The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

GEOMETRY

Friday, June 20, 2014 — 1:15 p.m.

SAMPLE RESPONSE SET

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Question 29

29 The coordinates of the endpoints of $\overline{BC}$ are $B(5,1)$ and $C(-3,-2)$. Under the transformation R_{90}, the image of $\overline{BC}$ is $\overline{B'C'}$. State the coordinates of points B' and C'.

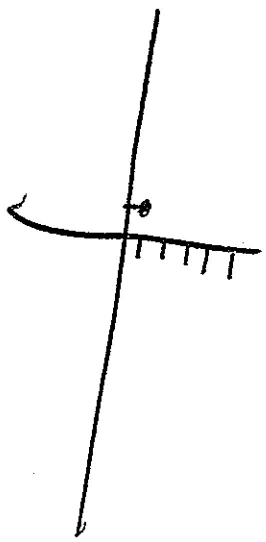
(-1,5)

(2,-3)

Score 2: The student has a complete and correct response.

Question 29

29 The coordinates of the endpoints of $\overline{BC}$ are $B(5,1)$ and $C(-3,-2)$. Under the transformation R_{90}, the image of $\overline{BC}$ is $\overline{B'C'}$. State the coordinates of points B' and C'.



$B' = -1,5$

$C' = 2,-3$

Score 1: The student did not express the coordinates as an ordered pair.

Question 29

29 The coordinates of the endpoints of $\overline{BC}$ are $B(5,1)$ and $C(-3,-2)$. Under the transformation R_{90}, the image of $\overline{BC}$ is $\overline{B'C'}$. State the coordinates of points B' and C'.

(1, -5)

(2, -3)

Score 1: The student only stated $(2,-3)$ correctly.

Question 29

29 The coordinates of the endpoints of $\overline{BC}$ are $B(5,1)$ and $C(-3,-2)$. Under the transformation R_{90}, the image of $\overline{BC}$ is $\overline{B'C'}$. State the coordinates of points B' and C'.

B(5,1) C(-3,-2)

(-1,5) (2,3)

B'(-1,-5)

C'(2,3)

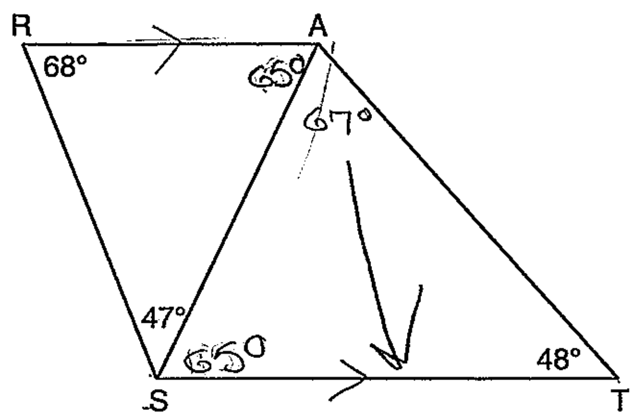
B' = (-1,-5

C' = (2,3

Score 0: The student's work is completely incorrect.

30 As shown in the diagram below, $\overline{AS}$ is a diagonal of trapezoid *STAR*, $\overline{RA} \parallel \overline{ST}$, m$\angle ATS = 48$, m$\angle RSA = 47$, and m$\angle ARS = 68$.

Determine and state the longest side of $\triangle SAT$.



$$\begin{array}{r} 47 \\ +\ 68 \\ \hline 115° \end{array} \qquad + \qquad \begin{array}{r} 65 \\ 48 \\ \hline 113° \end{array}$$

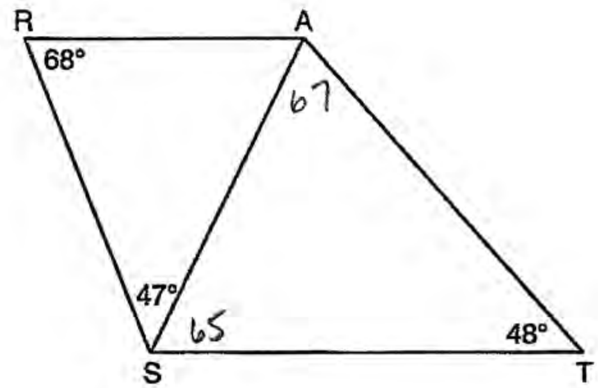
$\overline{ST}$ is the longest side

Score 2: The student has a complete and correct response.

Question 30

30 As shown in the diagram below, $\overline{AS}$ is a diagonal of trapezoid $STAR$, $\overline{RA} \parallel \overline{ST}$, $m\angle ATS = 48$, $m\angle RSA = 47$, and $m\angle ARS = 68$.

Determine and state the longest side of $\triangle SAT$.



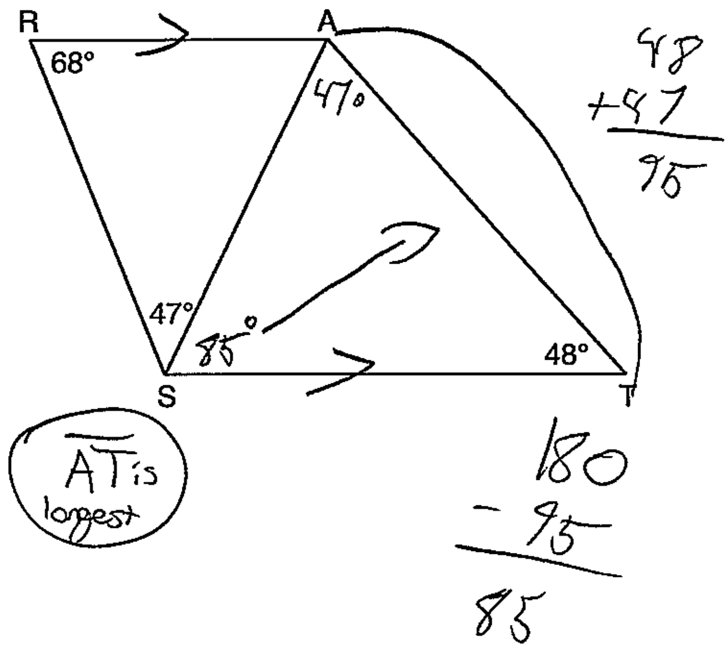
$\overline{ST}$

Score 2: The student has a complete and correct response.

Question 30

30 As shown in the diagram below, $\overline{AS}$ is a diagonal of trapezoid *STAR*, $\overline{RA} \parallel \overline{ST}$, m$\angle ATS = 48$, m$\angle RSA = 47$, and m$\angle ARS = 68$.

Determine and state the longest side of $\triangle SAT$.

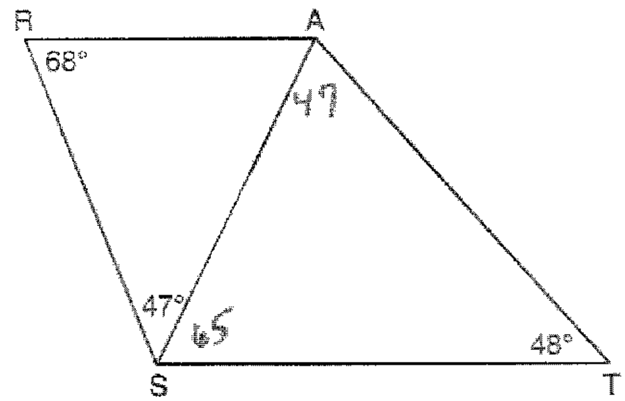


Score 1: The student made one conceptual error in finding m$\angle SAT = 47$, but found an appropriate m$\angle AST$ and determined $\overline{AT}$ as the longest side.

Question 30

30 As shown in the diagram below, $\overline{AS}$ is a diagonal of trapezoid *STAR*, $\overline{RA} \parallel \overline{ST}$, m$\angle ATS = 48$, m$\angle RSA = 47$, and m$\angle ARS = 68$.

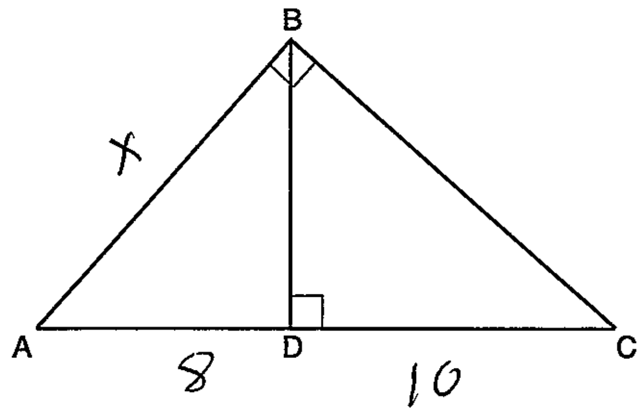
Determine and state the longest side of $\triangle SAT$.



Score 0: The student made one conceptual error in finding m$\angle SAT$. A longest side was not stated.

Question 31

31 In right triangle ABC shown below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



If $AD = 8$ and $DC = 10$, determine and state the length of $\overline{AB}$.

low leg / hyp $\frac{8}{x} = \frac{x}{18}$

$x^2 = 144$

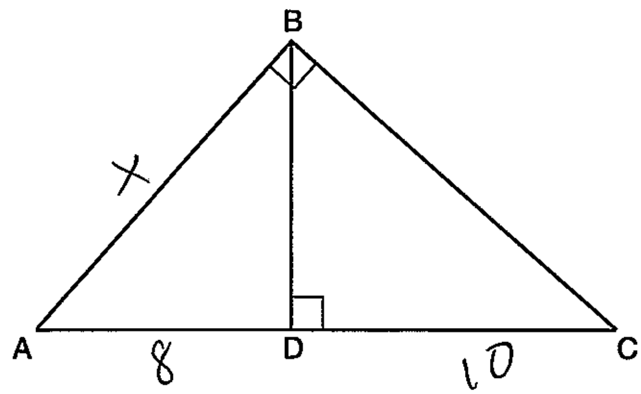
$x = 12$

length of $\overline{AB} = 12$

Score 2: The student has a complete and correct response.

Question 31

31 In right triangle ABC shown below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



If $AD = 8$ and $DC = 10$, determine and state the length of $\overline{AB}$.

$$\frac{8}{x} = \frac{x}{10}$$

1 4 9 12 16 25 36
49

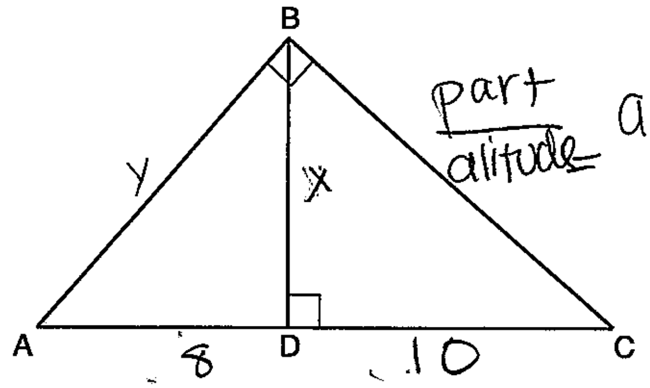
$$x^2 = \sqrt{80}$$

$$\sqrt{16}\ \sqrt{5}$$

$$\boxed{4\sqrt{5}}$$

Score 1: The student made a conceptual error when writing the proportion, but wrote an appropriate solution.

31 In right triangle ABC shown below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



part/alitude = altitude/hypotnuse

If $AD = 8$ and $DC = 10$, determine and state the length of $\overline{AB}$.

$\frac{8}{x} = \frac{x}{10}$

$80 = x^2$

$x = 8.9$

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

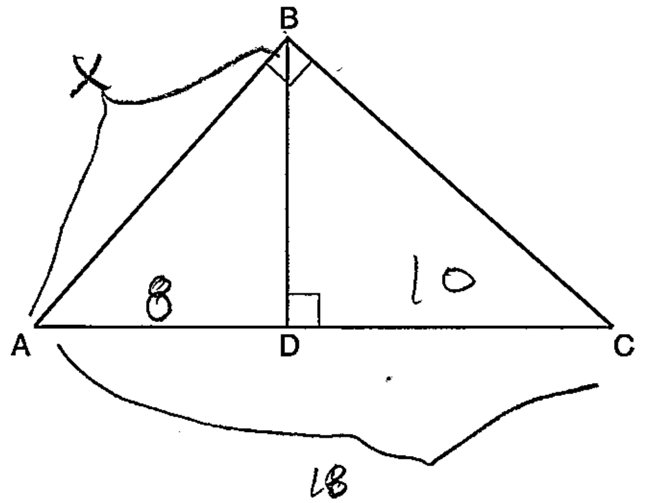
$8.9^2+8^2=y^2$

$79.21+64= 143.21$

$y=11.96$

Score 1: The student found an approximate length of $\overline{BD}$, and used it to find the length of $\overline{AB}$.

31 In right triangle *ABC* shown below, altitude $\overline{BD}$ is drawn to hypotenuse $\overline{AC}$.



If $AD = 8$ and $DC = 10$, determine and state the length of $\overline{AB}$.

$\frac{Hyp}{x}$ $\frac{x}{\text{~~reflect~~}}$

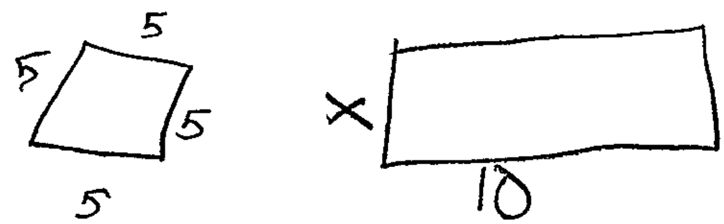
$\frac{x}{8}$ $\frac{8}{10}$

$\frac{64}{10} = 6.4$

Score 0: The student's work is completely incorrect.

