The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

GEOMETRY

Tuesday, August 20, 2024 — 12:30 to 3:30 p.m., only

MODEL RESPONSE SET

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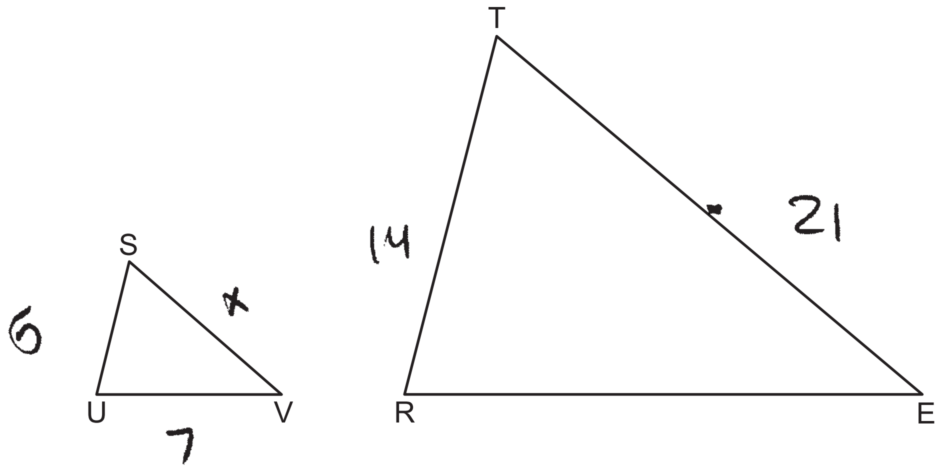
Question 25

25 In the diagram below, $\triangle SUV \sim \triangle TRE$.



If $SU = 5$, $UV = 7$, $TR = 14$, and $TE = 21$, determine and state the length of $\overline{SV}$.

$$\frac{5}{14} = \frac{x}{21}$$

$$\frac{14x}{14} = \frac{106}{14}$$

$$x = 7.6$$

$$7.5$$

Check

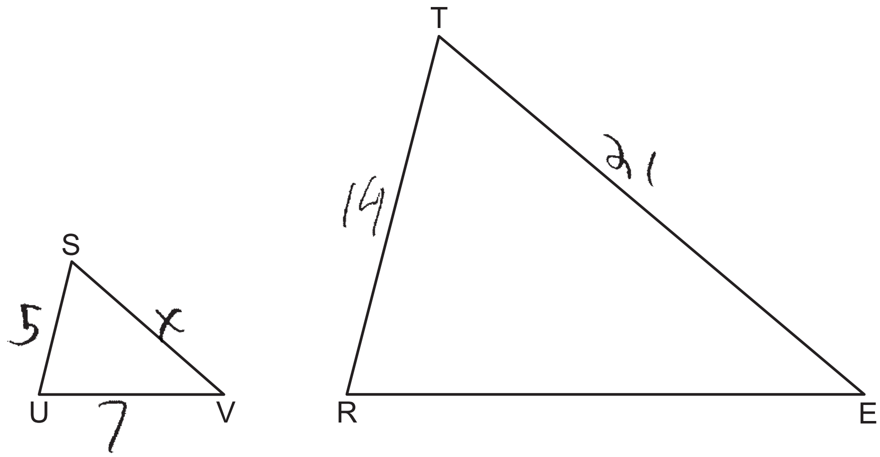
$$\frac{14}{5} = 2.8$$

$$7.5 * 2.8 = 21$$

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

Question 25

25 In the diagram below, $\triangle SUV \sim \triangle TRE$.



If $SU = 5$, $UV = 7$, $TR = 14$, and $TE = 21$, determine and state the length of $\overline{SV}$.

$$\frac{x}{5} = \frac{21}{14}$$

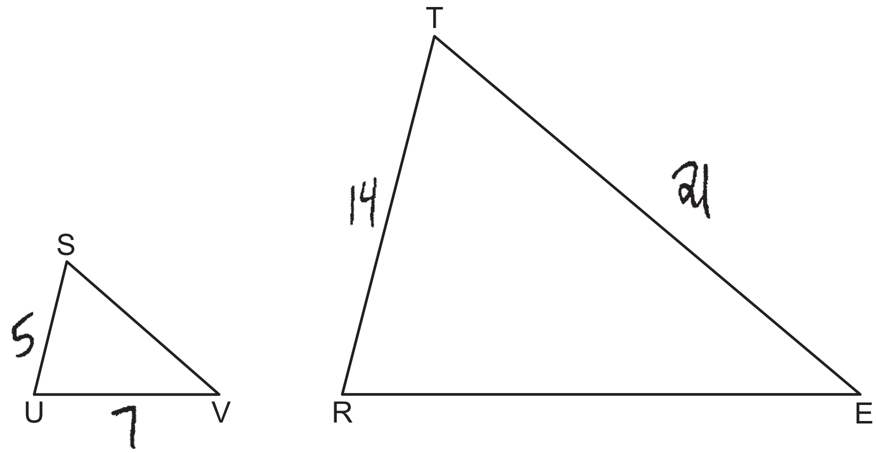
$$\frac{14x}{14} = \frac{105}{14}$$

$$x = \cancel{7}\frac{15}{2} = 7\frac{1}{2}$$

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

Question 25

25 In the diagram below, $\triangle SUV \sim \triangle TRE$.



If $SU = 5$, $UV = 7$, $TR = 14$, and $TE = 21$, determine and state the length of $\overline{SV}$.

$14 \div 5 = 2.8$

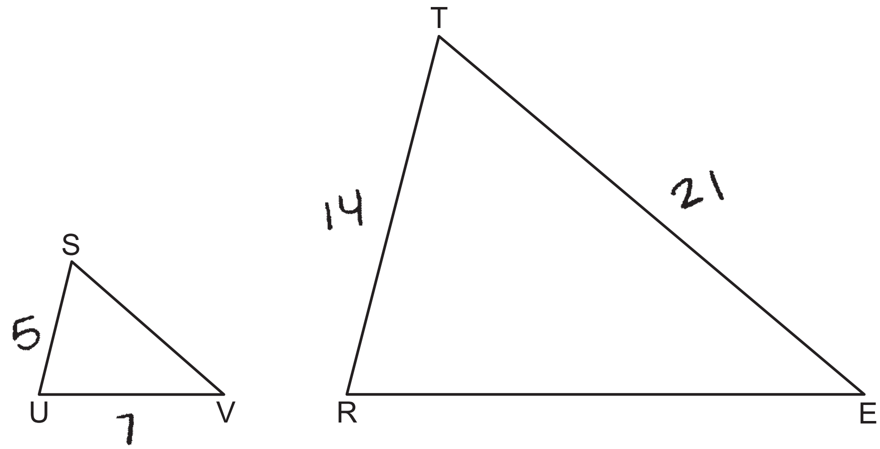
$21 \div 2.8 = 7.5$

$SV = 7.5$

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

Question 25

25 In the diagram below, $\triangle SUV \sim \triangle TRE$.



If $SU = 5$, $UV = 7$, $TR = 14$, and $TE = 21$, determine and state the length of $\overline{SV}$.

corresponding parts of ~Δ's are proportional

$$\frac{5}{14} = \frac{x}{21}$$

$$\frac{14x}{14} = \frac{315}{14}$$

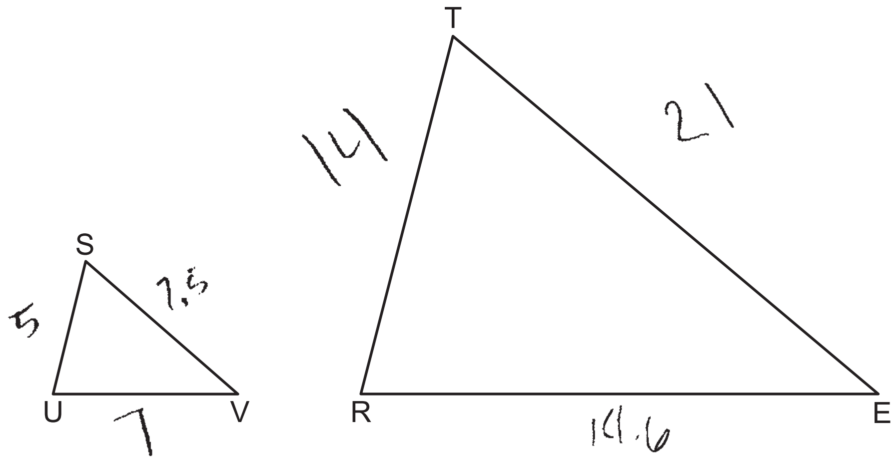
$$x = 22.5$$

$$\boxed{SV = 22.5}$$

Score 1: The student made a computational error.

