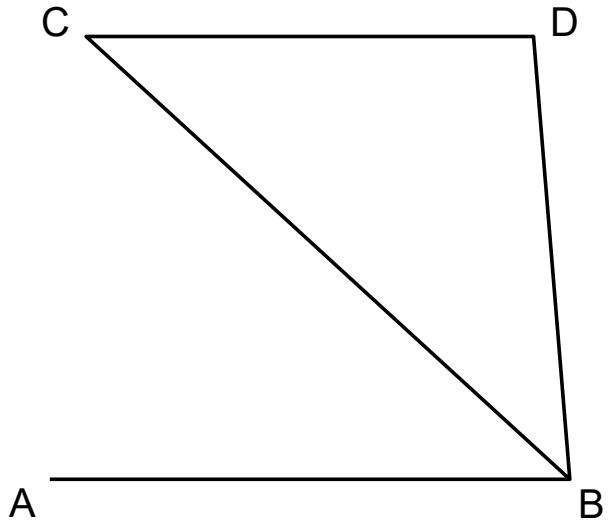
(2) 7.7

(3) 12.9

(4) 14.2

Use this space for computations.

11 In the diagram below, $\overline{CD} \parallel \overline{AB}$, and $\overline{CB}$ bisects $\angle ABD$.



Which statement must be true?

(1) $\overline{CD} \cong \overline{AB}$

(2) $\overline{AB} \cong \overline{BD}$

(3) $\triangle CDB$ is a right triangle

(4) $\triangle CDB$ is an isosceles triangle

Use this space for computations.

12 Line h is represented by the equation $y = \frac{2}{3}x - 4$.

Which equation represents the line that is perpendicular to line h and passes through the point (6,1)?

(1) $y - 1 = \frac{2}{3}(x - 6)$

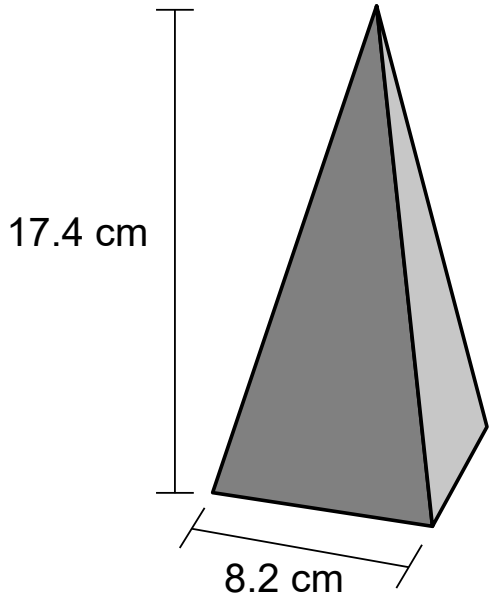
(2) $y + 1 = \frac{2}{3}(x + 6)$

(3) $y - 1 = -\frac{3}{2}(x - 6)$

(4) $y + 1 = -\frac{3}{2}(x + 6)$

Use this space for computations.

13 A wooden toy block can be modeled by a pyramid with a square base, as shown below. The height of the block is 17.4 cm and the square base has a side length of 8.2 cm.



The block is made of solid oak, which has a density of 0.77 g/cm^3. What is the mass of the block, to the *nearest gram*?

(1) 300

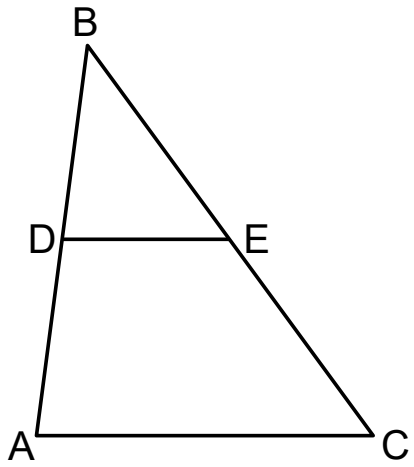
(2) 506

(3) 637

(4) 901

Use this space for computations.

14 In $\triangle ABC$ below, midsegment $\overline{DE}$ is drawn.



If $DE = x + 3$ and $AC = 3x - 5$, what is the length of $\overline{DE}$?

(1) 28

(2) 14

(3) 7

(4) 4

15 Triangle DUG is an isosceles right triangle with the right angle at G.
If $DU = 10\sqrt{2}$, what is the length of $\overline{GU}$?