32 Two prisms with equal altitudes have equal volumes. The base of one prism is a square with a side length of 5 inches. The base of the second prism is a rectangle with a side length of 10 inches. Determine and state, in inches, the measure of the width of the rectangle.

$\boxed{2.5}$



$A = bh$
$A = 25$

$A = bh$
$A = 10x$

$25 = 10x$
$2.5 = x$

Score 2: The student has a complete and correct response.

Question 32

32 Two prisms with equal altitudes have equal volumes. The base of one prism is a square with a side length of 5 inches. The base of the second prism is a rectangle with a side length of 10 inches. Determine and state, in inches, the measure of the width of the rectangle.

$\cancel{V} = l w \cancel{h}$ $\qquad$ $\cancel{V} = l w \cancel{h}$

$V = V$

$5^2 = 10w$

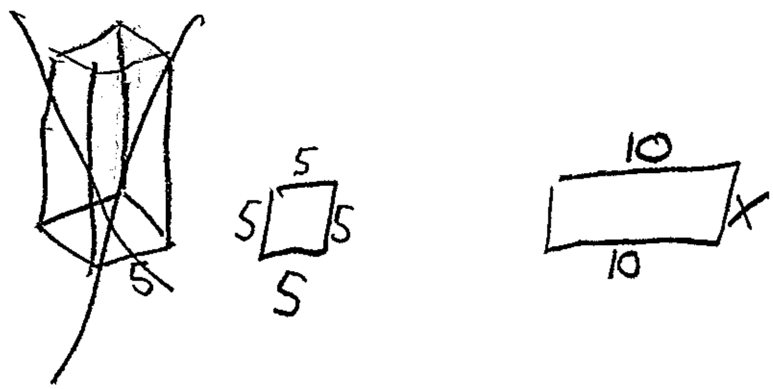
$\frac{10}{10} = \frac{10w}{10}$

$1 = w$

Score 1: The student made a conceptual error in squaring 5.

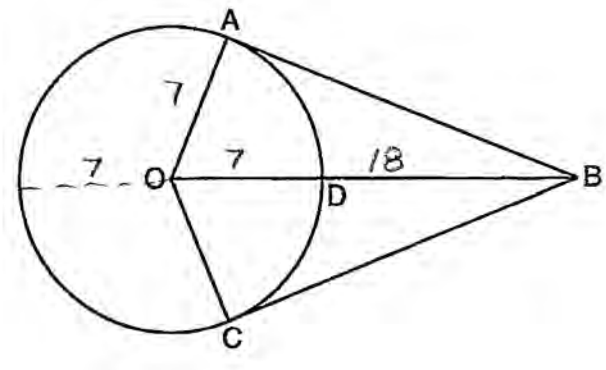
Question 32

32 Two prisms with equal altitudes have equal volumes. The base of one prism is a square with a side length of 5 inches. The base of the second prism is a rectangle with a side length of 10 inches. Determine and state, in inches, the measure of the width of the rectangle.



Score 0: The student did not write an equation or state an answer.

33 As shown in the diagram below, $\overline{BO}$ and tangents $\overline{BA}$ and $\overline{BC}$ are drawn from external point B to circle O. Radii $\overline{OA}$ and $\overline{OC}$ are drawn.



If $OA = 7$ and $DB = 18$, determine and state the length of $\overline{AB}$.

$18 \cdot 32 = AB^2$

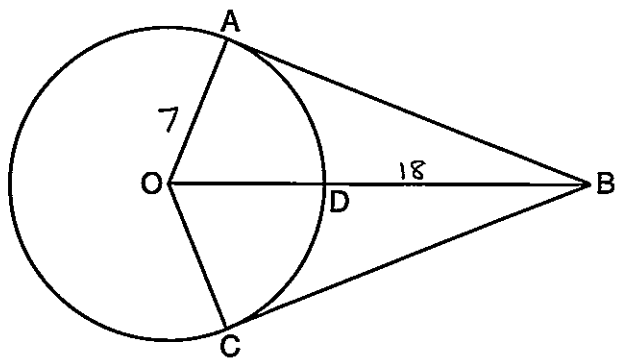
$\sqrt{576} = \sqrt{AB^2}$

$24 = AB$

Score 2: The student has a complete and correct response using the theorem of a tangent and secant drawn to a circle. $AB = 24$ is stated.

Question 33

33 As shown in the diagram below, $\overline{BO}$ and tangents $\overline{BA}$ and $\overline{BC}$ are drawn from external point B to circle O. Radii $\overline{OA}$ and $\overline{OC}$ are drawn.



If $OA = 7$ and $DB = 18$, determine and state the length of $\overline{AB}$.

$25^2 - 7^2 = 576$

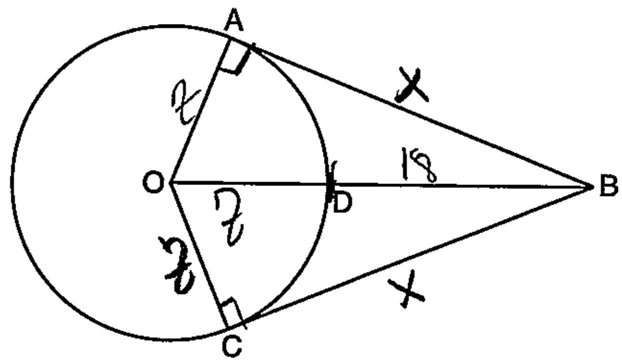
$\sqrt{576} = 24$

$AB = 24$

Score 2: The student has a correct response. The student used the Pythagorean Theorem to find $AB = 24$.

Question 33

33 As shown in the diagram below, $\overline{BO}$ and tangents $\overline{BA}$ and $\overline{BC}$ are drawn from external point B to circle O. Radii $\overline{OA}$ and $\overline{OC}$ are drawn.



If $OA = 7$ and $DB = 18$, determine and state the length of $\overline{AB}$.

$\cancel{a^2+b^2=c^2}$

$\cancel{7^2+b^2=18^2}$

$\cancel{49+b^2=324}$

$\cancel{-49 \quad -49}$

$\cancel{b^2=275}$

$7^2+b^2=25^2$

$49+b^2=225$

$-49 \quad -49$

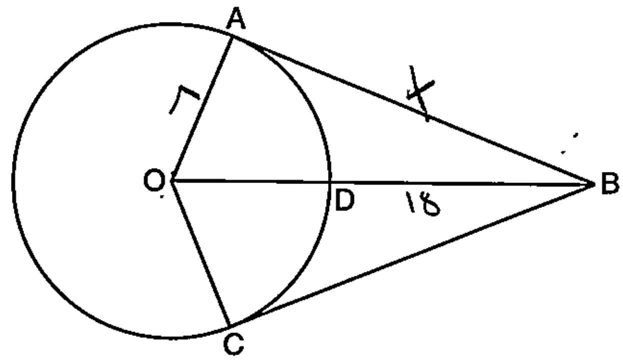
$\sqrt{b^2}=\sqrt{176}$

$b \approx 13.3$

Score 1: The student made a computational error in calculating 25^2.

Question 33

33 As shown in the diagram below, $\overline{BO}$ and tangents $\overline{BA}$ and $\overline{BC}$ are drawn from external point B to circle O. Radii $\overline{OA}$ and $\overline{OC}$ are drawn.



If $OA = 7$ and $DB = 18$, determine and state the length of $\overline{AB}$.

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

$7^2+b^2=18^2$

$49+b^2=324$

$-49 \qquad -49$

$\sqrt{b^2}=\sqrt{275}$

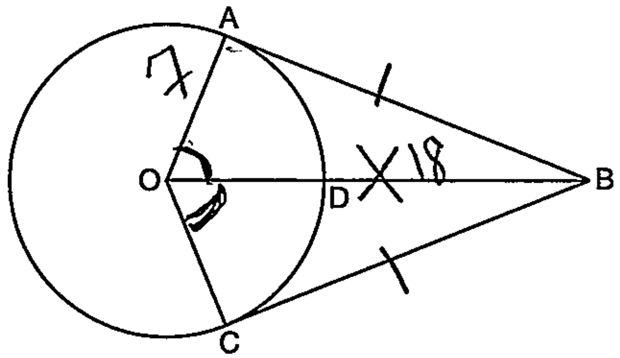
$b=\sqrt{25}\sqrt{11}$

$b=5\sqrt{11}.$

Score 1: The student made a conceptual error by using 18 as the length of the hypotenuse.

Question 33

33 As shown in the diagram below, $\overline{BO}$ and tangents $\overline{BA}$ and $\overline{BC}$ are drawn from external point B to circle O. Radii $\overline{OA}$ and $\overline{OC}$ are drawn.



If $OA = 7$ and $DB = 18$, determine and state the length of $\overline{AB}$.

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

$7^2 . 18^2 = c^2$

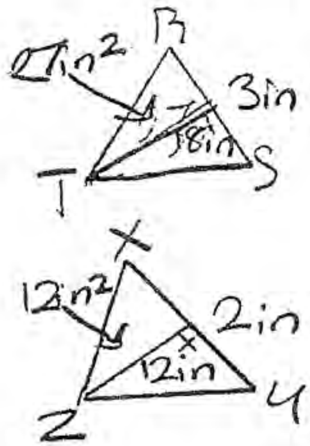
$\sqrt{373} = \sqrt{c^2}$

$19.3 = c$

Score 0: The student made two conceptual errors.

Question 34

34 Triangle RST is similar to $\triangle XYZ$ with $RS = 3$ inches and $XY = 2$ inches. If the area of $\triangle RST$ is 27 square inches, determine and state the area of $\triangle XYZ$, in square inches.



$$A = \frac{bh}{2}$$

$$27 = \frac{3 \cdot h}{\cancel{2}}$$

$$h = 18$$

$$\frac{18}{x} = \frac{3}{2}$$

$$\frac{\cancel{3}x}{\cancel{3}} = \frac{36}{3}$$

$$x = 12$$

$$A = \frac{bh}{2}$$

$$A = \frac{2 \cdot 12}{2}$$

$$\boxed{A = 12\text{in}^2}$$

Score 2: The student has a complete and correct response.

Question 34

34 Triangle RST is similar to $\triangle XYZ$ with $RS = 3$ inches and $XY = 2$ inches. If the area of $\triangle RST$ is 27 square inches, determine and state the area of $\triangle XYZ$, in square inches.

$$\frac{27}{A} = \frac{3^2}{2^2}$$

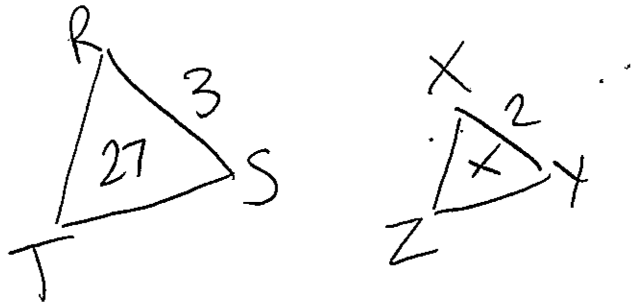
$$\frac{27}{A} = \frac{9}{4}$$

$$9A = 108$$

$$A = 12$$

Score 2: The student has a complete and correct response.

34 Triangle RST is similar to $\triangle XYZ$ with $RS = 3$ inches and $XY = 2$ inches. If the area of $\triangle RST$ is 27 square inches, determine and state the area of $\triangle XYZ$, in square inches.



$$\frac{3}{27} = \frac{2}{x}$$

$$3x = 2(27)$$

$$\frac{3x}{3} = \frac{54}{3}$$

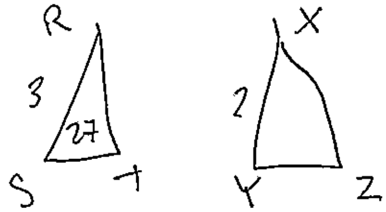
$$x = 18$$

The area of $\triangle XYZ$ is 18in^2

Score 1: The student made one conceptual error by not squaring the sides in the ratio.

Question 34

34 Triangle RST is similar to $\triangle XYZ$ with $RS = 3$ inches and $XY = 2$ inches. If the area of $\triangle RST$ is 27 square inches, determine and state the area of $\triangle XYZ$, in square inches.



$\frac{1}{2}Bh = 27$

$\frac{1}{2}3h = 27$

$\cancel{1.5h = 27}$

$\cancel{h = 25.5}$

$\frac{1.5h}{1.5} = \frac{27}{1.5}$

$\boxed{h = 18}$

$\frac{3}{2} = \frac{18}{x}$

$\frac{3x}{3} = \frac{36}{3}$

$\boxed{x = 12}$

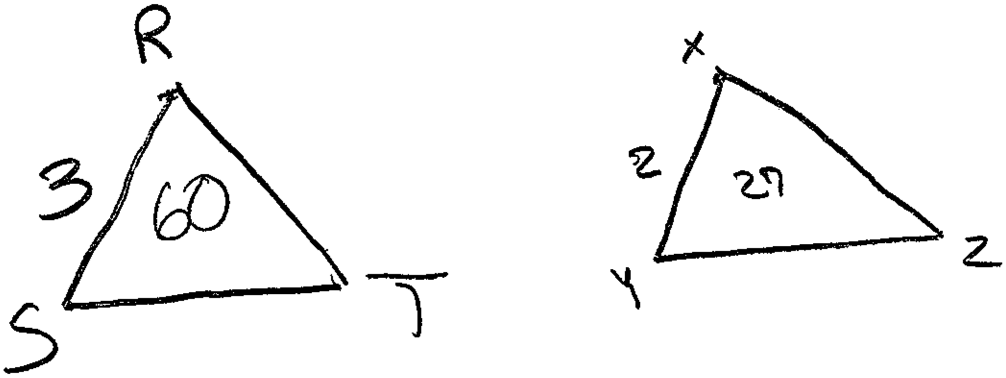
$\frac{1}{2}(2)(12)$

$\frac{1}{2}\ 24$

24 = area of $\triangle XYZ$

Score 1: The student correctly calculated the height of $\triangle XYZ$, but made an error in calculating the area of the triangle.