Question 25

25 In the diagram below, $\triangle SUV \sim \triangle TRE$.



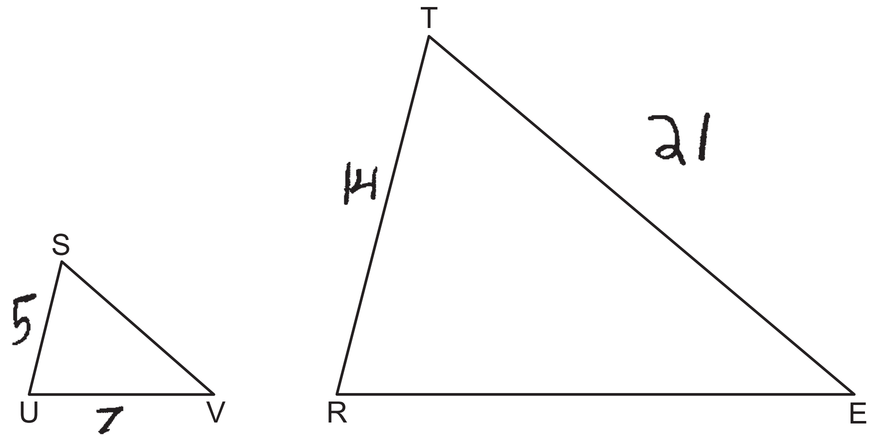
If $SU = 5$, $UV = 7$, $TR = 14$, and $TE = 21$, determine and state the length of $\overline{SV}$.

7.5

Score 1: The student correctly determined the length of $\overline{SV}$, but did not show work.

Question 25

25 In the diagram below, $\triangle SUV \sim \triangle TRE$.



If $SU = 5$, $UV = 7$, $TR = 14$, and $TE = 21$, determine and state the length of $\overline{SV}$.

$5^2 + 7^2 = x^2$

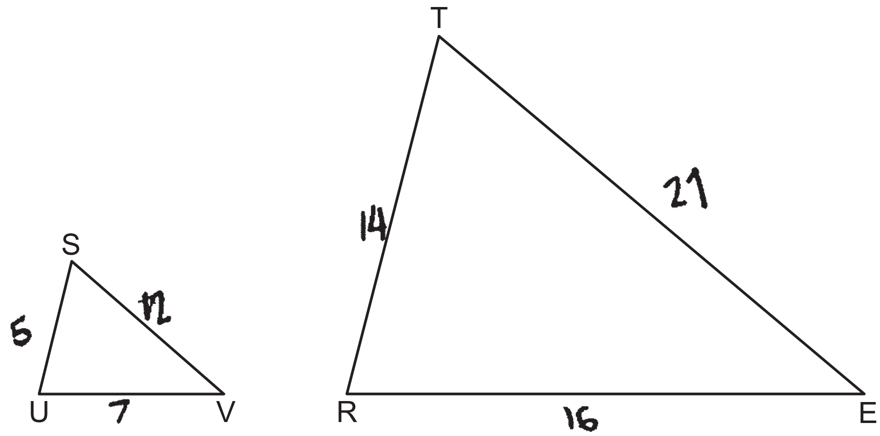
$25 + 49 = 74^2$

$\sqrt{74} = 8.6$

Score 0: The student gave a completely incorrect response.

Question 25

25 In the diagram below, $\triangle SUV \sim \triangle TRE$.



If $SU = 5$, $UV = 7$, $TR = 14$, and $TE = 21$, determine and state the length of $\overline{SV}$.

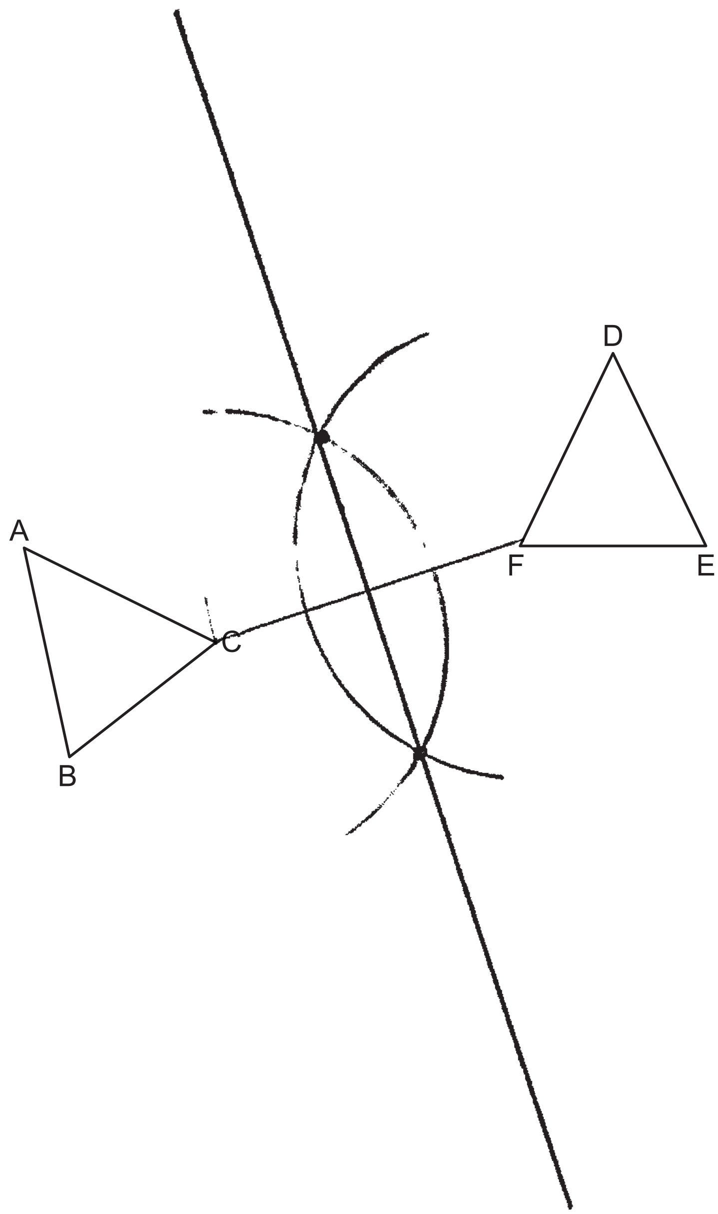
$\tan = \frac{opp}{adj} = \frac{7}{5}$

$\overline{SV} = 12$

Score 0: The student gave a completely incorrect response.

Question 26

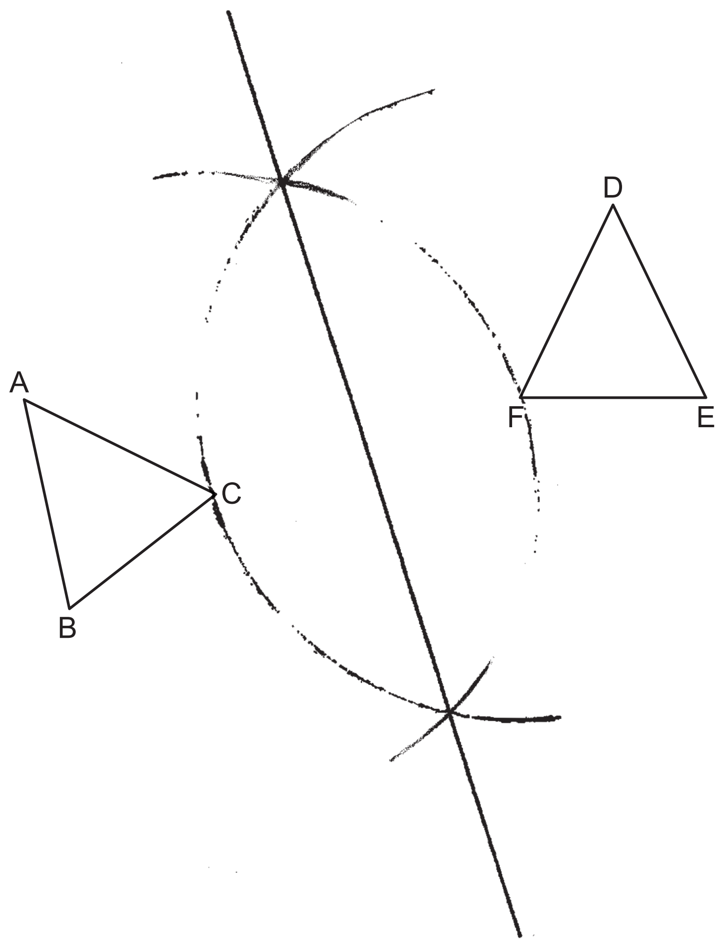
26 Using a compass and straightedge, construct the line of reflection that maps $\triangle ABC$ onto its image, $\triangle DEF$. [Leave all construction marks.]



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

Question 26

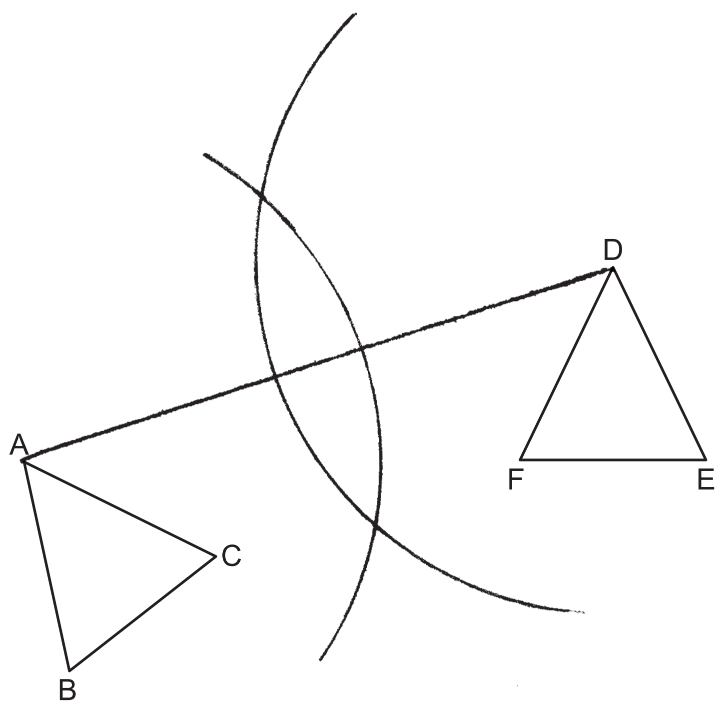
26 Using a compass and straightedge, construct the line of reflection that maps $\triangle ABC$ onto its image, $\triangle DEF$. [Leave all construction marks.]