(1) 5

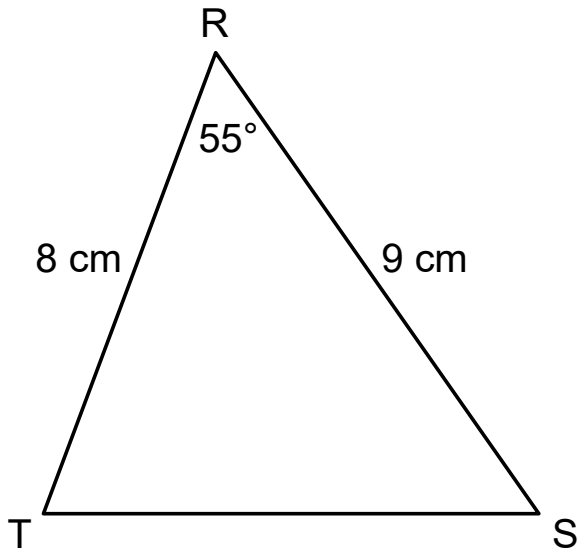
(2) $5\sqrt{2}$

(3) 10

(4) $10\sqrt{2}$

Use this space for computations.

16 In $\triangle RST$ below, RS = 9 cm, RT = 8 cm, and $m\angle TRS = 55°$.



What is the area of $\triangle RST$, to the *nearest square centimeter*?