34 Triangle RST is similar to $\triangle XYZ$ with $RS = 3$ inches and $XY = 2$ inches. If the area of $\triangle RST$ is 27 square inches, determine and state the area of $\triangle XYZ$, in square inches.



$$\frac{2^2}{3^2} = \frac{4}{9}$$

$$\left(\frac{9}{4}\right)\frac{4}{9}x = 27\left(\frac{9}{4}\right)$$

$$x = 60$$

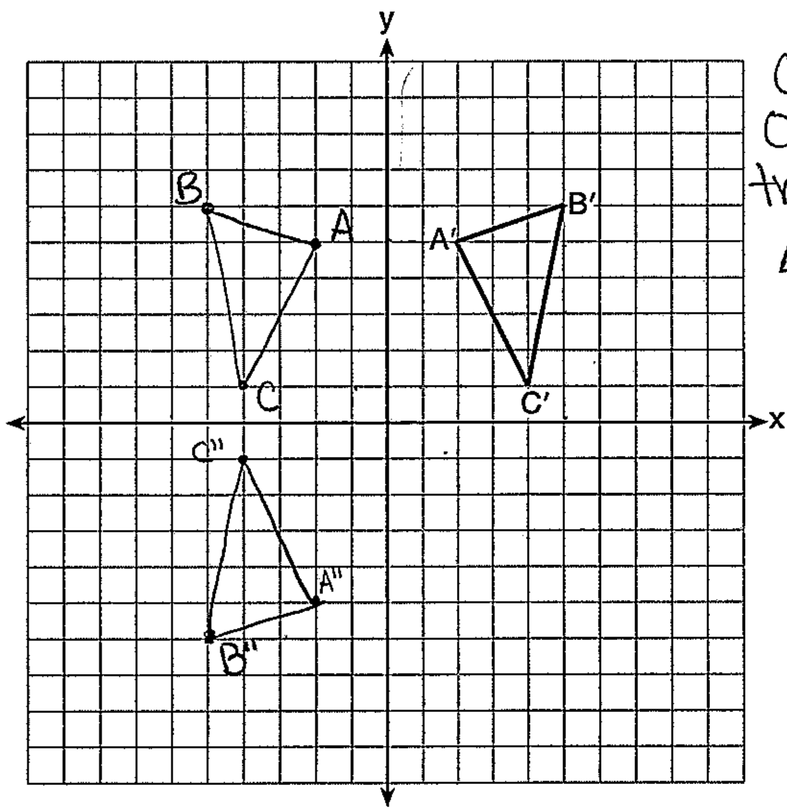
Score 0: The student made an error by labeling the area of $\triangle XYZ$ as 27. The student made a rounding error in finding $x = 60$.

35 The graph below shows $\triangle A'B'C'$, the image of $\triangle ABC$ after it was reflected over the y-axis.

Graph and label $\triangle ABC$, the pre-image of $\triangle A'B'C'$.

Graph and label $\triangle A''B''C''$, the image of $\triangle A'B'C'$ after it is reflected through the origin.

State a single transformation that will map $\triangle ABC$ onto $\triangle A''B''C''$.



Reflection over the x-axis of $\triangle ABC$ will transform into $\triangle A''B''C''$.

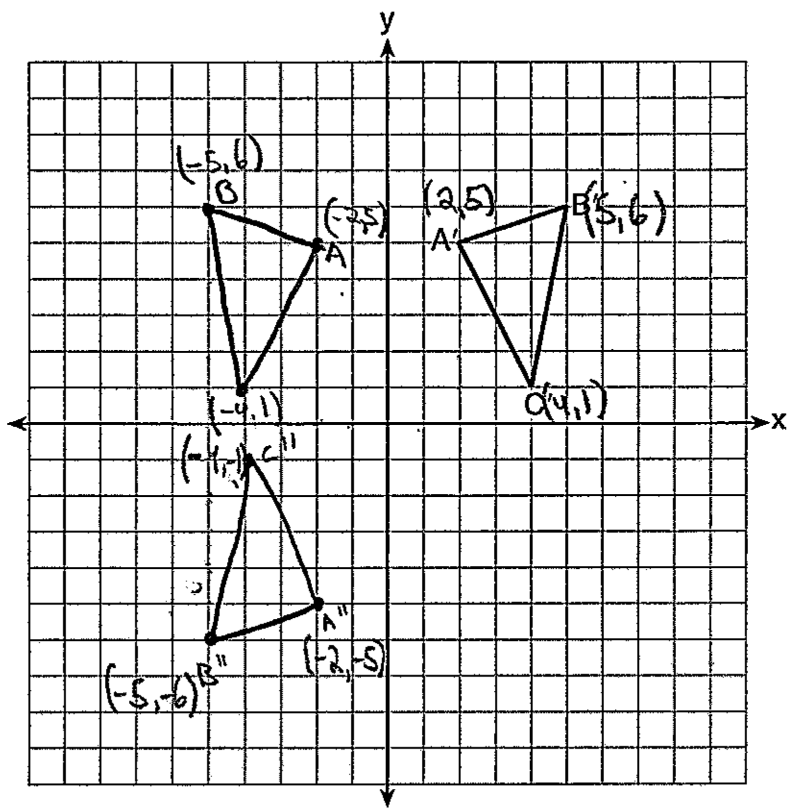
Score 4: The student has a complete and correct response.

35 The graph below shows $\triangle A'B'C'$, the image of $\triangle ABC$ after it was reflected over the y-axis.

Graph and label $\triangle ABC$, the pre-image of $\triangle A'B'C'$.

Graph and label $\triangle A''B''C''$, the image of $\triangle A'B'C'$ after it is reflected through the origin.

State a single transformation that will map $\triangle ABC$ onto $\triangle A''B''C''$. A rotatian over the x-axis



Score 3: The student graphed and labeled $\triangle ABC$ and $\triangle A''B''C''$ correctly, but stated an incorrect transformation.

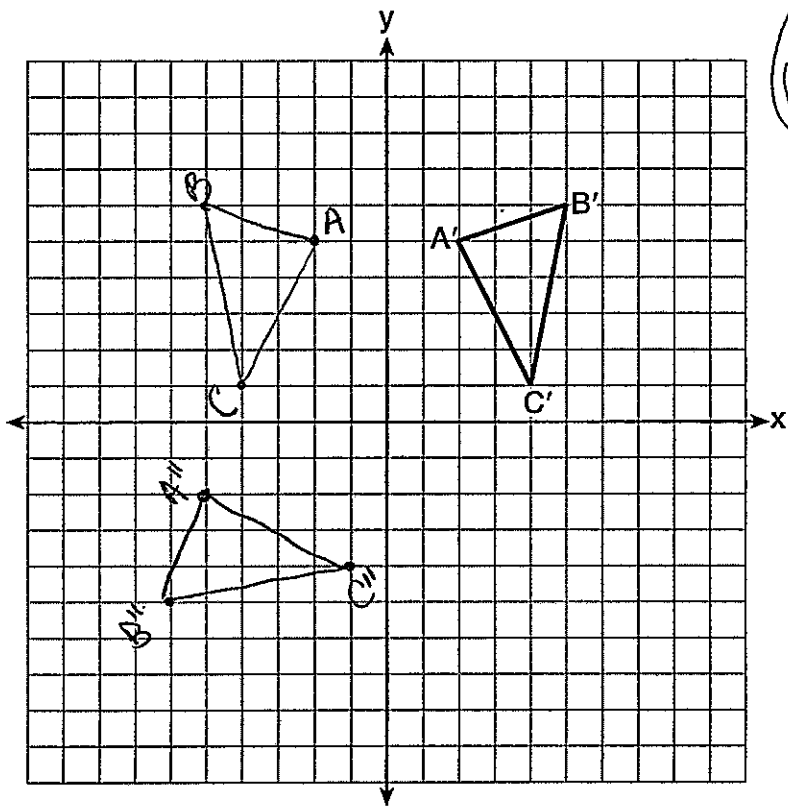
Question 35

35 The graph below shows $\triangle A'B'C'$, the image of $\triangle ABC$ after it was reflected over the y-axis.

Graph and label $\triangle ABC$, the pre-image of $\triangle A'B'C'$.

Graph and label $\triangle A''B''C''$, the image of $\triangle A'B'C'$ after it is reflected through the origin.

State a single transformation that will map $\triangle ABC$ onto $\triangle A''B''C''$.



R_{90}

Score 2: The student graphed and labeled $\triangle ABC$ correctly, but made one conceptual error in graphing $\triangle A''B''C''$. An appropriate transformation was stated.

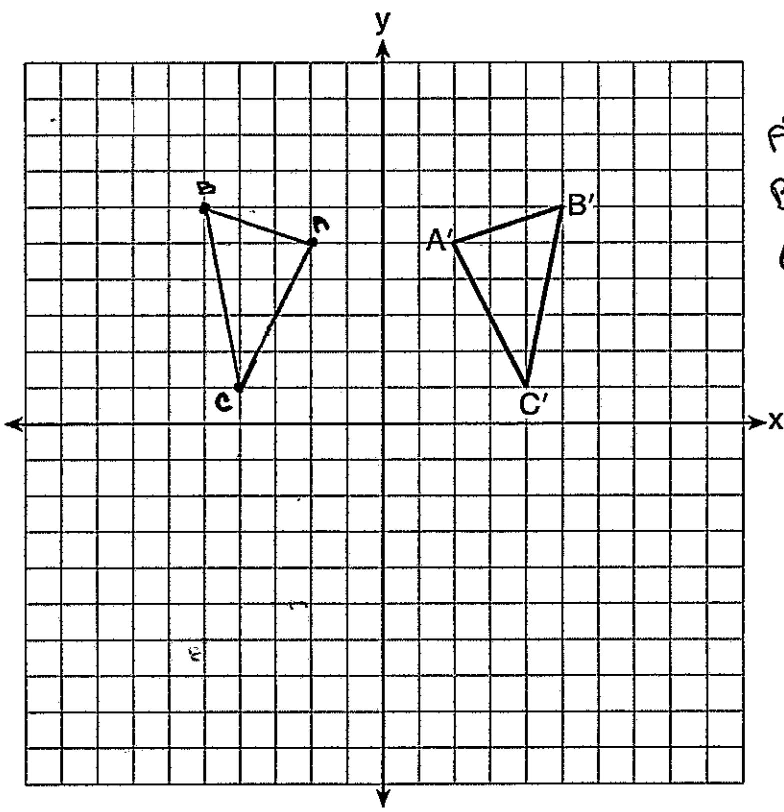
Question 35

35 The graph below shows $\triangle A'B'C'$, the image of $\triangle ABC$ after it was reflected over the y-axis.

Graph and label $\triangle ABC$, the pre-image of $\triangle A'B'C'$.

Graph and label $\triangle A''B''C''$, the image of $\triangle A'B'C'$ after it is reflected through the origin.

State a single transformation that will map $\triangle ABC$ onto $\triangle A''B''C''$.



A(−2, 5)
B(−5, 6)
C(−4, 1)

A′(2, 5)
B′(5, 6)
C′(4, 1)

A″(,)
B″(,)
C″(,)

Score 1: The student graphed and labeled $\triangle ABC$ correctly. No further correct work is shown.

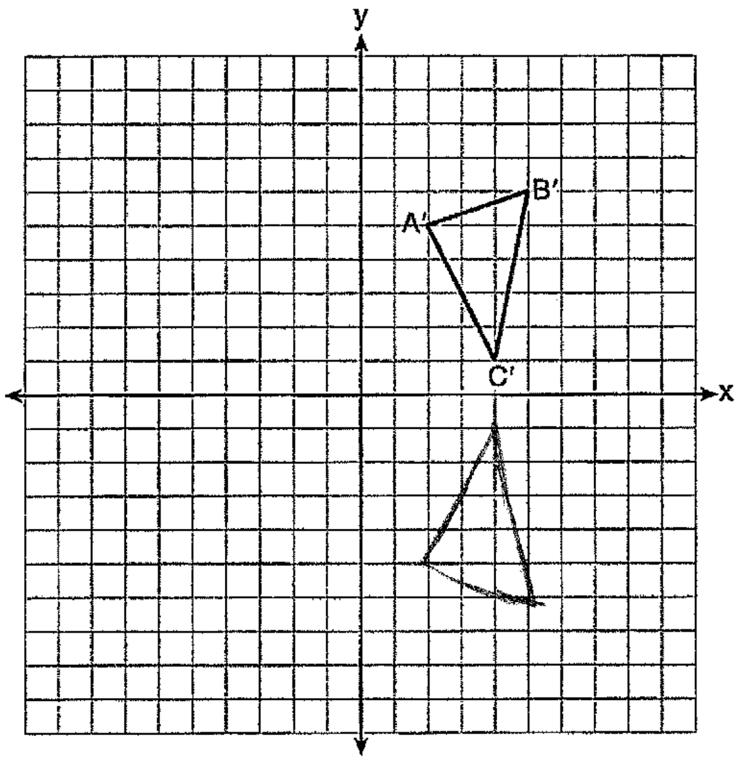
Question 35

35 The graph below shows $\triangle A'B'C'$, the image of $\triangle ABC$ after it was reflected over the y-axis.

Graph and label $\triangle ABC$, the pre-image of $\triangle A'B'C'$.