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

Question 26

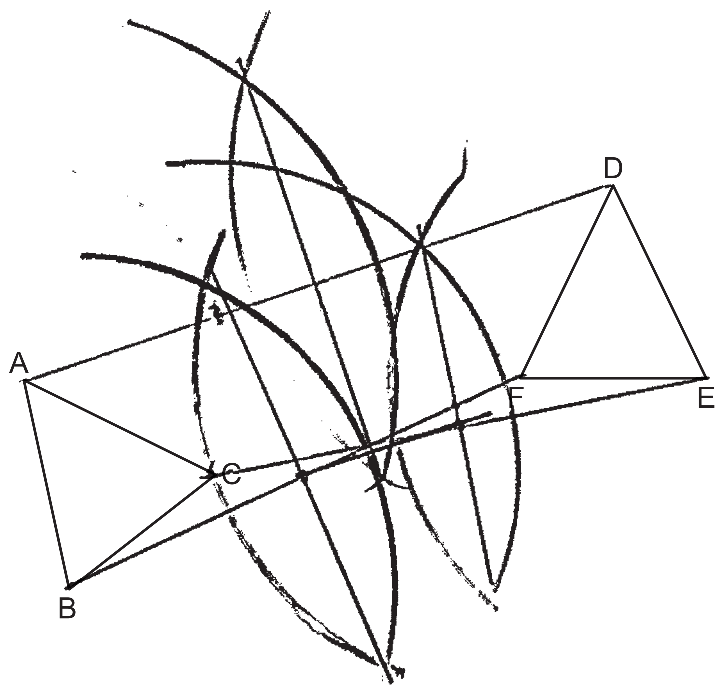
26 Using a compass and straightedge, construct the line of reflection that maps $\triangle ABC$ onto its image, $\triangle DEF$. [Leave all construction marks.]



Score 1: The student constructed all appropriate arcs, but did not draw the line of reflection.

Question 26

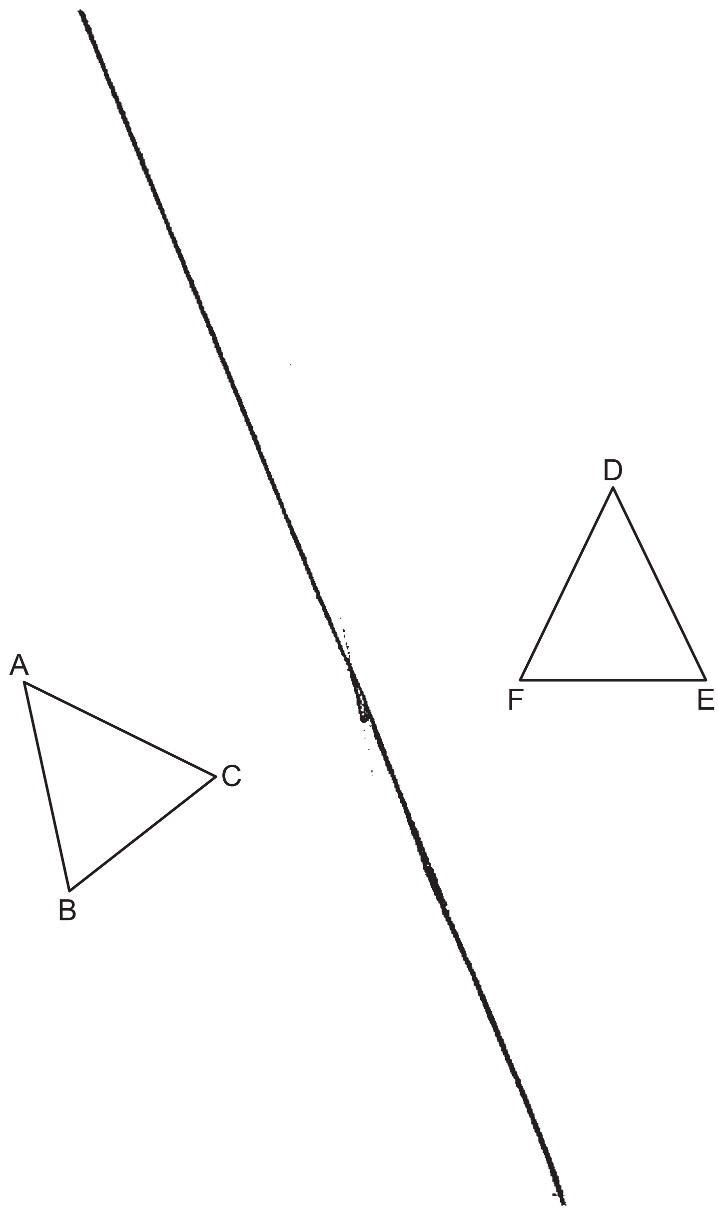
26 Using a compass and straightedge, construct the line of reflection that maps $\triangle ABC$ onto its image, $\triangle DEF$. [Leave all construction marks.]



Score 1: The student constructed a correct line of reflection of $\overline{AD}$, but also constructed two incorrect lines of reflection of $\overline{BF}$ and $\overline{CE}$.

Question 26

26 Using a compass and straightedge, construct the line of reflection that maps $\triangle ABC$ onto its image, $\triangle DEF$. [Leave all construction marks.]



Score 0: The student made a drawing that was not a construction.

Question 27

27 Triangle MAX has vertices with coordinates $M(-5,-2)$, $A(1,4)$, and $X(4,1)$.

Determine and state the area of $\triangle MAX$.

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

$AR = 6 \times 9 = 54$

$A1 = \frac{6 \times 6}{2} = \frac{36}{2} = 18$

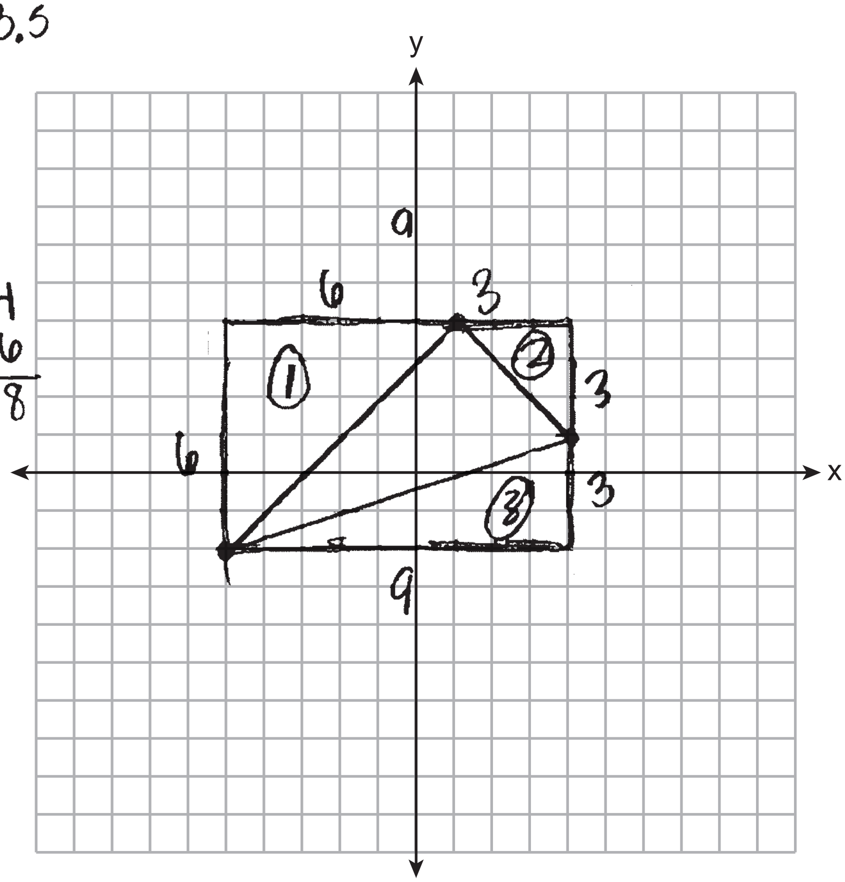
$A2 = \frac{3 \times 3}{2} = \frac{9}{2} = 4.5$

$A3 = \frac{9 \times 3}{2} = \frac{27}{2} = 13.5$

area of $\triangle MAX = 18$

$$\begin{array}{r} 18 \\ +13.5 \\ +\ 4.5 \\ \hline 36.0 \end{array}$$

$$\begin{array}{r} 54 \\ -36 \\ \hline 18 \end{array}$$



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

Question 27

27 Triangle MAX has vertices with coordinates $M(-5,-2)$, $A(1,4)$, and $X(4,1)$.

Determine and state the area of $\triangle MAX$.