(1) 59

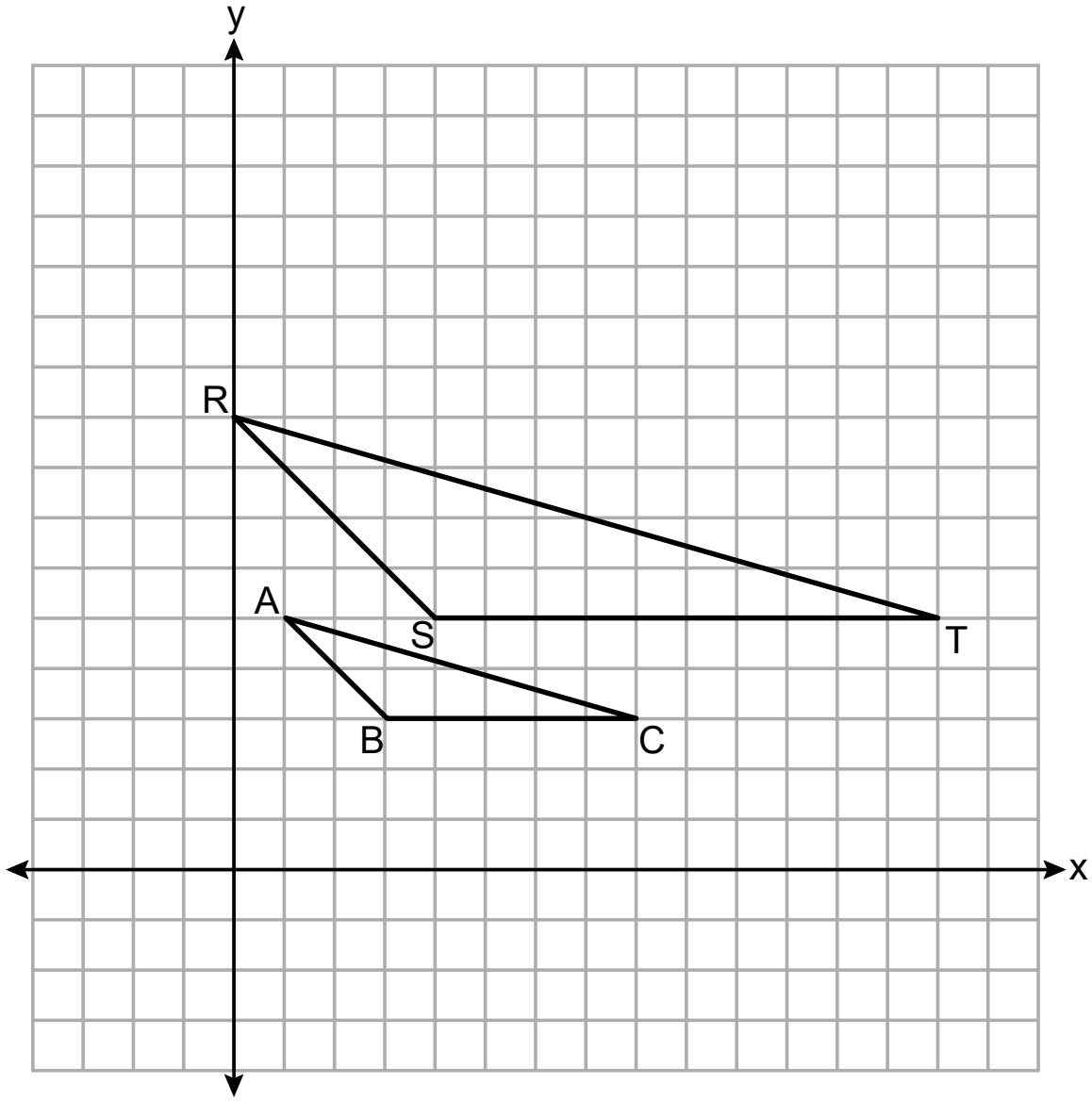
(2) 36

(3) 29

(4) 21

17 Triangle ABC is dilated by a scale factor of 2 to map onto its image, $\triangle RST$, on the set of axes below.

Use this space for computations.



What are the coordinates of the center of this dilation?

(1) (1,–1)

(2) (2,1)

(3) (3,3)

(4) (0,0)

Use this space for computations.

18 What is the perimeter of $\triangle ABC$, where the vertices have coordinates $A(-2,3)$, $B(-2,-1)$, and $C(6,-1)$?

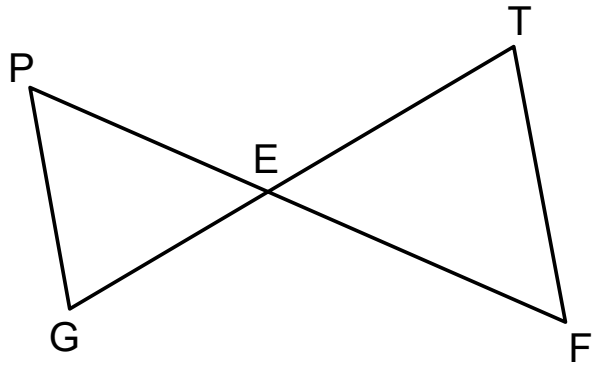
(1) 16

(2) 92

(3) $16\sqrt{5}$

(4) $12 + 4\sqrt{5}$

19 In the diagram below, $\overline{GT}$ and $\overline{PF}$ intersect at E, and $\angle P \cong \angle F$.



Which equation is always true?

(1) $\frac{PE}{FE} = \frac{FT}{PG}$

(2) $\frac{GE}{TE} = \frac{FT}{PG}$

(3) $\frac{PE}{GE} = \frac{TE}{FE}$

(4) $\frac{PE}{FE} = \frac{PG}{FT}$

Use this space for computations.

20 A section of sidewalk in the shape of a rectangular prism is being replaced. The sidewalk is 10 feet long, 4 feet wide, and 4 inches deep. A brand of concrete mix yields 0.6 cubic foot of concrete per bag. What is the minimum number of bags of concrete mix that must be purchased to completely replace this sidewalk?

(1) 22

(2) 23

(3) 26

(4) 27

21 The line $4x - 6y = 24$ is transformed by a dilation of scale factor 3 centered at the origin. Which equation represents the image of the line after this dilation?