Graph and label $\triangle A''B''C''$, the image of $\triangle A'B'C'$ after it is reflected through the origin.

State a single transformation that will map $\triangle ABC$ onto $\triangle A''B''C''$.

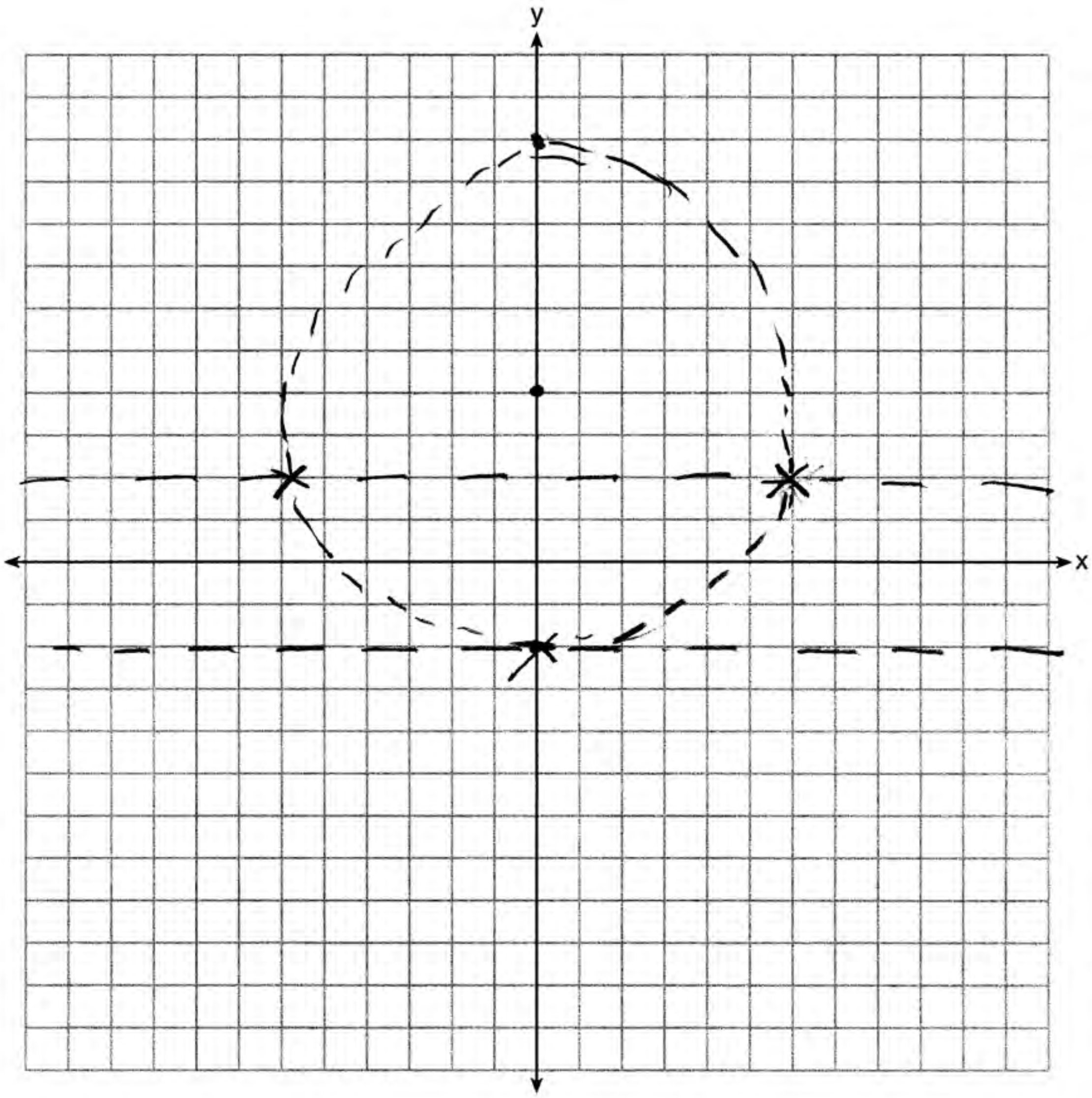


Score 0: The student has no correct work.

Question 36

36 On the set of axes below, sketch the locus of points 2 units from the x-axis and sketch the locus of points 6 units from the point (0,4).

Label with an **X** all points that satisfy both conditions.

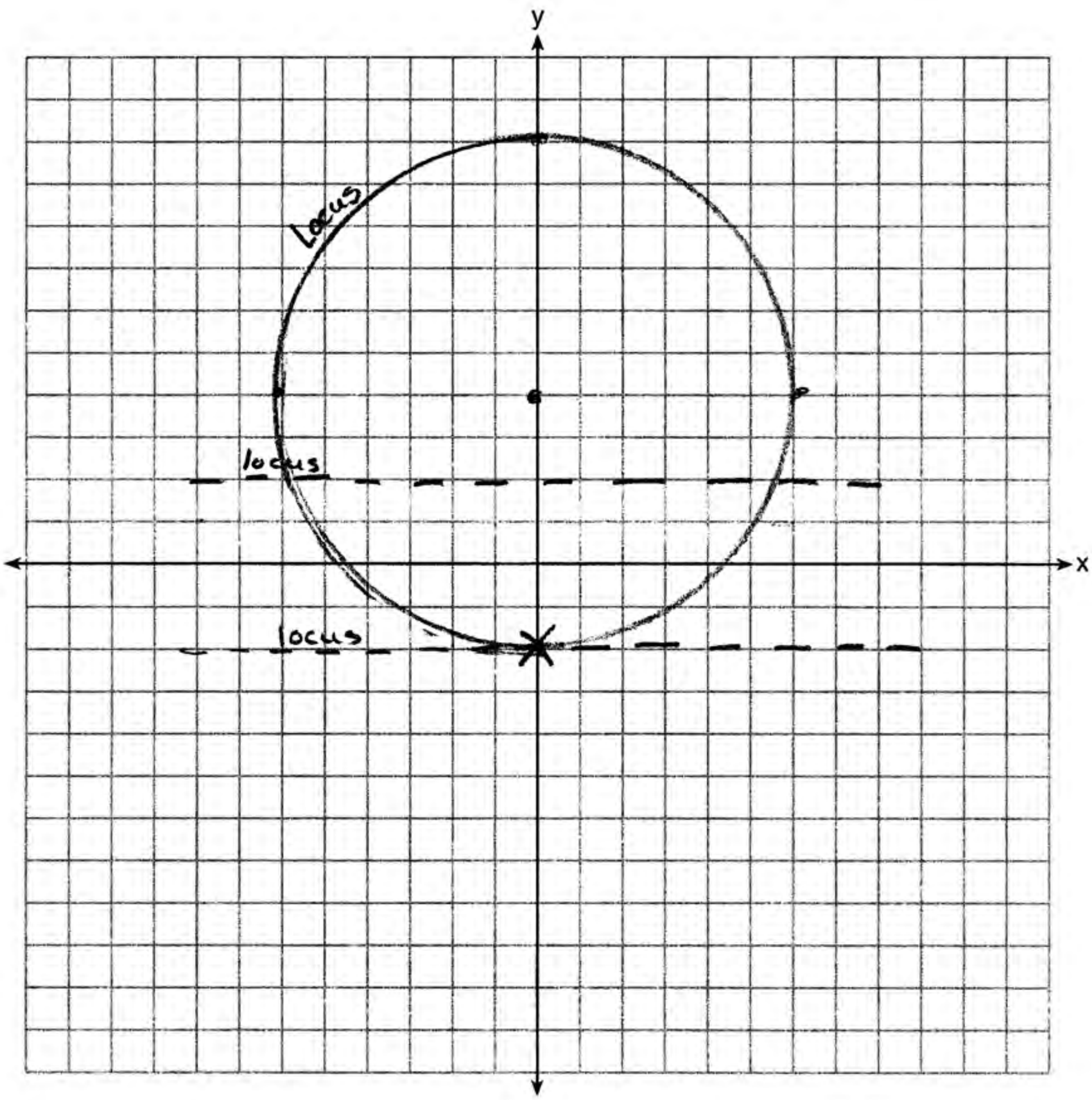


Score 4: The student has a complete and correct response.

Question 36

36 On the set of axes below, sketch the locus of points 2 units from the x-axis and sketch the locus of points 6 units from the point (0,4).

Label with an **X** all points that satisfy both conditions.

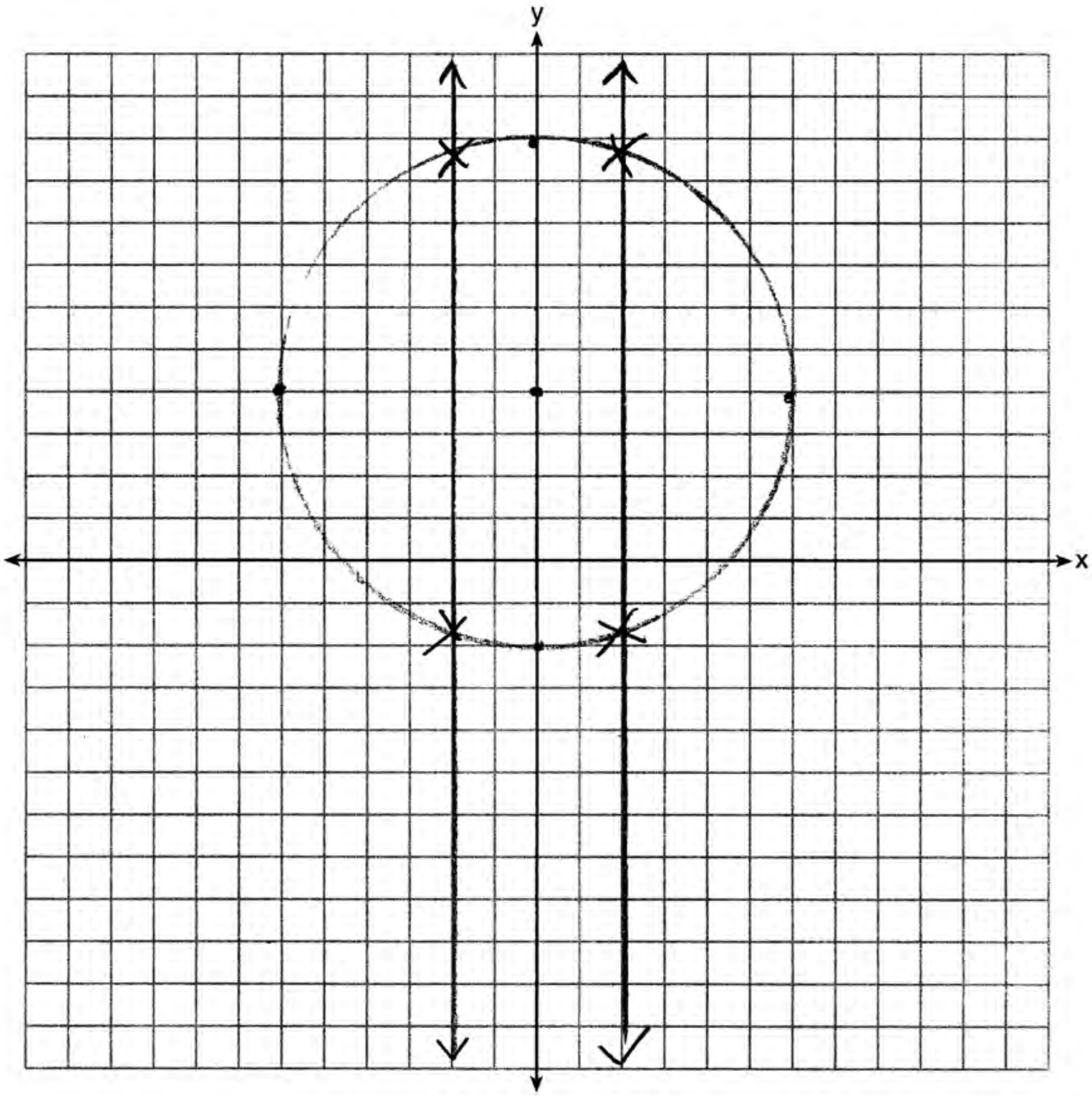


Score 3: The student sketched both loci correctly, but labeled only one point of intersection with an **X**.

Question 36

36 On the set of axes below, sketch the locus of points 2 units from the x-axis and sketch the locus of points 6 units from the point (0,4).

Label with an **X** all points that satisfy both conditions.