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

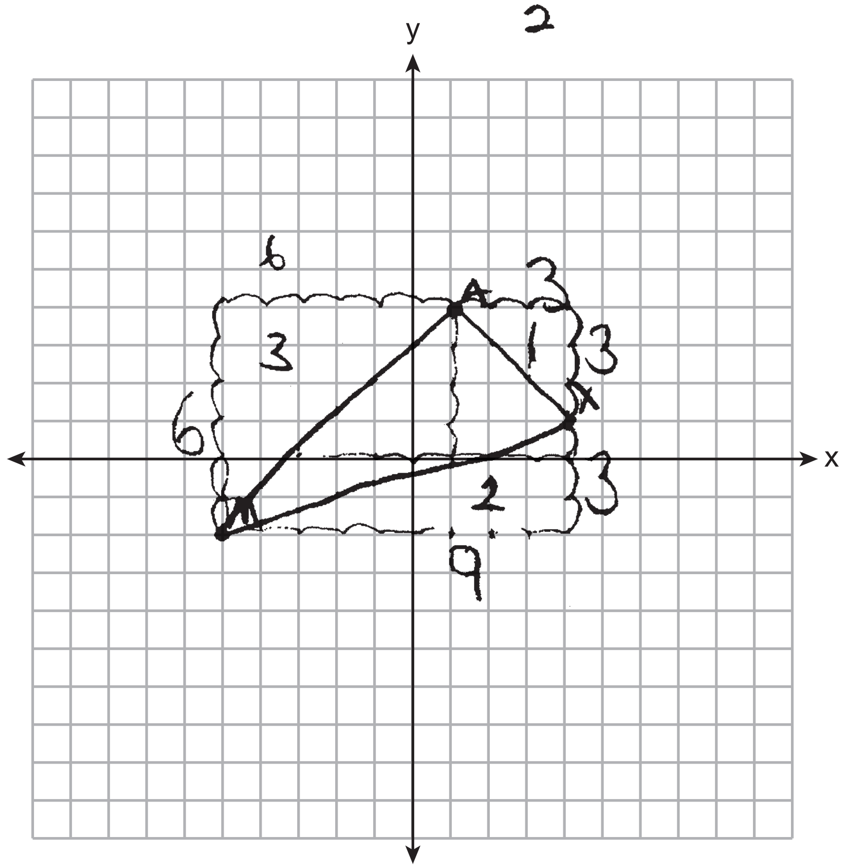
$A_{\square} = 9 \cdot 6 = 54$

$54 - 36$

$\boxed{18}$

$A_{\Delta 1} = \dfrac{3 \cdot 3}{2} = 4.5$ $\quad A_{\Delta 3} = \dfrac{6 \cdot 6}{2} = 18$

$A_{\Delta 2} = \dfrac{9 \cdot 3}{2} = 13.5$



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

Question 27

27 Triangle *MAX* has vertices with coordinates $M(-5,-2)$, $A(1,4)$, and $X(4,1)$.

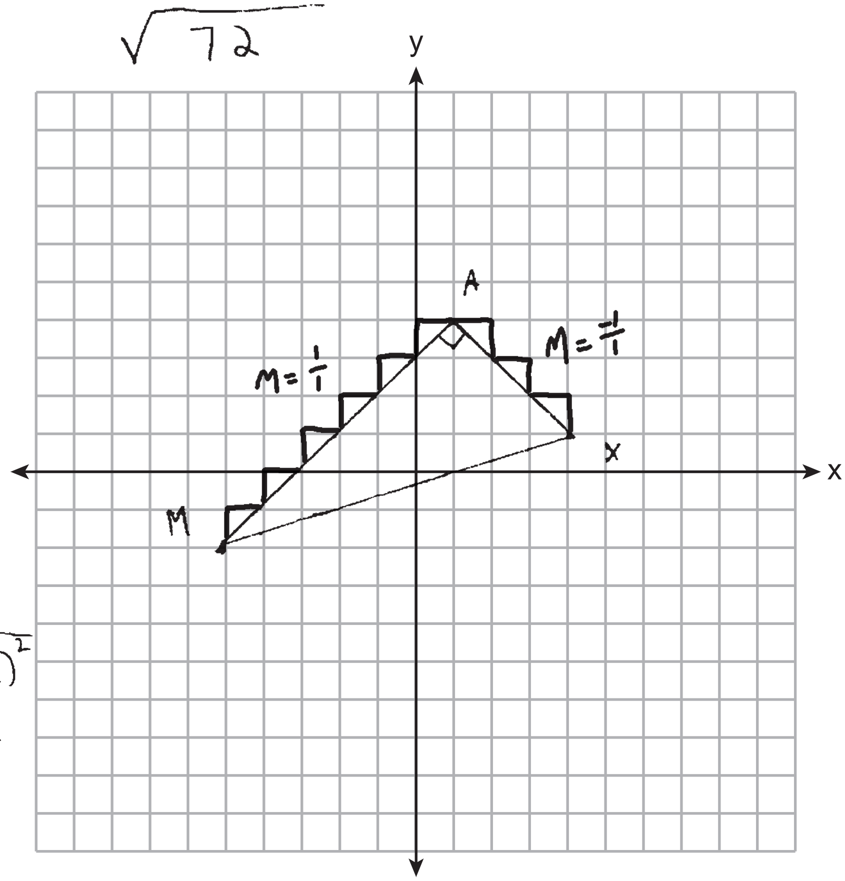
Determine and state the area of $\triangle MAX$.

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

$AM = \sqrt{(4+2)^2 + (1+5)^2}$

$\sqrt{36 + 36}$

$\sqrt{72}$



$A = \frac{1}{2}\sqrt{72} \cdot \sqrt{18}$

18

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

$\sqrt{9 + 9}$

$\sqrt{18}$

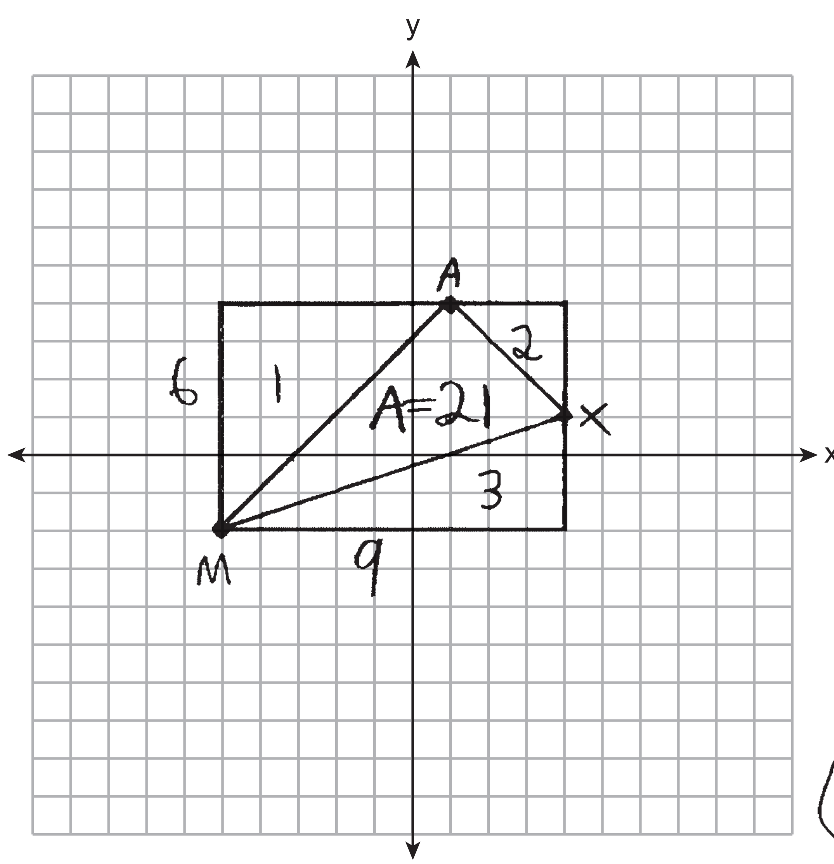
Score 2: The student gave a complete and correct response.

Question 27

27 Triangle MAX has vertices with coordinates $M(-5,-2)$, $A(1,4)$, and $X(4,1)$.

Determine and state the area of $\triangle MAX$.

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



$A = 6 \cdot 9$

$A = 54$

$\Delta 1 = \frac{6 \cdot 5}{2} = \frac{30}{2} = 15$

$\Delta 2 = \frac{3 \cdot 3}{2} = \frac{9}{2} = 4.5$

$\Delta 3 = \frac{9 \cdot 3}{2} = \frac{27}{2} = 13.5$

33

$54 - 33 = \boxed{21}$

$\Delta MAX = 21$

Score 1: The student made a computational error when determining the area of $\triangle 1$.

Question 27

27 Triangle MAX has vertices with coordinates $M(-5,-2)$, $A(1,4)$, and $X(4,1)$.

Determine and state the area of $\triangle MAX$.