(1) $y = \frac{2}{3}x - 12$

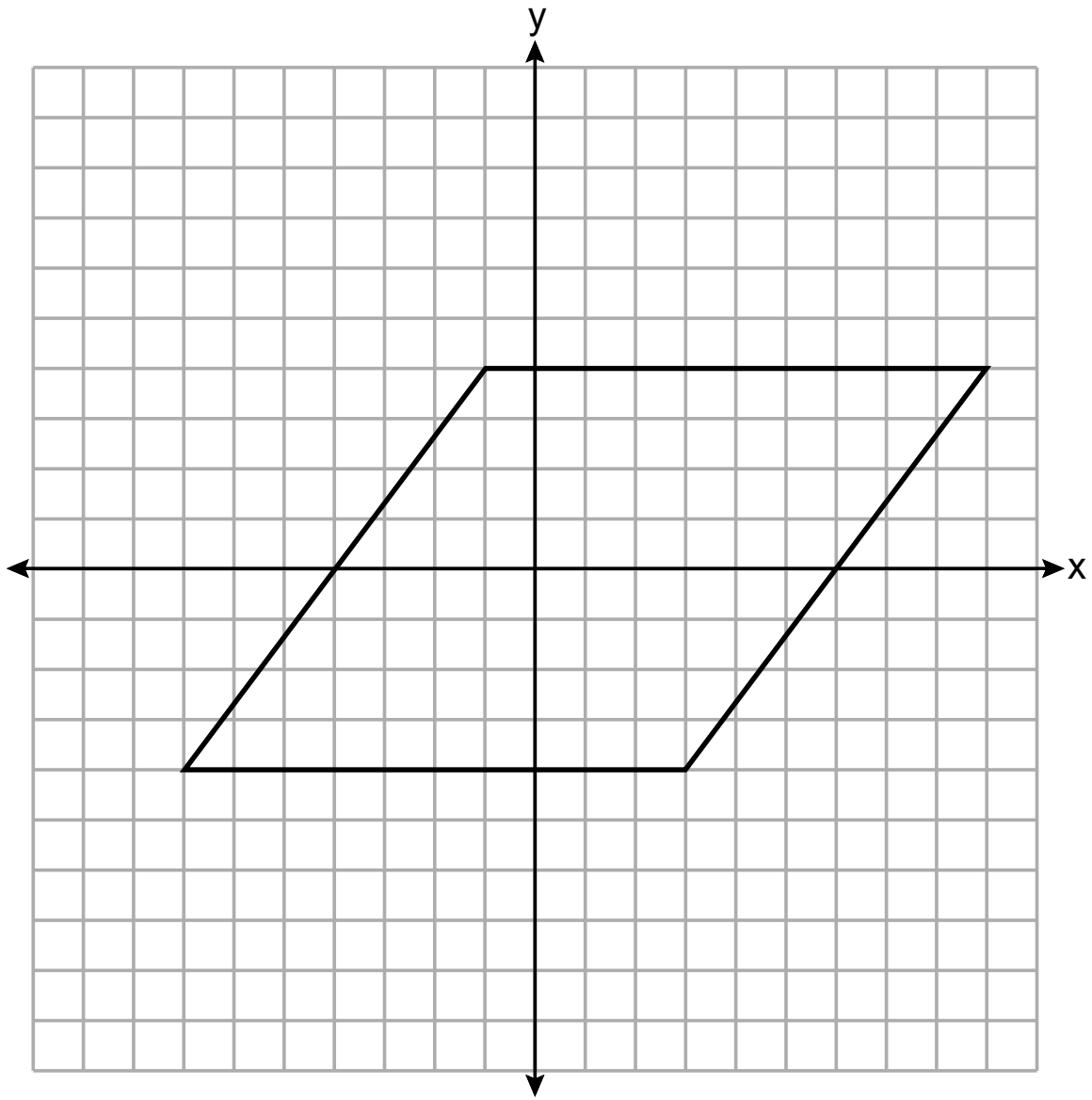
(2) $y = \frac{2}{3}x - 4$

(3) $y = 2x - 12$

(4) $y = 2x - 4$

Use this space for computations.

22 A rhombus is graphed on the set of axes below.



Question 22 is continued on the page below.

Use this space for computations.

Which transformation does *not* carry the rhombus onto itself?

(1) a rotation of 180° about the origin

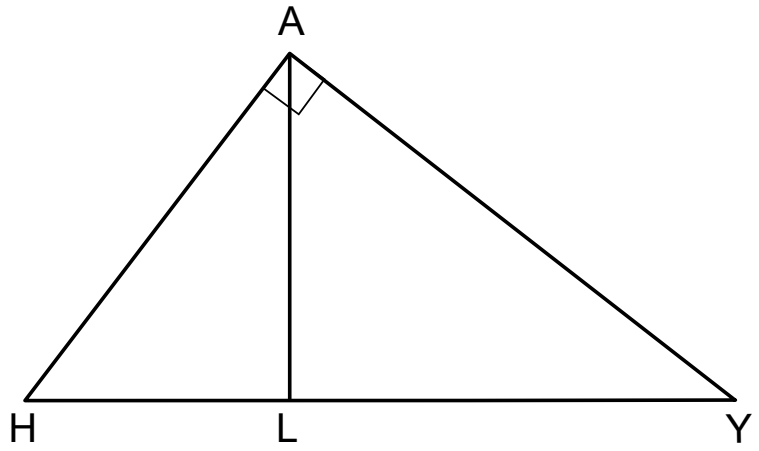
(2) a rotation of 180° about point (1,0)

(3) a reflection over the line $y = \frac{1}{2}x - \frac{1}{2}$

(4) a reflection over the line $y = -2x + 2$

Use this space for computations.

23 In right triangle HAY below, altitude $\overline{AL}$ is drawn to hypotenuse $\overline{HY}$.



If $HY = 25$ and $YA = 20$, the length of $\overline{AL}$ is

(1) 9

(2) 12

(3) 15

(4) 16

24 Square $ABCD$ has an area of 36. If the square is dilated by a scale factor of $\frac{1}{2}$ centered at A, what is the area of its image?