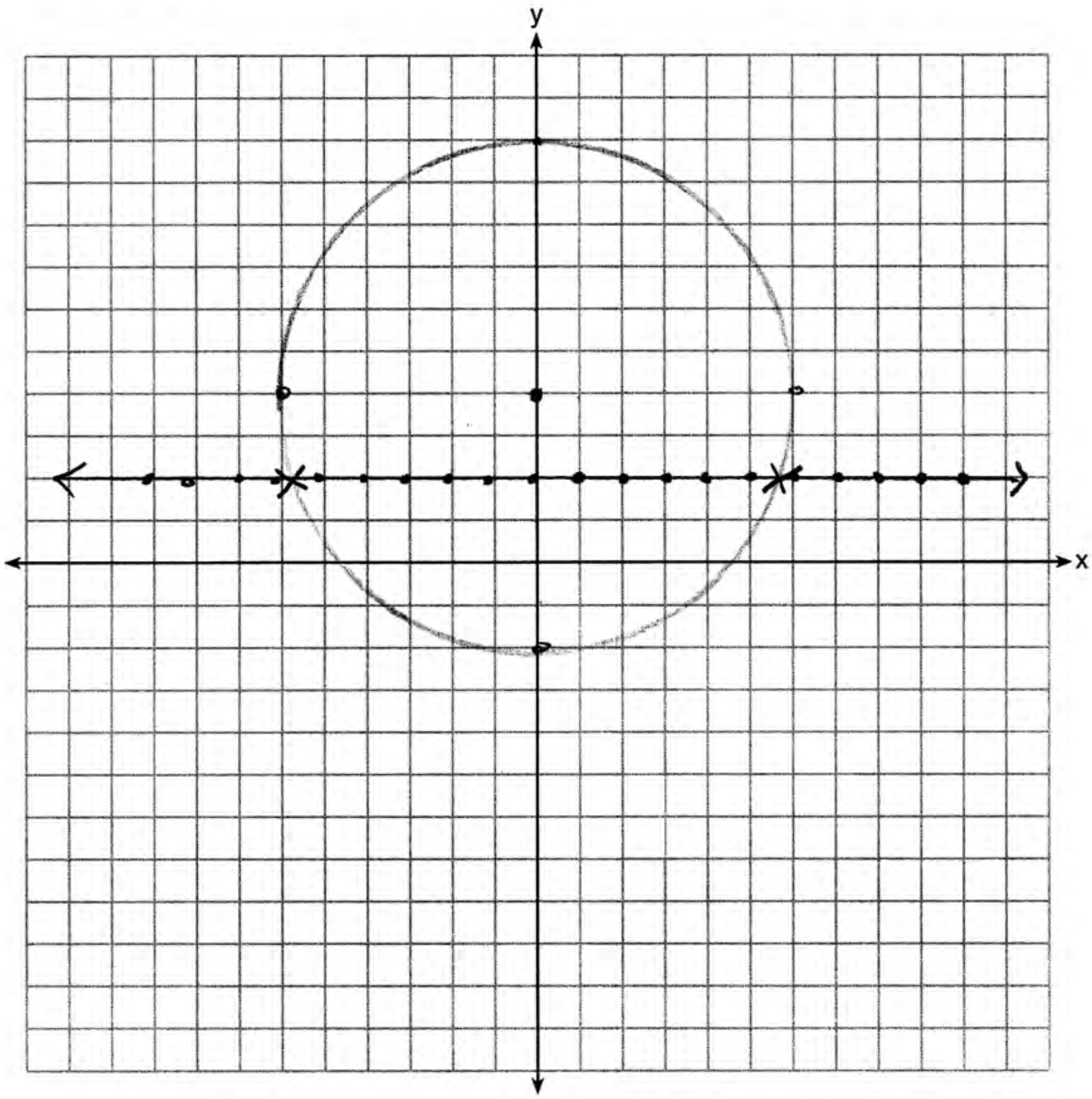


Score 2: The student made a conceptual error by sketching the locus of points 2 units from the y-axis. Appropriate points are labeled with an **X**.

Question 36

36 On the set of axes below, sketch the locus of points 2 units from the x-axis and sketch the locus of points 6 units from the point (0,4).

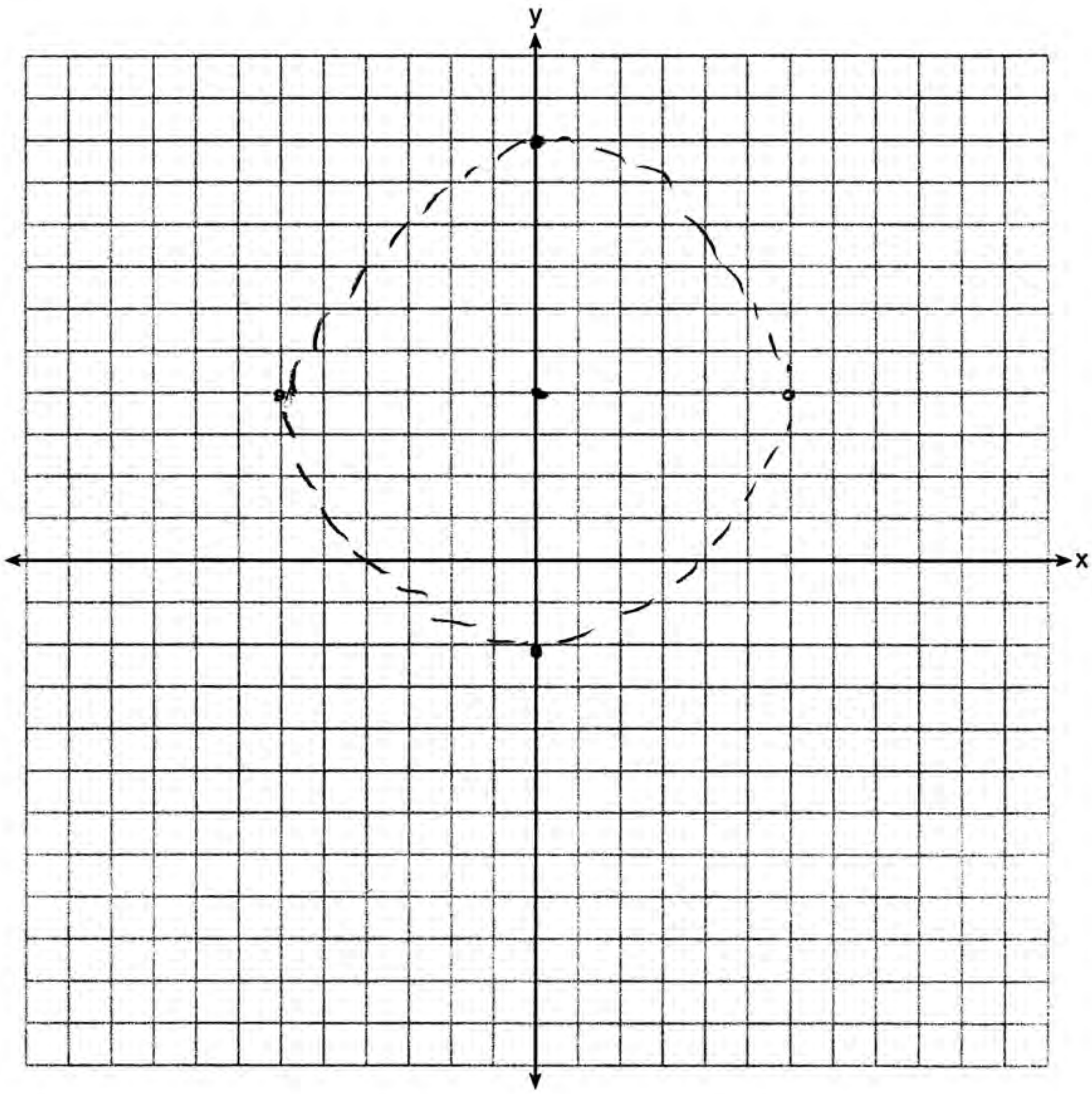
Label with an **X** all points that satisfy both conditions.



Score 2: The student made a conceptual error by not graphing $y = -2$. Appropriate points are labeled with an **X**.

36 On the set of axes below, sketch the locus of points 2 units from the *x*-axis and sketch the locus of points 6 units from the point (0,4).

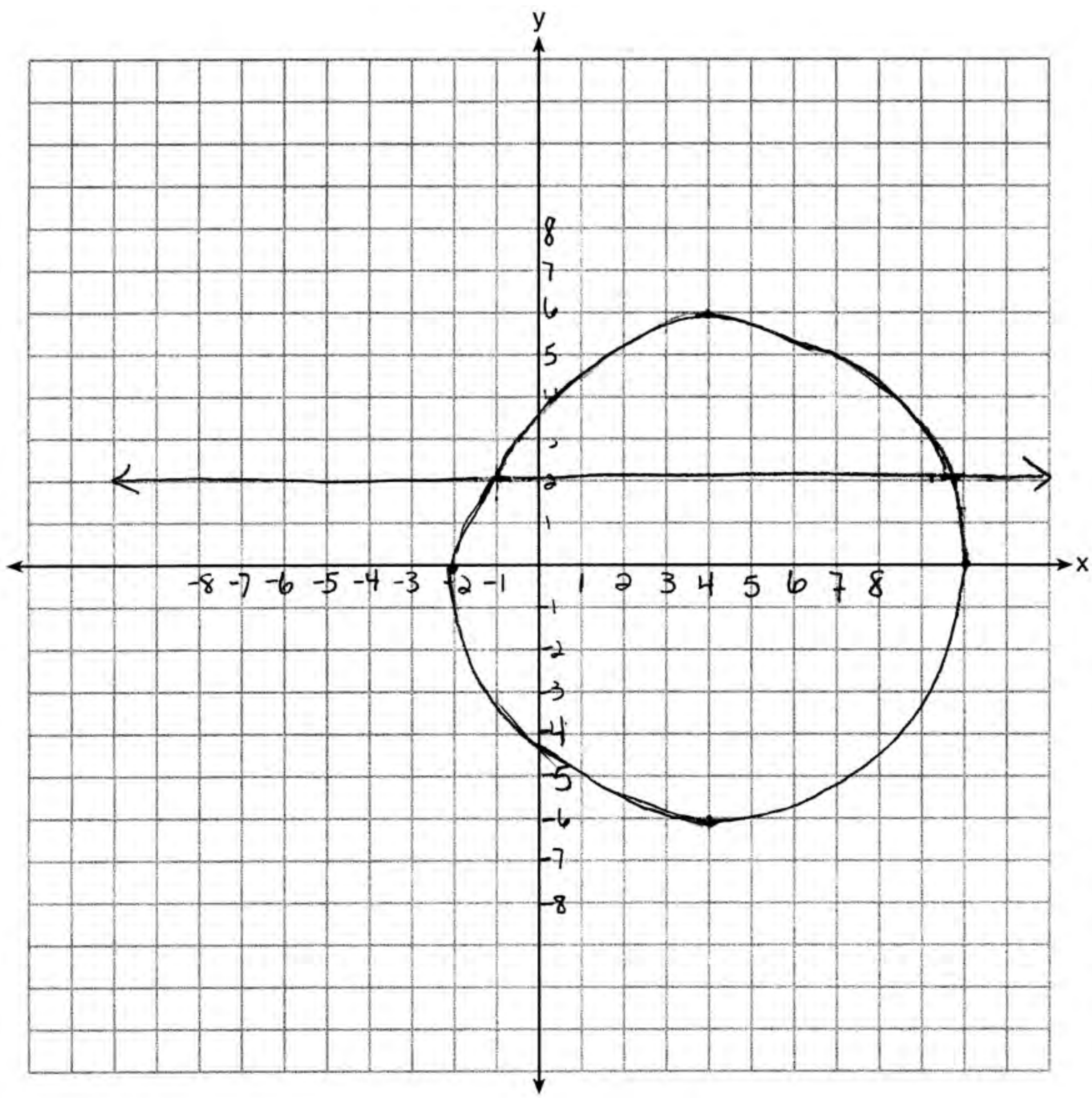
Label with an **X** all points that satisfy both conditions.



Score 1: The student sketched one locus correctly.

36 On the set of axes below, sketch the locus of points 2 units from the *x*-axis and sketch the locus of points 6 units from the point (0,4).

Label with an **X** all points that satisfy both conditions.

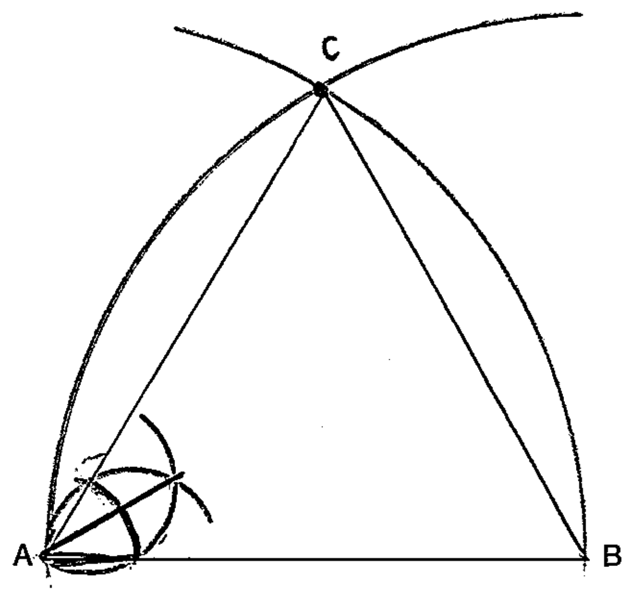


Score 0: The student did not graph $y = -2$ and sketched the locus of points 6 units from (4,0) instead of (0,4). Points of intersection are not labeled.

Question 37

37 Using a compass and straightedge, construct an equilateral triangle with $\overline{AB}$ as a side.

Using this triangle, construct a 30° angle with its vertex at A.
[Leave all construction marks.]