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

$\square = 6 \cdot 9 = 54$

tr. 1 $\left(\frac{1}{2}\right)(6)(6)$

3×6

18

tr. 2 $\left(\frac{1}{2}\right)(3)(3)$

$3 \times 3 = 9$

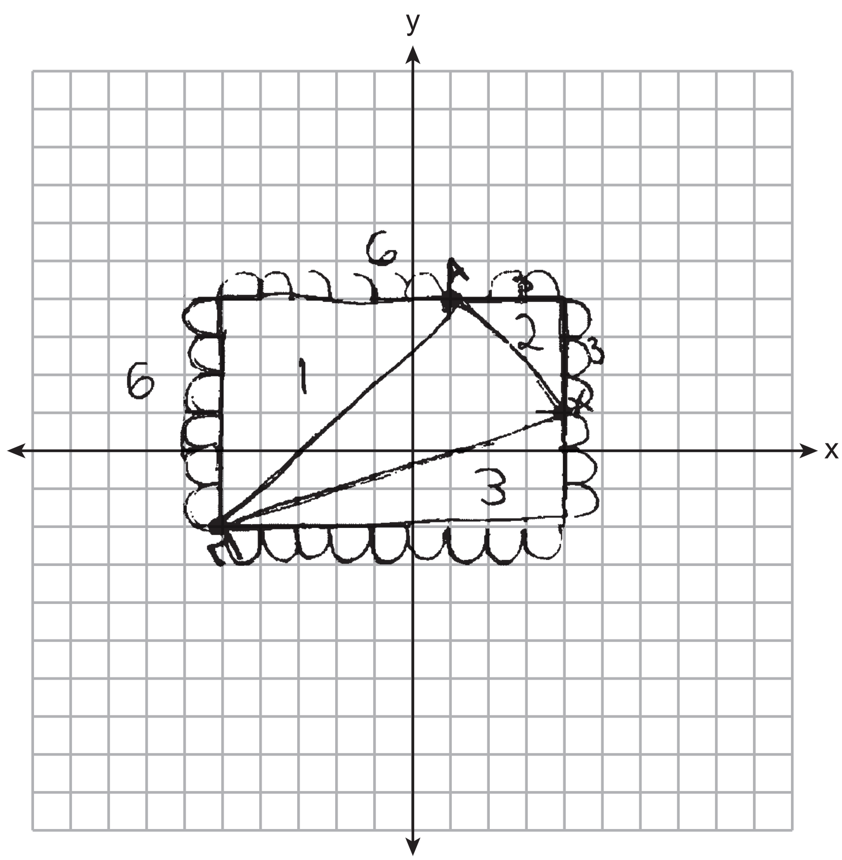
4.5

tr. 3

$\frac{1}{2}(9)(3)$

4.5×3

13.5



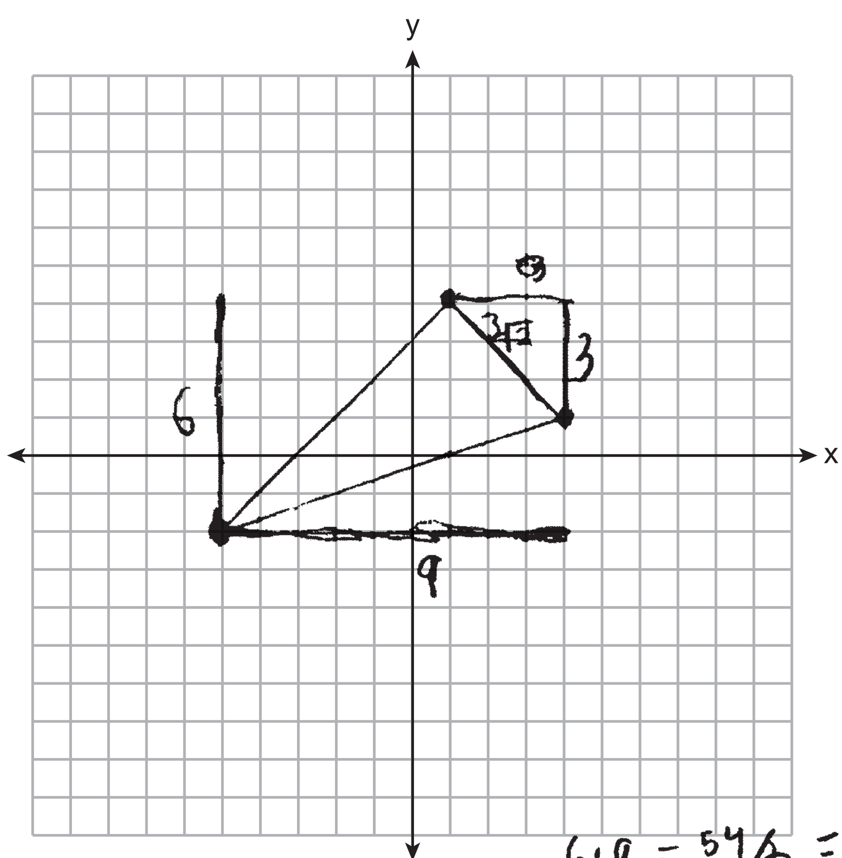
Score 1: The student determined the areas of the surrounding triangles and rectangle, but did not determine the area of $\triangle MAX$.

Question 27

27 Triangle MAX has vertices with coordinates $M(-5,-2)$, $A(1,4)$, and $X(4,1)$.

Determine and state the area of $\triangle MAX$.

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



$B \cdot h = 6 \cdot 9 = 54/2 = 27$

Score 0: The student did not show enough correct relevant work to receive any credit.

Question 27

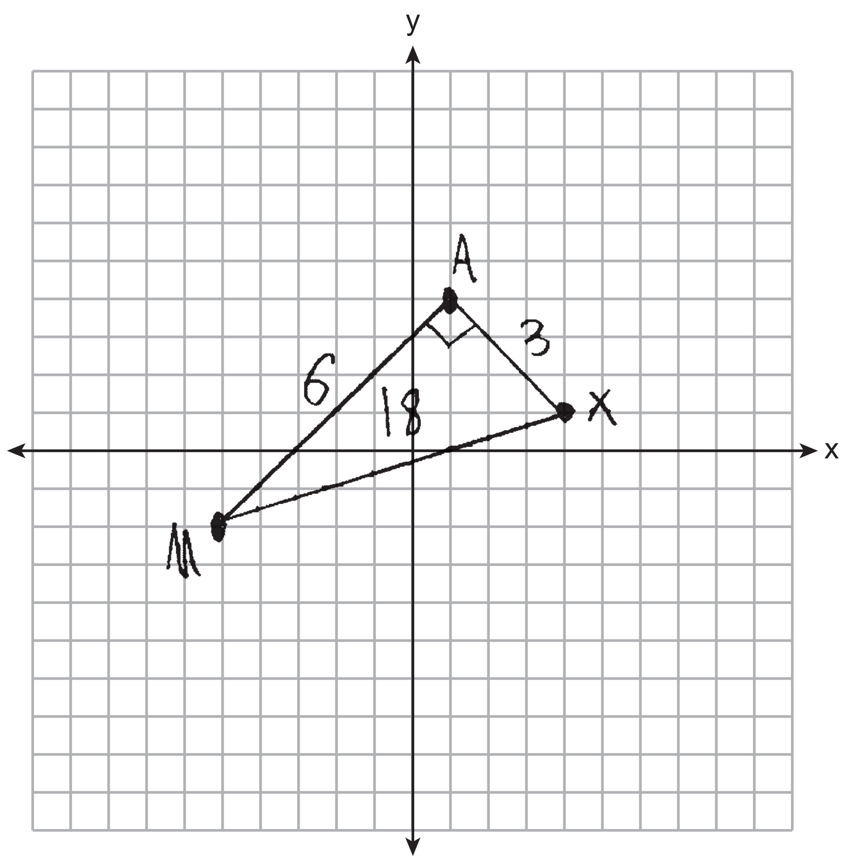
27 Triangle MAX has vertices with coordinates $M(-5,-2)$, $A(1,4)$, and $X(4,1)$.

Determine and state the area of $\triangle MAX$.

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

$A = 6 \cdot 3$

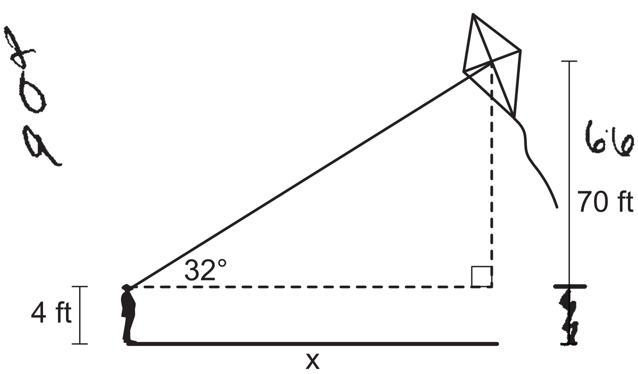
$A = 18$

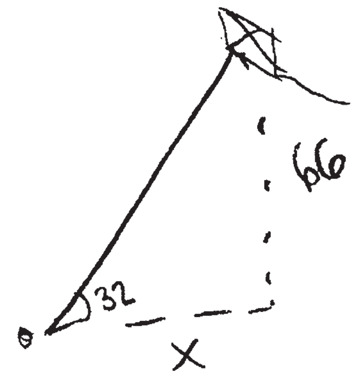


Score 0: The student determined a correct answer by an obviously incorrect procedure.