(1) 9

(2) 18

(3) 72

(4) 144

GO RIGHT ON TO THE NEXT PAGE ⇨

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 $D'A'N'$ is the image of $\triangle DAN$ after a translation.

Explain why $\triangle D'A'N'$ must be congruent to $\triangle DAN$.

Work space for question 25 is continued on the page below.

Question 25 continued

26 The table below lists five metals and their densities.

Metal	Density (g/cm^3)
Zinc	7.14
Tin	7.31
Iron	7.86
Copper	8.96
Silver	10.5

A solid metal cube has an edge length of 5 cm and a mass of 982.5 grams.

Using the table above, determine and state the type of metal from which this cube is made.

Work space for question 26 is continued on the page below.

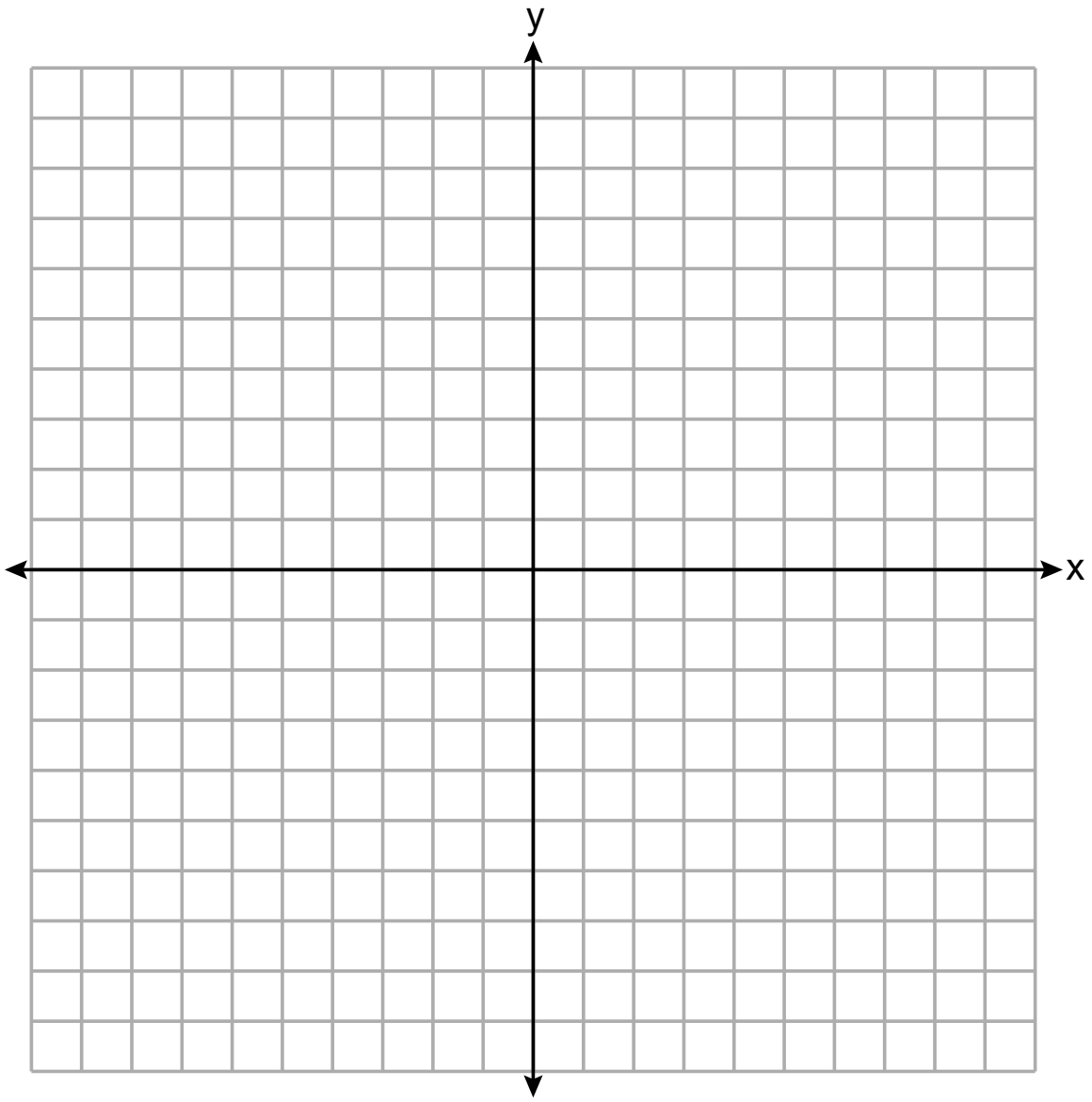
Question 26 continued

27 The endpoints of $\overline{CAS}$ are $C(-3,1)$ and $S(7,6)$. Determine and state the coordinates of point A such that the ratio of $CA:AS$ is 3:2.