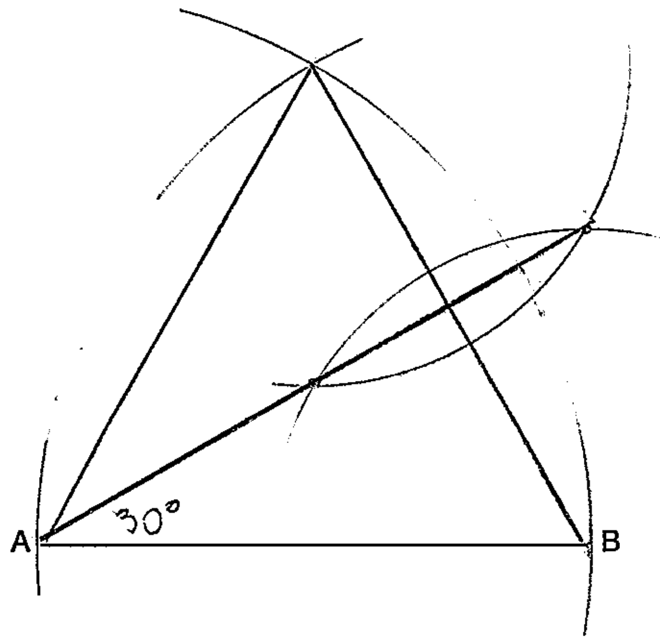


Score 4: The student has a complete and correct construction.

Question 37

37 Using a compass and straightedge, construct an equilateral triangle with $\overline{AB}$ as a side.

Using this triangle, construct a 30° angle with its vertex at A.
[Leave all construction marks.]

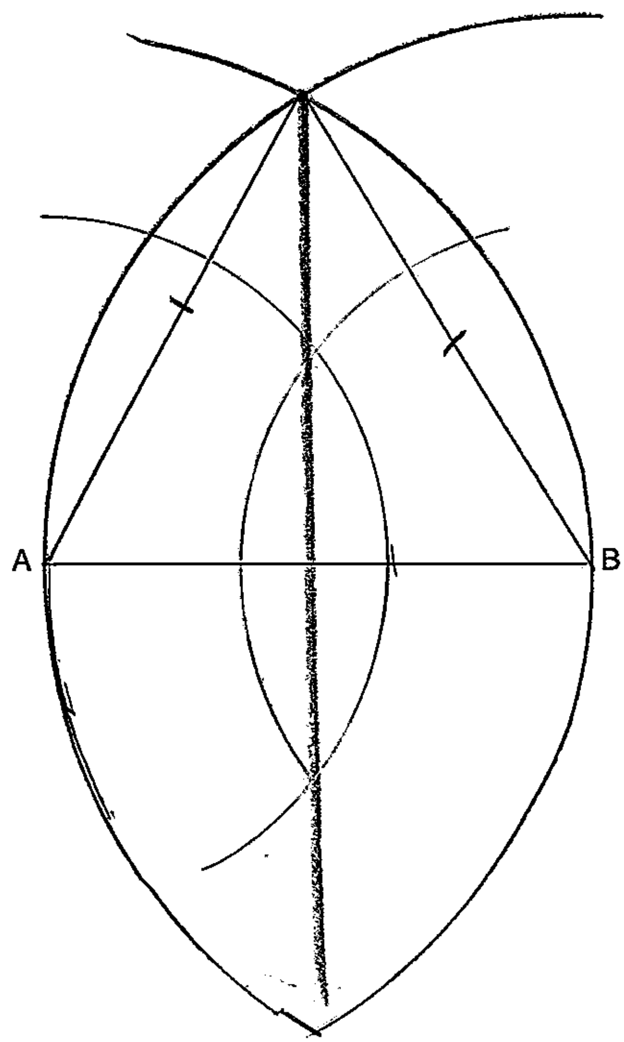


Score 4: The student has a complete and correct construction.

Question 37

37 Using a compass and straightedge, construct an equilateral triangle with $\overline{AB}$ as a side.

Using this triangle, construct a 30° angle with its vertex at A.
[Leave all construction marks.]

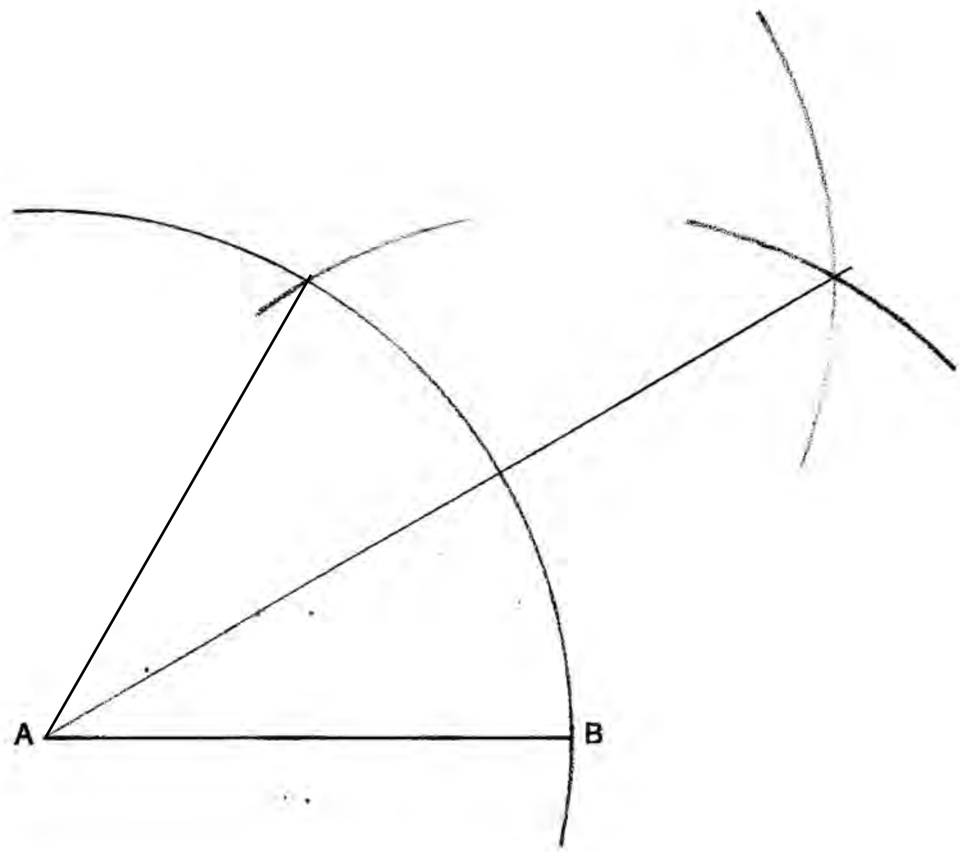


Score 3 The student has a correct construction of an equilateral triangle, but constructed a 30° angle at a vertex other than A.

Question 37

37 Using a compass and straightedge, construct an equilateral triangle with $\overline{AB}$ as a side.

Using this triangle, construct a 30° angle with its vertex at A.
[Leave all construction marks.]

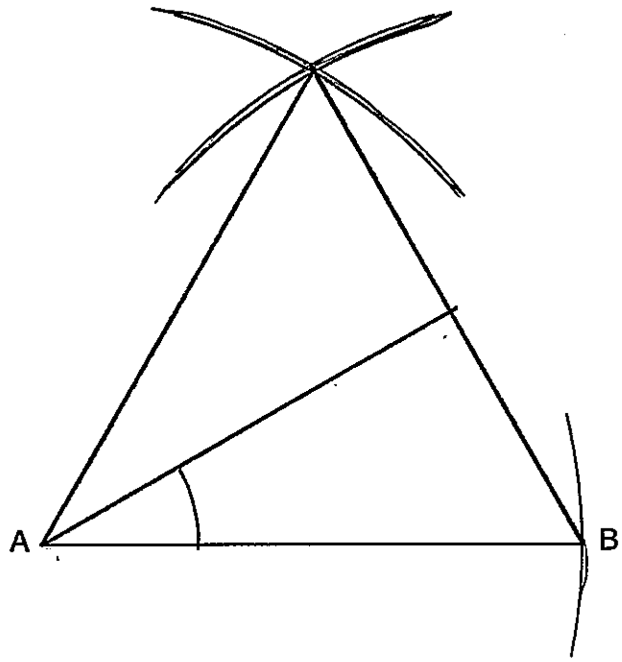


Score 3: The student showed all appropriate arcs for constructing an equilateral triangle, but did not draw both sides. The student made a correct construction of a 30° angle at vertex A.

Question 37

37 Using a compass and straightedge, construct an equilateral triangle with $\overline{AB}$ as a side.

Using this triangle, construct a 30° angle with its vertex at A.
[Leave all construction marks.]

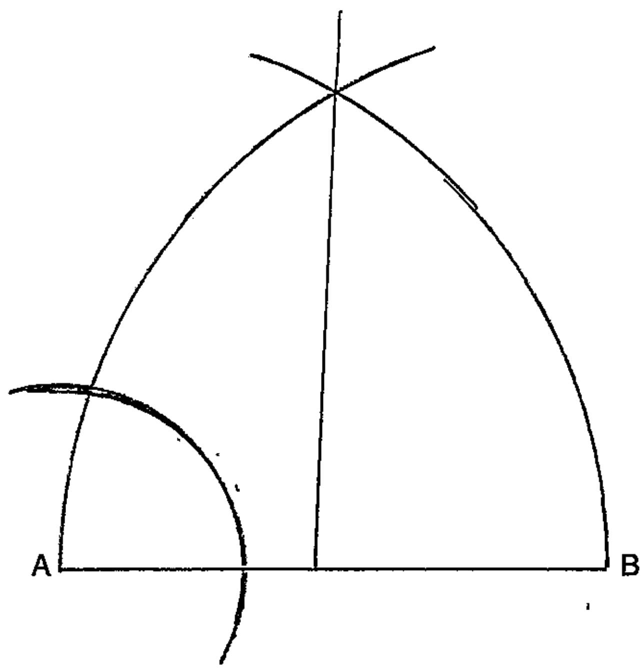


Score 2: The student showed a correct construction of an equilateral triangle. No further correct work is shown.

Question 37

37 Using a compass and straightedge, construct an equilateral triangle with $\overline{AB}$ as a side.

Using this triangle, construct a 30° angle with its vertex at A.
[Leave all construction marks.]

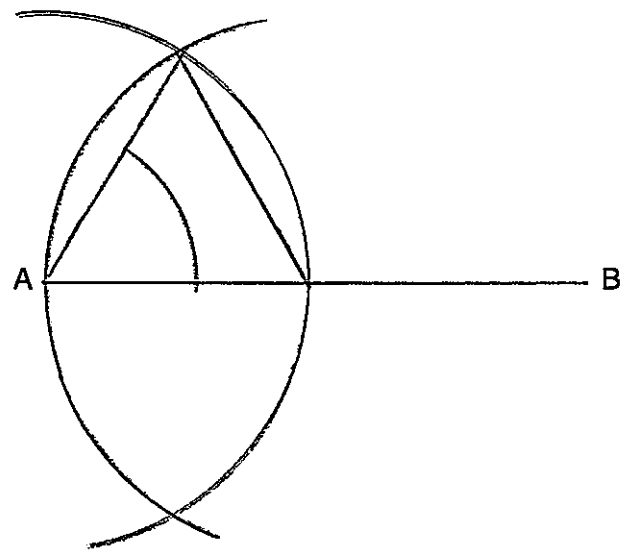


Score 1: The student showed all appropriate arcs for constructing an equilateral triangle, but did not draw the sides. No further correct work is shown.

Question 37

37 Using a compass and straightedge, construct an equilateral triangle with $\overline{AB}$ as a side.

Using this triangle, construct a 30° angle with its vertex at *A*.
[Leave all construction marks.]

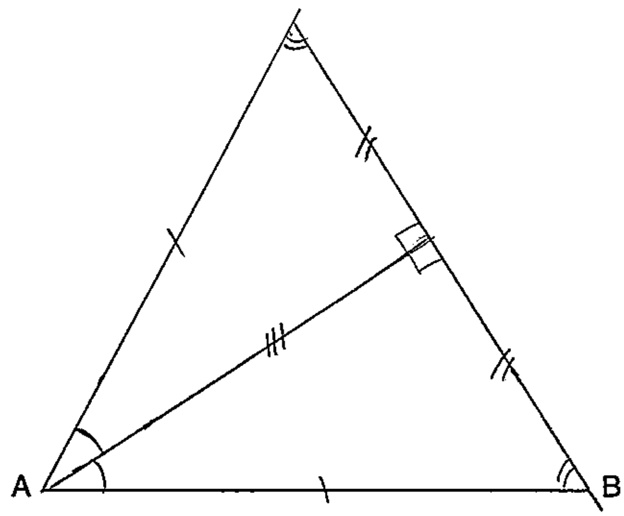


Score 1: The student showed an appropriate construction of an equilateral triangle, but used a length other than *AB*.

Question 37

37 Using a compass and straightedge, construct an equilateral triangle with $\overline{AB}$ as a side.

Using this triangle, construct a 30° angle with its vertex at *A*.
[Leave all construction marks.]



Score 0: The student made a drawing that is not an appropriate construction.

38 The vertices of quadrilateral *JKLM* have coordinates $J(-3,1)$, $K(1,-5)$, $L(7,-2)$, and $M(3,4)$.

Prove that *JKLM* is a parallelogram.

Prove that *JKLM* is *not* a rhombus.

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

$m\overline{JM} = \frac{4-1}{3++3} = \frac{3}{6} = \frac{1}{2}$

$m\overline{KL} = \frac{-2+5}{7-1} = \frac{3}{6} = \frac{1}{2}$

$\overline{JM}$ + KL are // b/c the have the same slope.