Question 28

28 A person observes a kite at an angle of elevation of 32° from a line of sight that begins 4 feet above the ground, as modeled in the diagram below. At the moment of observation, the kite is 70 feet above the ground.





Determine and state the horizontal distance, *x*, between the person and the point on the ground directly below the kite, to the *nearest foot*.

$\tan(32) = \frac{66}{x}$

$x = \frac{66}{\tan(32)}$

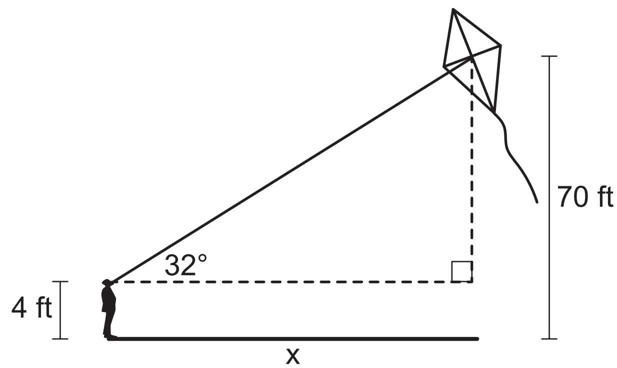
$x = 105.62$

$\boxed{106 \text{ ft}}$

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

Question 28

28 A person observes a kite at an angle of elevation of 32° from a line of sight that begins 4 feet above the ground, as modeled in the diagram below. At the moment of observation, the kite is 70 feet above the ground.



Determine and state the horizontal distance, x, between the person and the point on the ground directly below the kite, to the *nearest foot*.

106 ft.

$\tan 32 = \frac{66}{x}$

$x \tan 32 = 66$

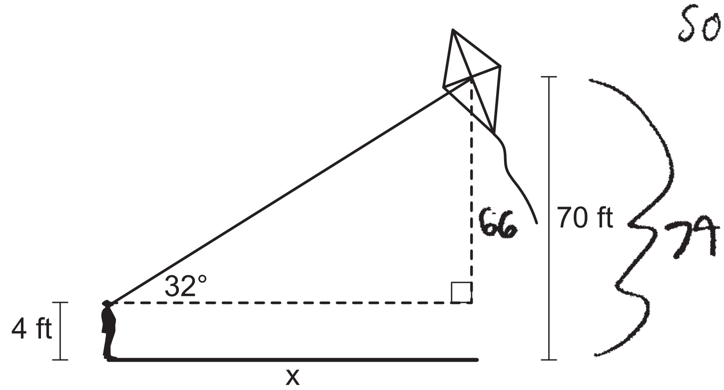
$\frac{66}{\tan 32}$

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

Question 28

28 A person observes a kite at an angle of elevation of 32° from a line of sight that begins 4 feet above the ground, as modeled in the diagram below. At the moment of observation, the kite is 70 feet above the ground.

SOH CAH TOA



Determine and state the horizontal distance, x, between the person and the point on the ground directly below the kite, to the *nearest foot*.

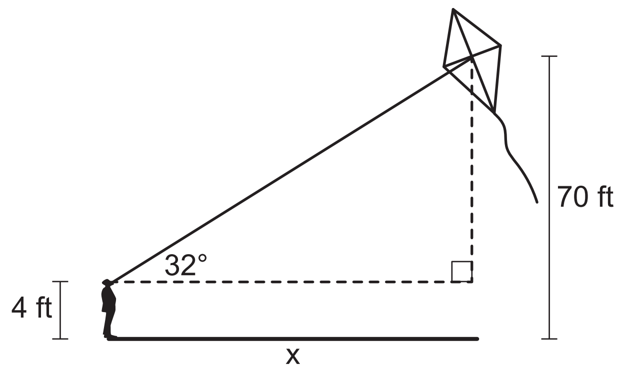
$$\frac{\tan 32}{1} = \frac{66}{x}$$

$$\frac{66}{\tan(32)} = \frac{\tan(32)x}{\tan(32)}$$

Score 1: The student wrote a correct relevant trigonometric equation.

Question 28

28 A person observes a kite at an angle of elevation of 32° from a line of sight that begins 4 feet above the ground, as modeled in the diagram below. At the moment of observation, the kite is 70 feet above the ground.



Determine and state the horizontal distance, x, between the person and the point on the ground directly below the kite, to the *nearest foot*.

SOH CAH TOA

tan (32 = 0.6248693519

$$\frac{0.6249}{1} = \frac{70}{x}$$

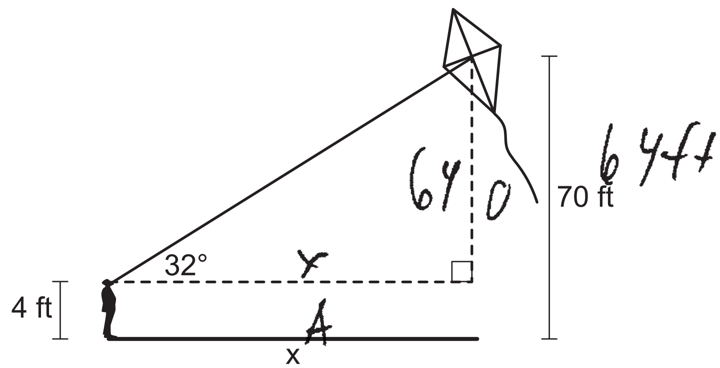
$$\frac{70}{0.6249} = \frac{0.6249x}{0.6249}$$

112 = x

Score 1: The student wrote an incorrect trigonometric equation, but found an appropriate answer.

Question 28

28 A person observes a kite at an angle of elevation of 32° from a line of sight that begins 4 feet above the ground, as modeled in the diagram below. At the moment of observation, the kite is 70 feet above the ground.



Determine and state the horizontal distance, x, between the person and the point on the ground directly below the kite, to the *nearest foot*.

$$\frac{\tan 32}{1} = \frac{64}{x}$$

$$\frac{\tan 32 x}{\tan 32} = \frac{64}{\tan 32}$$

$x =$

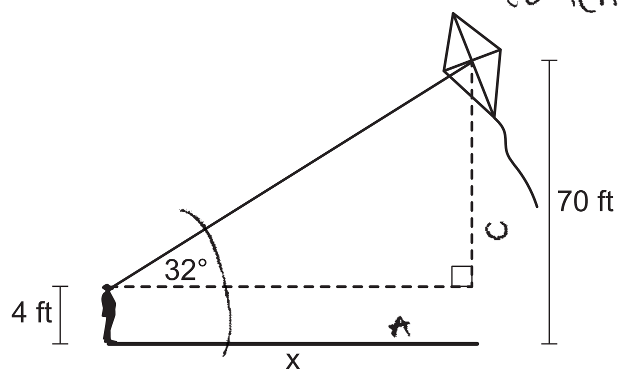
102.421

$x = 102$ ft

Score 1: The student made a computational error.

28 A person observes a kite at an angle of elevation of 32° from a line of sight that begins 4 feet above the ground, as modeled in the diagram below. At the moment of observation, the kite is 70 feet above the ground.

SOHCAHTOA



Determine and state the horizontal distance, x, between the person and the point on the ground directly below the kite, to the *nearest foot*.

$\tan\theta = \frac{O}{A}$

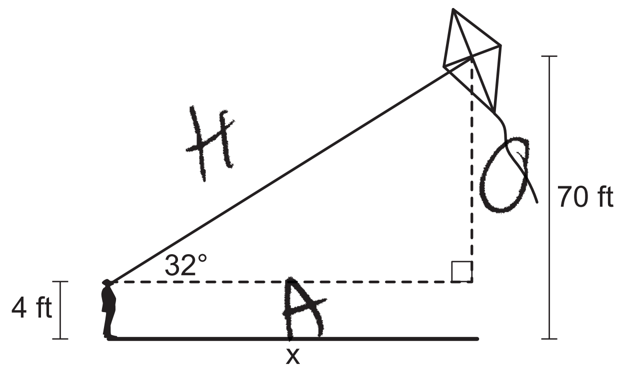
$70 \cdot \tan(32) = \frac{70}{x} \cdot 70$

$x = 43.74085463$

$\boxed{x = 43.7}$

Score 0: The student wrote an incorrect trigonometric equation and solved it incorrectly.

28 A person observes a kite at an angle of elevation of 32° from a line of sight that begins 4 feet above the ground, as modeled in the diagram below. At the moment of observation, the kite is 70 feet above the ground.



Determine and state the horizontal distance, x, between the person and the point on the ground directly below the kite, to the *nearest foot*.

$$\frac{\tan(32)}{1} = \frac{70}{x}$$

$$\frac{70}{\tan(32)} = \frac{\tan(32)(x)}{\tan(32)}$$

112.023 feet

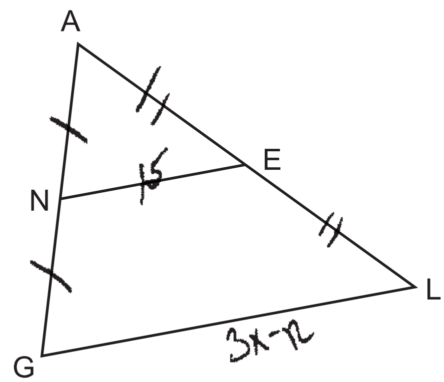
112.023 + 4 = 116.023

116.023 feet

Score 0: The student wrote an incorrect trigonometric equation, made an error adding 4 to the distance, and made a rounding error.