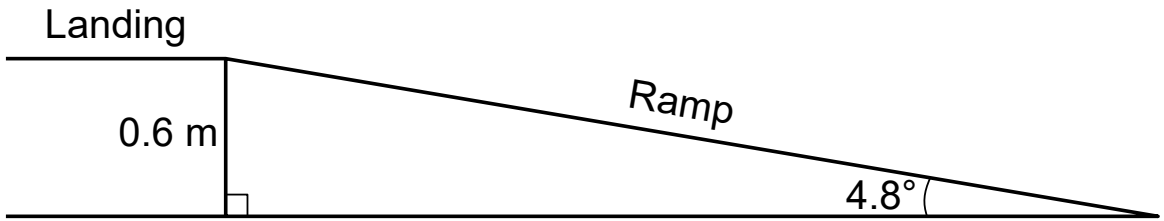
[The use of the set of axes below is optional.]

The set of axes for question 27 is on the page below.

Question 27 continued



28 The ramp shown in the diagram below has an angle of elevation of 4.8°. The ramp is built to a landing 0.6 m above the ground.

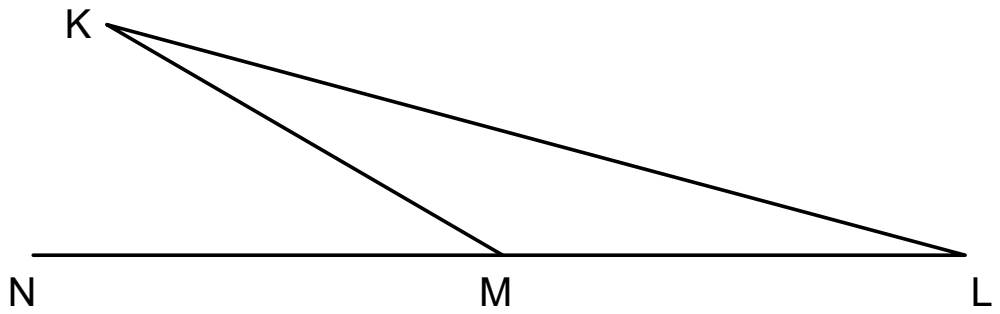


Determine and state the length of the ramp, to the *nearest tenth of a meter*.

Work space for question 28 is continued on the page below.

Question 28 continued

29 Angle KML is the vertex angle of isosceles triangle KLM below. Side $\overline{LM}$ is extended through vertex M to point N.

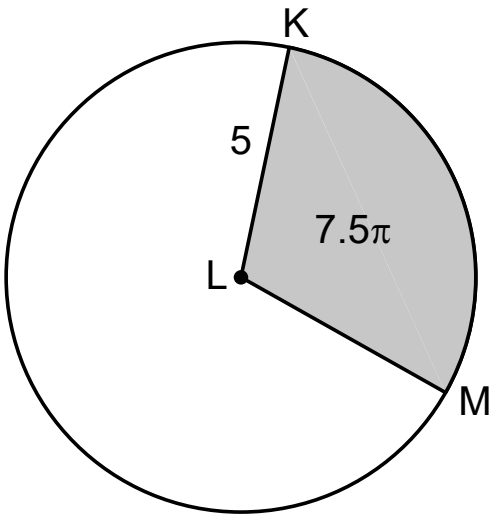


If $m\angle K = 15°$, determine and state $m\angle KMN$.

Work space for question 29 is continued on the page below.

Question 29 continued

30 In the diagram below of circle L, the area of the shaded sector KLM is 7.5π and $LK = 5$.



Determine and state the degree measure of angle KLM, the central angle of the shaded sector.

Work space for question 30 is continued on the page below.

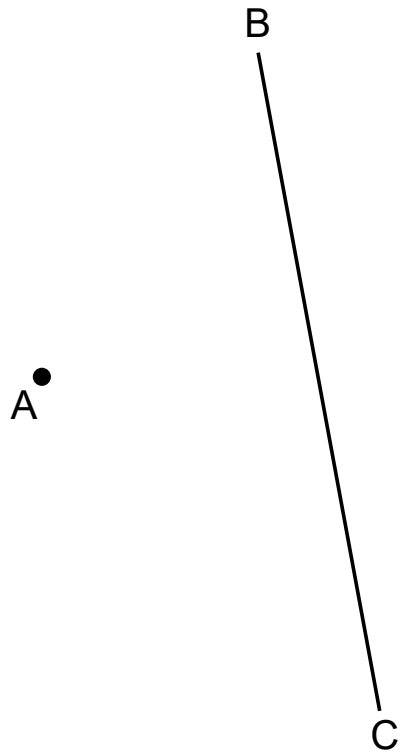
Question 30 continued

31 Using a compass and straightedge, construct the image of point A after a reflection over $\overline{BC}$.

[Leave all construction marks.]