$m\overline{JK} = \frac{-5-1}{1++3} = \frac{-6}{4} = -\frac{3}{2}$

$m\overline{ML} = \frac{4++2}{3-7} = \frac{6}{-4} = -\frac{3}{2}$

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

$= \sqrt{36+9}$

$d = \sqrt{45}$

$d_{JK} = \sqrt{(-3-1)^2+(1-+5)^2}$

$= \sqrt{16+36}$

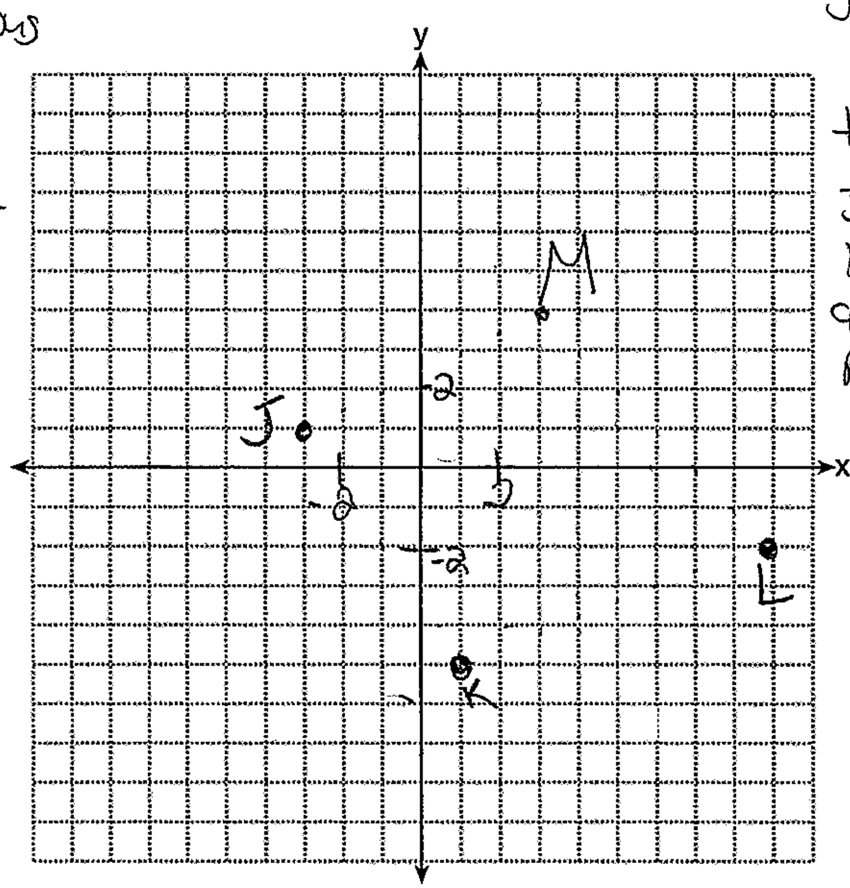
$d = \sqrt{52}$

$\sqrt{52} \neq \sqrt{45}$

JKLM is not a rhombus b/c not all of the sides are equal.

$\overline{JK}$ + $\overline{ML}$ are // b/c the have the same slope

JKLM is a ▱ b/c 2 pairs of opposite sides are parallel.



Score 6: The student has a complete and correct response.

Question 38

38 The vertices of quadrilateral *JKLM* have coordinates *J*(−3,1), *K*(1,–5), *L*(7,−2), and *M*(3,4).

Prove that *JKLM* is a parallelogram.

Prove that *JKLM* is *not* a rhombus.

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

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

If opposite sides are ≅, then it's a parallelogram

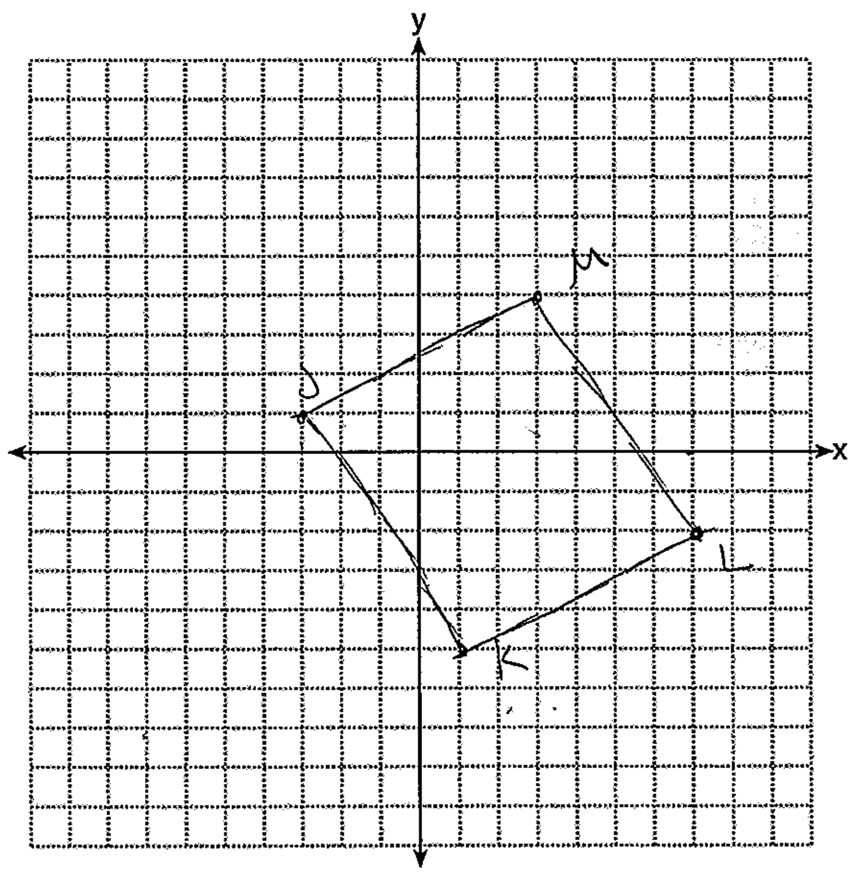
It's not a rhombus because not all sides are ≅.

JK
$\sqrt{(-5-1)^2+(1+3)^2}$
$\sqrt{36+16}$
$\sqrt{52}$

ML
$\sqrt{(4+2)^2+(3-7)^2}$
$\sqrt{6^2+(-4)^2}$
$\sqrt{36+16}$
$\sqrt{52}$

JM
$\sqrt{(1-4)^2+(-3-3)^2}$
$\sqrt{-3^2+(-6)^2}$
$\sqrt{9+36}$
$\sqrt{45}$

KL
$\sqrt{(-2+5)^2+(7-1)^2}$
$\sqrt{3^2+6^2}$
$9+36$
45



Score 5: The student did not write the radical symbol when finding the length of $\overline{KL}$.

38 The vertices of quadrilateral $JKLM$ have coordinates $J(-3,1)$, $K(1,-5)$, $L(7,-2)$, and $M(3,4)$.

Prove that $JKLM$ is a parallelogram.

Prove that $JKLM$ is *not* a rhombus.

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

$m = \frac{y-y}{x-x}$

$\overline{KM} = \frac{-5-4}{1-3} = \frac{-9}{-2}$

$\overline{JL} = \frac{1+2}{-3-7} = \frac{3}{-10}$

$JM = \frac{1-4}{-3-3} = \frac{-3}{-6} = \frac{3}{6}$

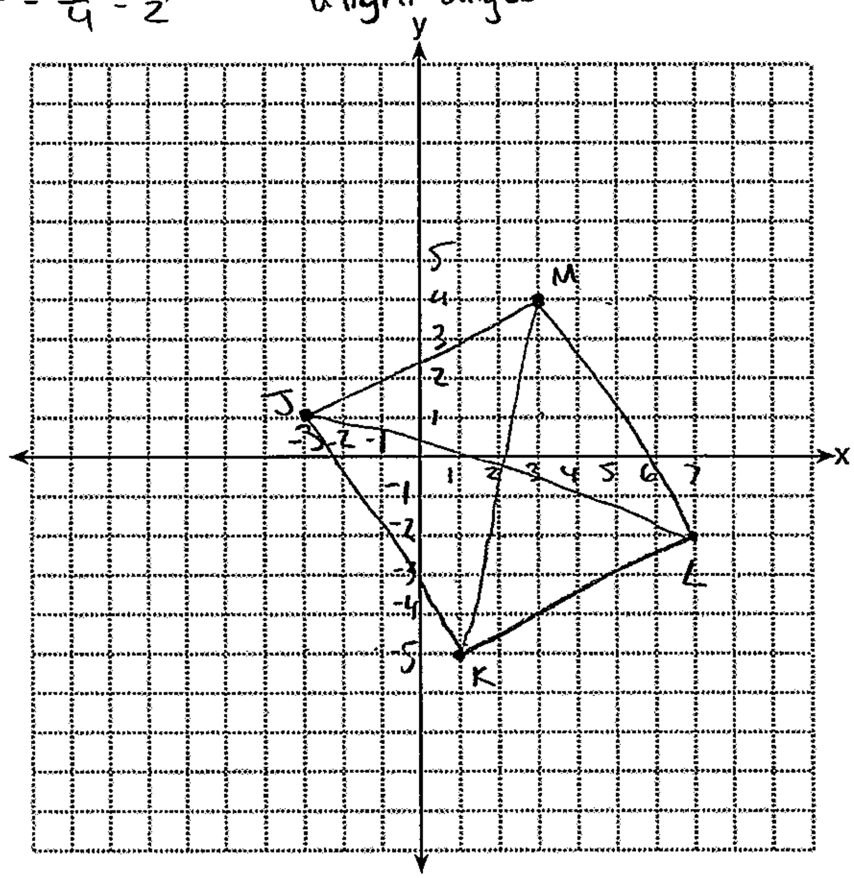
$KL = \frac{-5+2}{1-7} = \frac{-3}{-6} = \frac{3}{6}$

$ML = \frac{4+2}{3-7} = \frac{6}{4} = \frac{3}{2}$

$JK = \frac{-5-1}{-3-1} = \frac{-6}{-4} = \frac{6}{4} = \frac{3}{2}$

The diagonals in a rhombus form a right angle. Since the slopes of the diagonals are not negative reciprocals it is not a rhombus because the diagonals are not perpendicular and do not form a right angle.

JKLM is a parallelogram. A parallelogram contains 2 sets of parallel sides. Parallel sides are created when 2 segments share the same slope.



Score 4: The student made a computational error in finding the slope of $\overline{ML}$. The student made a second error in finding the slope of $\overline{JK}$.

Question 38

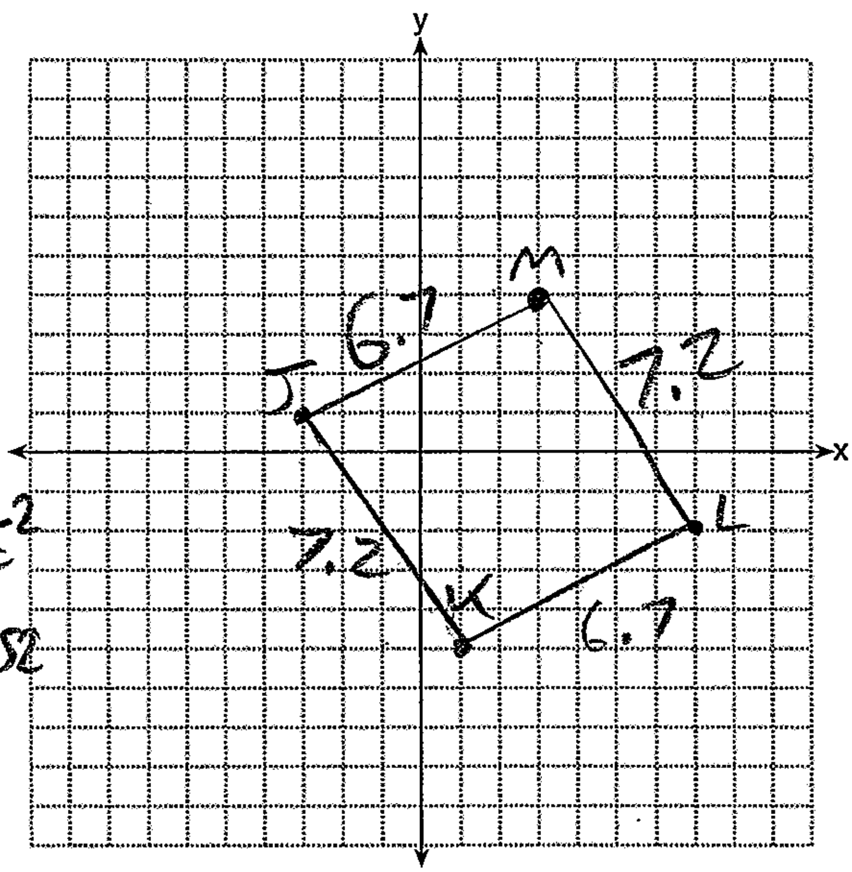
38 The vertices of quadrilateral *JKLM* have coordinates *J*(−3,1), *K*(1,–5), *L*(7,−2), and *M*(3,4).

Prove that *JKLM* is a parallelogram.

Prove that *JKLM* is *not* a rhombus.

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

This is not a rhombus because not all sides are congruent.