Question 29

29 In $\triangle AGL$ below, N and E are the midpoints of $\overline{AG}$ and $\overline{AL}$, respectively, $\overline{NE}$ is drawn.



If $NE = 15$ and $GL = 3x - 12$, determine and state the value of x.

$$3x - 12 = 15 \cdot 2$$

$$3x - 12 = 30$$
$$+12 \quad +12$$

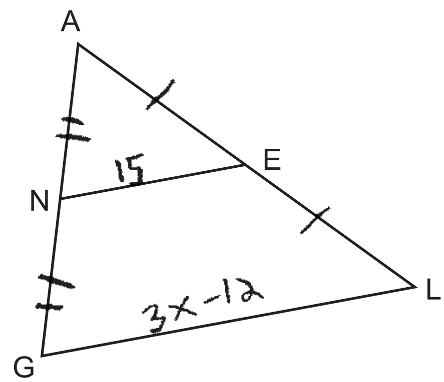
$$\frac{3x}{3} = \frac{42}{3}$$

$$x = 14$$

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

Question 29

29 In $\triangle AGL$ below, N and E are the midpoints of $\overline{AG}$ and $\overline{AL}$, respectively, $\overline{NE}$ is drawn.



If $NE = 15$ and $GL = 3x - 12$, determine and state the value of x.

$$\frac{3x-12}{2} = 15$$

or

$$\underline{15 \cdot 2} = 3x-12$$

$$30 = 3x - 12$$
$$+12 \qquad +12$$

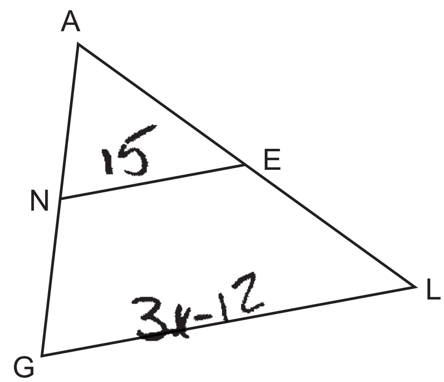
$$\frac{42}{3} = \frac{3x}{3}$$

$$\boxed{x = 14}$$

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

Question 29

29 In $\triangle AGL$ below, N and E are the midpoints of $\overline{AG}$ and $\overline{AL}$, respectively, $\overline{NE}$ is drawn.



If $NE = 15$ and $GL = 3x - 12$, determine and state the value of x.

$3x - 12 = (15)2$

$3x - 12 = 30$

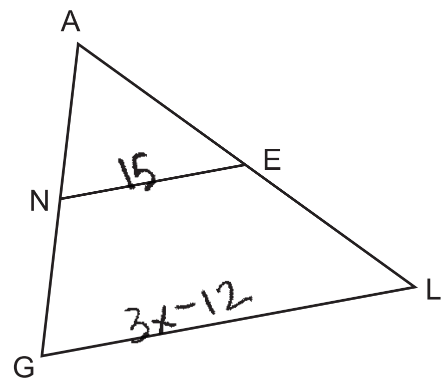
$3x = 18$

$x = 6$

Score 1: The student made a computational error.

Question 29

29 In $\triangle AGL$ below, N and E are the midpoints of $\overline{AG}$ and $\overline{AL}$, respectively, $\overline{NE}$ is drawn.



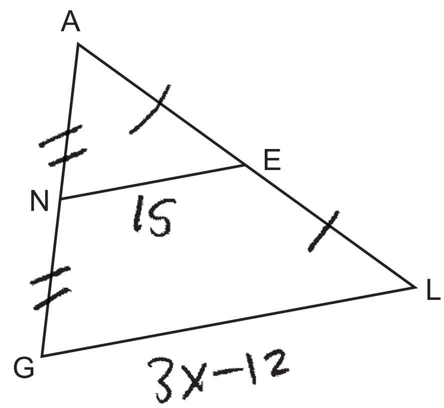
If $NE = 15$ and $GL = 3x - 12$, determine and state the value of x.

$$3x - 12 = 15$$
$$+12 \quad +12$$
$$\frac{3x}{3} = \frac{27}{3}$$
$$\boxed{x = 9}$$

Score 1: The student made a conceptual error, but found an appropriate answer.

Question 29

29 In $\triangle AGL$ below, N and E are the midpoints of $\overline{AG}$ and $\overline{AL}$, respectively, $\overline{NE}$ is drawn.



If $NE = 15$ and $GL = 3x - 12$, determine and state the value of x.

$3x-12=\frac{1}{2}(15)$

$3x-12=7.5$
$+12 \quad +12$

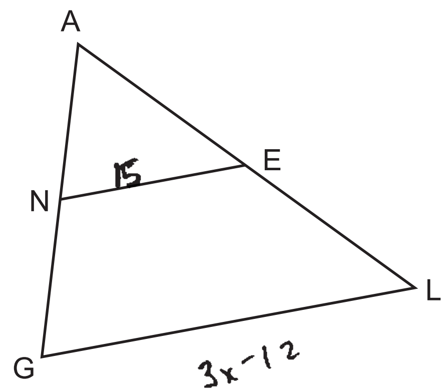
$\frac{3x}{3}=\frac{19.5}{3}$

$\boxed{x=6.5}$

Score 1: The student made a conceptual error, but found an appropriate answer.

Question 29

29 In $\triangle AGL$ below, N and E are the midpoints of $\overline{AG}$ and $\overline{AL}$, respectively, $\overline{NE}$ is drawn.



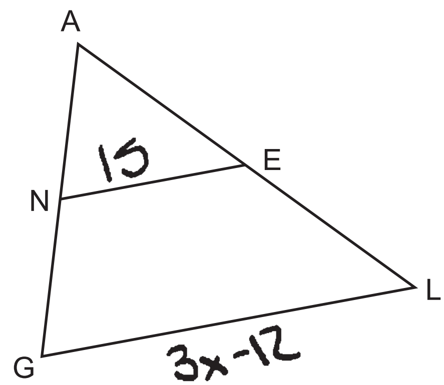
If $NE = 15$ and $GL = 3x - 12$, determine and state the value of x.

$$12 = 3x - 12$$
$$+12 \qquad +12$$
$$\frac{24}{3} = \frac{3x}{3}$$
$$8 = x$$

Score 0: The student made one conceptual error and one transcription error.

Question 29

29 In $\triangle AGL$ below, N and E are the midpoints of $\overline{AG}$ and $\overline{AL}$, respectively, $\overline{NE}$ is drawn.



If $NE = 15$ and $GL = 3x - 12$, determine and state the value of x.

$3x-12+15=180$

$3x+3=180$
$-3 \quad -3$

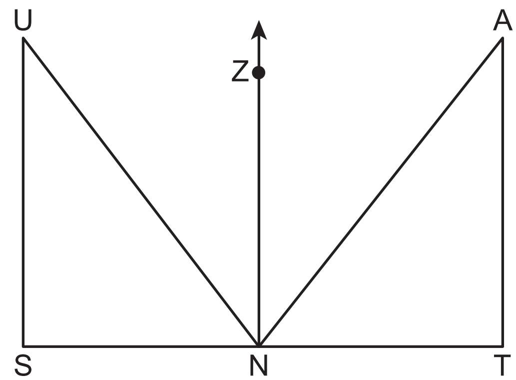
$\frac{3x}{3}=\frac{177}{3}$

$x=59$

Score 0: The student did not show enough correct relevant course-level work to receive any credit.

Question 30

30 In the diagram below, $\triangle TAN$ is the image of $\triangle SUN$ after a reflection over $\overrightarrow{NZ}$.



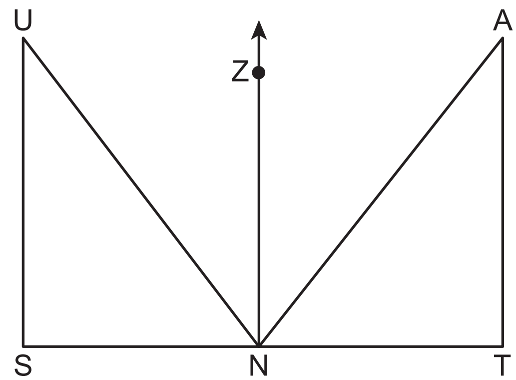
Use the properties of rigid motions to explain why $\triangle TAN \cong \triangle SUN$.

$\triangle TAN \cong \triangle SUN$ Because only a reflection was made, the rigid mothion reflection preserves all side lengths and angle measurements.

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

Question 30

30 In the diagram below, $\triangle TAN$ is the image of $\triangle SUN$ after a reflection over $\overrightarrow{NZ}$.



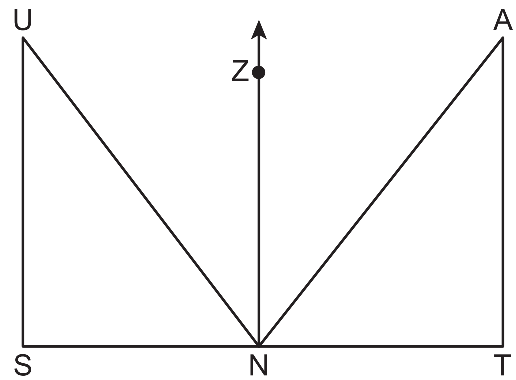
Use the properties of rigid motions to explain why $\triangle TAN \cong \triangle SUN$.