Question 31 is continued on the page below.

Question 31 continued



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 Joan wants to fill an empty 75-liter fish tank with water. She uses a cylindrical bucket with a diameter of 20 cm.

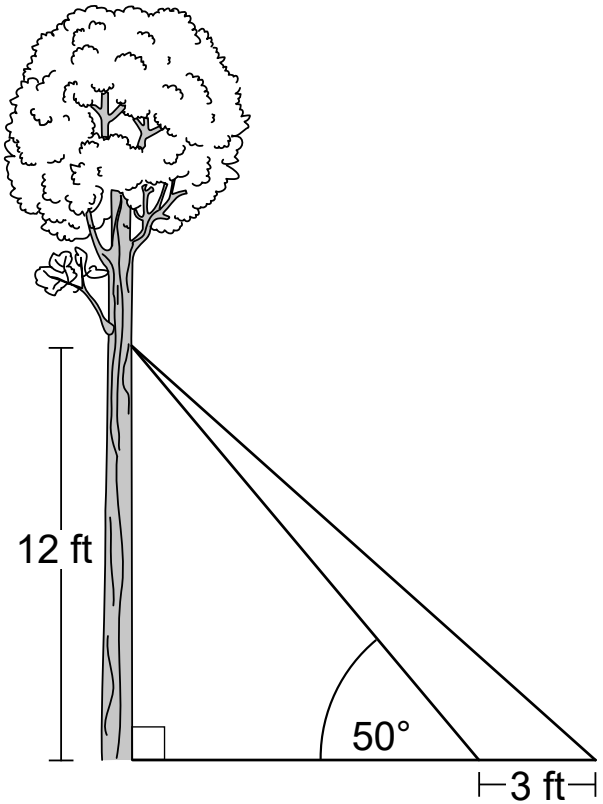
Determine and state the maximum number of buckets of water, filled to an exact height of 26 cm, Joan can put into the fish tank before it overflows.

[1000 cm^3 = 1 liter]

Work space for question 32 is continued on the page below.

Question 32 continued

33 As modeled in the diagram below, two cables are attached from a point on a tree 12 feet above the ground. The longer cable is anchored on the ground 3 feet farther from the tree than the shorter cable is anchored. The angle of elevation between the shorter cable and the ground is 50°.



Question 33 is continued on the page below.

Question 33 continued

Determine and state, to the *nearest foot*, the distance from the base of the tree to the point where the longer cable is attached to the ground.