$\overline{JT}$

$4^2+6^2=c^2$

$16+36=52$

$\sqrt{52}=$

7.2

$\overline{JM}$

$3^2+6^2=$

$9+36=45$

$\sqrt{45}=6.7$

$\overline{KL}=6.7$

Score 3: The student showed work to prove *JKLM* is not a rhombus.

Question 38

38 The vertices of quadrilateral *JKLM* have coordinates *J*(−3,1), *K*(1,–5), *L*(7,−2), and *M*(3,4).

Prove that *JKLM* is a parallelogram.

Prove that *JKLM* is *not* a rhombus.

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

parallelogram have parallel sides.

This is a parallelogram because JM slope is = to KL's slope. It is not a rhombus because JM ≇ KL and rhombi have opposite sides ≅.

slope JM

$\frac{4-1}{3+3} = \frac{3}{6}$

slope KL

$\frac{-2+5}{7-1} = \frac{3}{6}$

≅ slopes

distance of JM

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

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

$d = \sqrt{36+9}$

$d = \sqrt{45}$

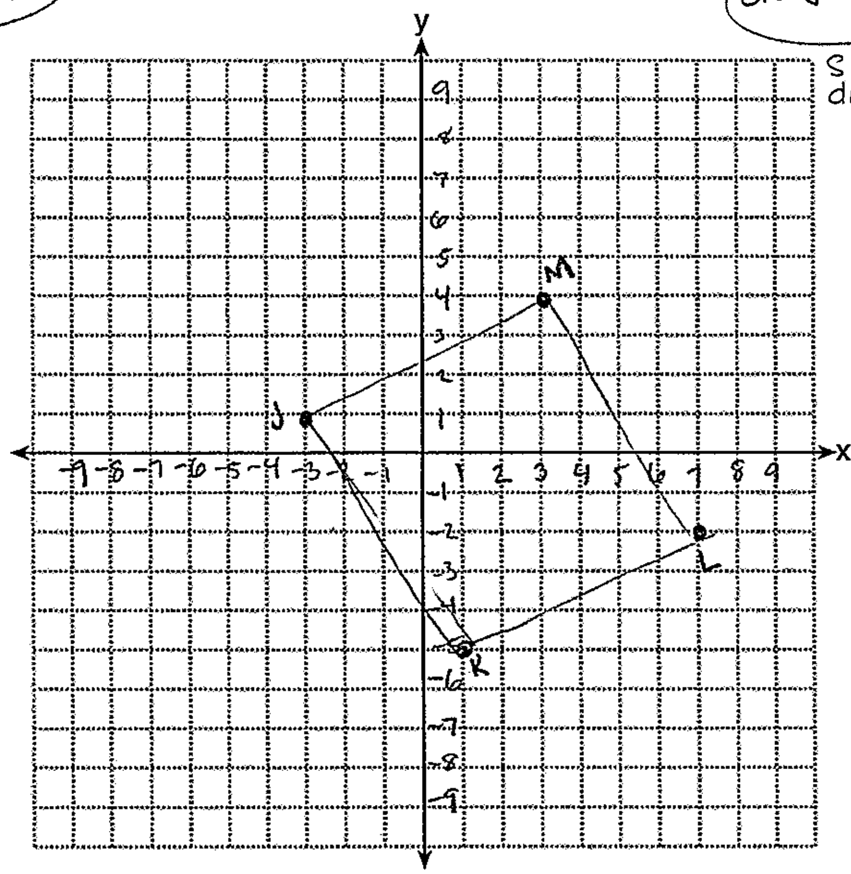
distance KL

$d = \sqrt{(7-1)^2+(-2+5)^2}$

$d = \sqrt{36+9}$

$d = \sqrt{45}$

same distances



Score 2: The student did work to show that one pair of sides is congruent and parallel.

Question 38

38 The vertices of quadrilateral *JKLM* have coordinates *J*(−3,1), *K*(1,–5), *L*(7,−2), and *M*(3,4).

Prove that *JKLM* is a parallelogram.

Prove that *JKLM* is *not* a rhombus.

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

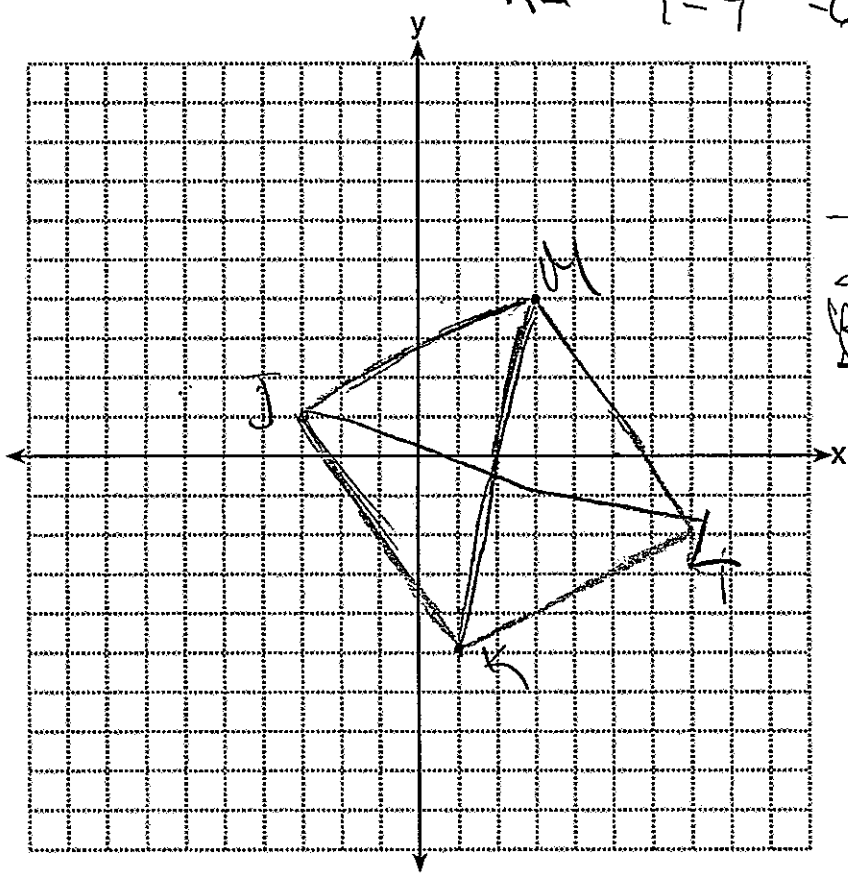
$\text{slope} = \frac{\Delta y}{\Delta x}$

$JK = \frac{1-(-5)}{-3-1} = \frac{6}{-4} = \boxed{\frac{3}{-2}}$ (Parallelogram

$ML = \frac{4-(-2)}{3-7} = \frac{6}{-4} = \boxed{\frac{3}{-2}}$

$JM = \frac{1-4}{-3-3} = \frac{-3}{-6} = \boxed{\frac{1}{2}}$

$KL = \frac{-5-(-2)}{1-7} = \frac{-3}{-6} = \boxed{\frac{1}{2}}$



JKLM is a parallelogram because opposite slopes are equal.

Score 1: The student found the slopes of all four sides. The concluding statement is not complete.

Question 38

38 The vertices of quadrilateral *JKLM* have coordinates *J*(−3,1), *K*(1,–5), *L*(7,−2), and *M*(3,4).

Prove that *JKLM* is a parallelogram.

Prove that *JKLM* is *not* a rhombus.

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

Prove parallelogram

distance

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

$(7-(-3))^2+(-2-1)^2$

$(-3)^2+(10)^2$

$\sqrt{9+100}$

$\sqrt{109}$

KM

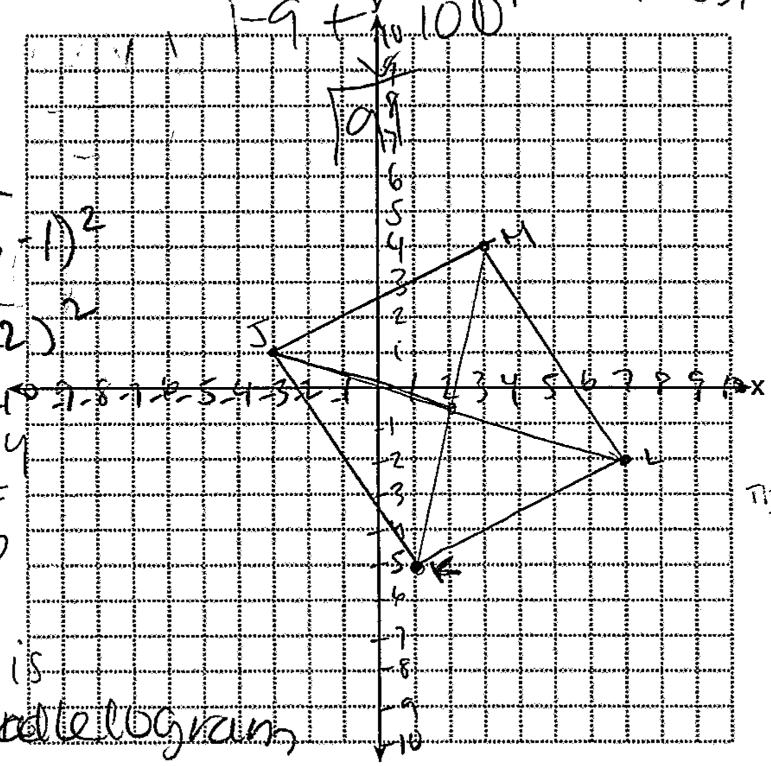
$\sqrt{(4-(-5))^2+(3-1)^2}$

$(9)^2+(2)^2$

$81+4$

$\sqrt{85}$

Jklm is a parallelogram



Prove not a rhombus

slope

JL

JL x_1 y_1

$J=(-3,1)$

$L=(7,-2)$ x_2 y_2

$\left(\frac{y_2-y_1}{x_2-x_1}\right)$

$\left(\frac{(-2)-1}{7-(-3)}\right)$

$\frac{-3}{10}$

KM x_1 y_1

$K=(1,-5)$

$M=(3,4)$ x_2 y_2

$\left(\frac{y_2-y_1}{x_2-x_1}\right)$

$\left(\frac{4-(-5)}{3-1}\right)$

$\frac{9}{2}$

JKLM is not a rhombus because the slopes are not congruent to one another.

Score 1: The student found the slopes of both diagonals.

38 The vertices of quadrilateral *JKLM* have coordinates $J(-3,1)$, $K(1,-5)$, $L(7,-2)$, and $M(3,4)$.

Prove that *JKLM* is a parallelogram.

Prove that *JKLM* is *not* a rhombus.

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

JKLM

Yes it is Parallel because when you set up the axes is gives you two parallel lines.

Yes Parallel
J(-3, 1)
K(1,-5)
L(7,-2)
M(3,4)

No rhombus
J(-3,1)
K(1,-5)
L(7,-2)
m(3,4)

It is not a rhombus because when you set up the axes it does not form into a rhombus

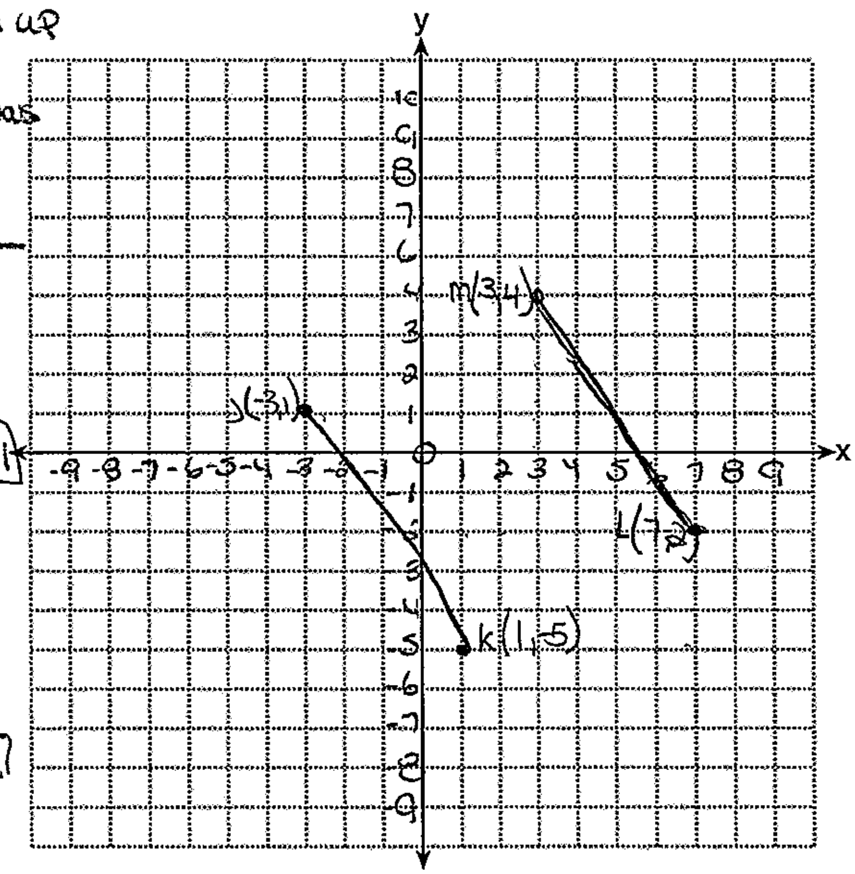
Staments	Reasons
J(-3,1) m(3,4)	Given
	Parallel

7 moves to the left
3 moves down

K(1,-5) Given
L(7,-2)

Parallel

7 moves to the left
4 moves Down



Score 0: The student has no relevant work.