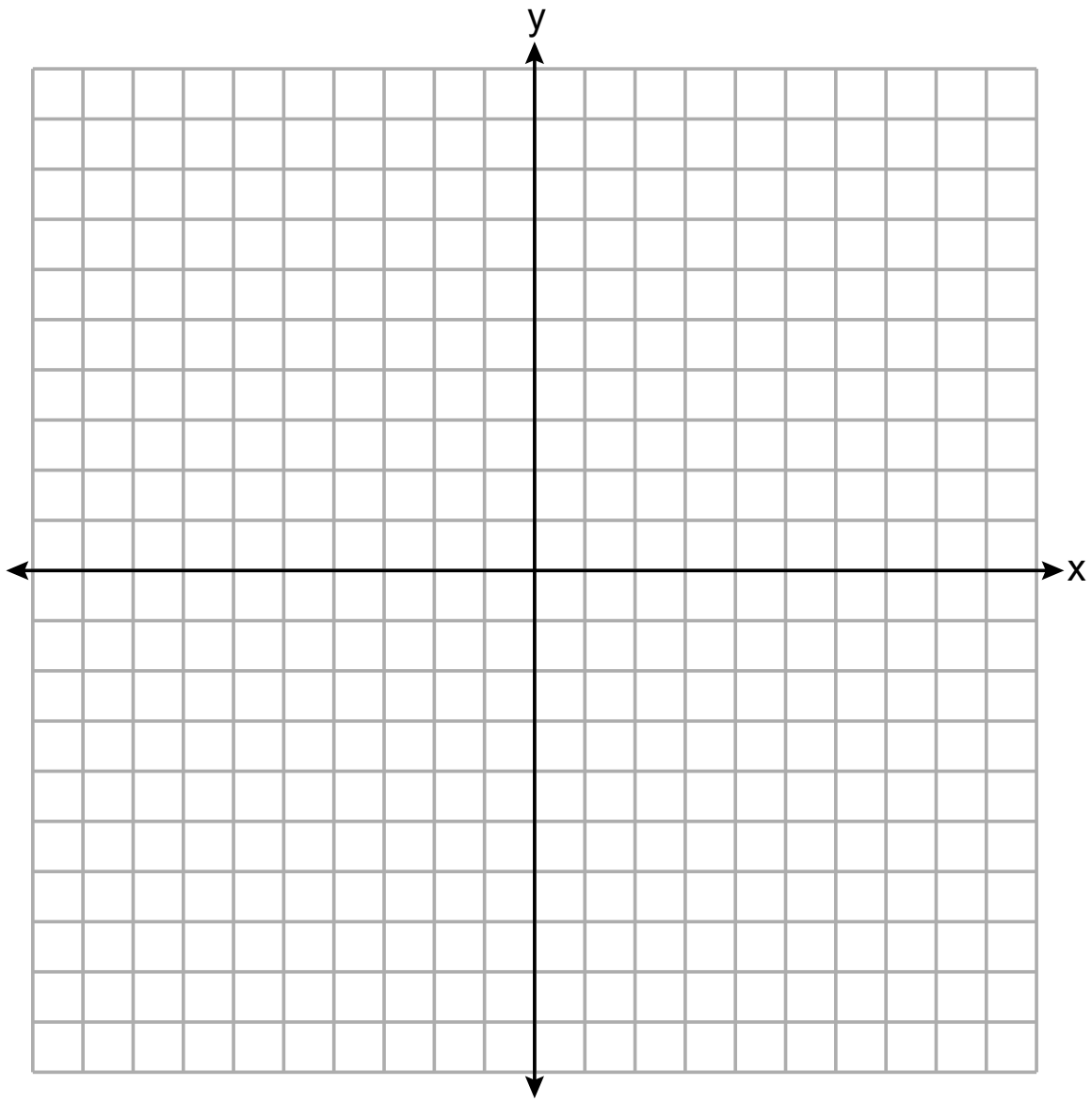
Determine and state, to the *nearest degree*, the angle of elevation between the longer cable and the ground.

34 Quadrilateral *READ* has vertices with coordinates $R(-1,3)$, $E(2,7)$, $A(10,1)$, and $D(7,-3)$.

Prove *READ* is a rectangle. [The use of the set of axes below is optional.]

The set of axes for question 34 is on the page below.

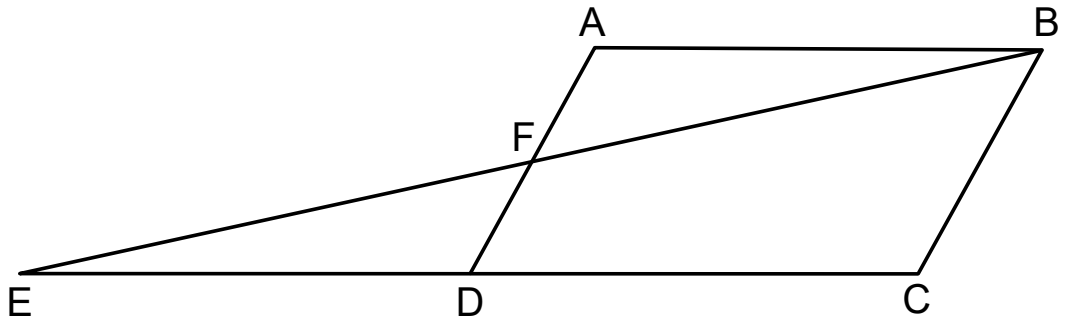
Question 34 continued



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 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 quadrilateral $ABCD$ below, side $\overline{CD}$ is extended through D to point E such that $\overline{AFD}$ and $\overline{BFE}$ bisect each other, and $\overline{DE} \cong \overline{DC}$.



Prove $ABCD$ is a parallelogram.

Work space for question 35 is continued on the page below.

Question 35 continued

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Scrap Graph Paper — this sheet will *not* be scored.

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Reference Sheet for Geometry

Volume	Cylinder	$V = Bh$ where B is the area of the base
	General Prism	$V = Bh$ where B is the area of the base
	Sphere	$V = \frac{4}{3}\pi r^3$
	Cone	$V = \frac{1}{3}Bh$ where B is the area of the base
	Pyramid	$V = \frac{1}{3}Bh$ where B is the area of the base