Rigid motions preserve ∠ measure and side measure, and reflections are rigid motions.

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

Question 30

30 In the diagram below, $\triangle TAN$ is the image of $\triangle SUN$ after a reflection over $\overrightarrow{NZ}$.



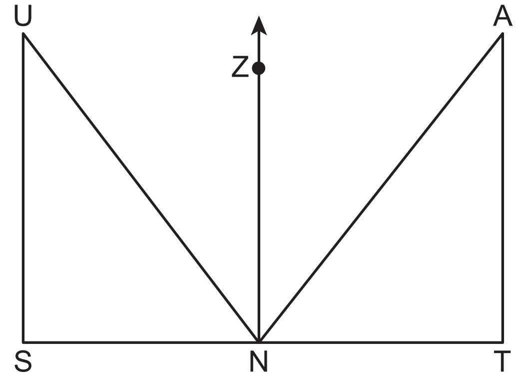
Use the properties of rigid motions to explain why $\triangle TAN \cong \triangle SUN$.

$\triangle TAN \cong \triangle SUN$ because a reflection is a rigid motion which means it perserves size and shape.

Score 1: The student wrote an incomplete explanation.

Question 30

30 In the diagram below, $\triangle TAN$ is the image of $\triangle SUN$ after a reflection over $\overleftrightarrow{NZ}$.



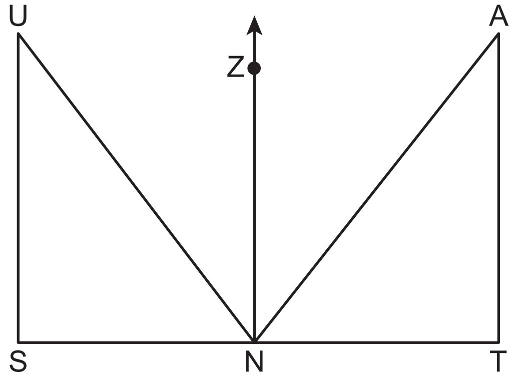
Use the properties of rigid motions to explain why $\triangle TAN \cong \triangle SUN$.

$\triangle TAN \cong \triangle SUN$ b/c it was reflected over the line NZ $\therefore$ the distances between points didn't change only orientation.

Score 1: The student wrote an incomplete explanation.

Question 30

30 In the diagram below, $\triangle TAN$ is the image of $\triangle SUN$ after a reflection over $\overrightarrow{NZ}$.

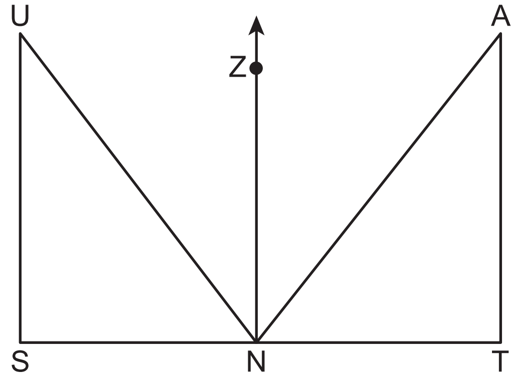


Use the properties of rigid motions to explain why $\triangle TAN \cong \triangle SUN$.

Using the properties of rigid motion $\triangle TAN \cong \triangle SUN$ because of translation/reflection. $\measuredangle A$ and $\measuredangle U$ are congruent

Score 0: The student wrote an incorrect explanation.

30 In the diagram below, $\triangle TAN$ is the image of $\triangle SUN$ after a reflection over $\overrightarrow{NZ}$.



Use the properties of rigid motions to explain why $\triangle TAN \cong \triangle SUN$.

The only rigid motion that changes ~~size~~ size is dialation because you have to multiply. In a reflection, you just flip the shape.

Score 0: The student wrote an incorrect explanation.

Question 31

31 A pyramid with a square base is made of solid glass. The pyramid has a base with a side length of 5.7 cm and a height of 7 cm. The density of the glass is 2.4 grams per cubic centimeter.

Determine and state, to the *nearest gram*, the mass of the pyramid.

$V=\frac{1}{3}Bh$

$V=\frac{1}{3}(5.7)^2\cdot 7$

$V=75.81$

$75.81\times 2.4=181.944$

182 g.

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

Question 31

31 A pyramid with a square base is made of solid glass. The pyramid has a base with a side length of 5.7 cm and a height of 7 cm. The density of the glass is 2.4 grams per cubic centimeter.

Determine and state, to the *nearest gram*, the mass of the pyramid.

$$\frac{M}{D} = V$$

$$\frac{M}{D \mid V}$$

$D \circ V$

$V = 1/3\ (5.7)(5.7)(7)$

$V = 1/3\ (32.49)7$

$V = 75.81$

75.81×2.4

$M = \cancel{181.9}$

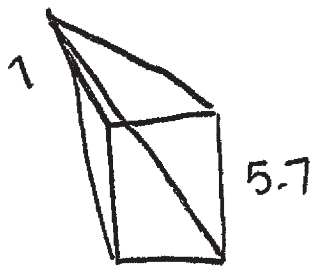
$M = 182$

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

Question 31

31 A pyramid with a square base is made of solid glass. The pyramid has a base with a side length of 5.7 cm and a height of 7 cm. The density of the glass is 2.4 grams per cubic centimeter.

Determine and state, to the *nearest gram*, the mass of the pyramid.



D M V

$M = \frac{D}{V} \quad \frac{V}{D}$

$M = \frac{75.81}{2.4}$

$V = \frac{1}{3}Bh$

$V = \frac{1}{3}(5.7)^2(7)$

$V = 75.81$

31.5875

$\boxed{32 \text{ grams}}$

Score 1: The student made a computational error when determining the mass.

Question 31

31 A pyramid with a square base is made of solid glass. The pyramid has a base with a side length of 5.7 cm and a height of 7 cm. The density of the glass is 2.4 grams per cubic centimeter.

Determine and state, to the *nearest gram*, the mass of the pyramid.

$D = \cancel{\frac{m}{v}}$ so $m = Dv$

$v = \frac{1}{3}bh$

$\frac{1}{3}(5.7 \cdot 7)$

13.3

$$\begin{array}{r} 2.4 \\ \times\ 13.3 \\ \hline 31.92 \end{array}$$

The mass of the pyramid is 32 grams.

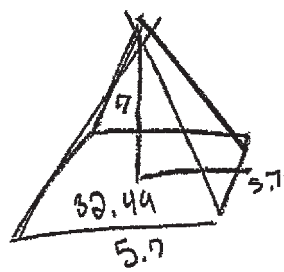
Score 1: The student made an error when determining the volume, but found an appropriate mass.

Question 31

31 A pyramid with a square base is made of solid glass. The pyramid has a base with a side length of 5.7 cm and a height of 7 cm. The density of the glass is 2.4 grams per cubic centimeter.

Determine and state, to the *nearest gram*, the mass of the pyramid.

$D = \frac{m}{V}$



$V = \frac{1}{3}Bh$

$V = \frac{1}{3}(32.49)(7)$

$V = \frac{1}{3}(227.43)$

$V = 75.81\text{cm}^3$

$D = \frac{m}{V}$

$\frac{181.944}{1} = \frac{x}{75.81}$

$$\begin{array}{r} 75.81 \\ \times\ 2.4 \\ \hline 181.944 \end{array}$$

$x = 13793.175$

$m = 13{,}793\text{g}$

Score 1: The student correctly determined the volume of the pyramid.

Question 31

31 A pyramid with a square base is made of solid glass. The pyramid has a base with a side length of 5.7 cm and a height of 7 cm. The density of the glass is 2.4 grams per cubic centimeter.

Determine and state, to the *nearest gram*, the mass of the pyramid.

5.7cm 7m

2.4

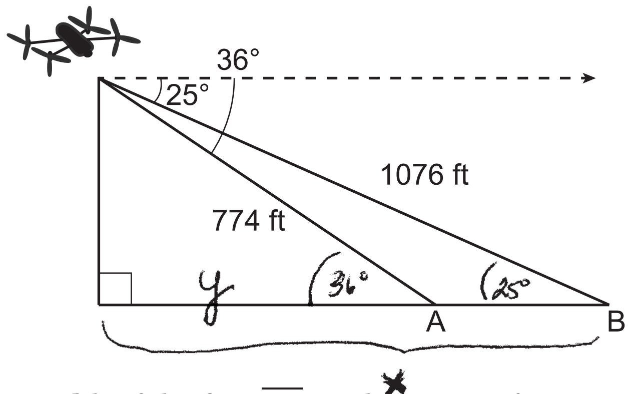
$\frac{5.7c}{7m} - \frac{x}{24}$

$\sqrt{7x} \quad \sqrt{136.8}$

x= 19.5g

Score 0: The student did not show enough correct relevant course-level work to receive any credit.

32 A drone is used to measure the size of a brush fire on the ground. Segment AB represents the width of the fire, as shown below. The drone calculates the distance to point B to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point A to be 774 feet at an angle of depression of 36°.



Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

$\cos 25 = \frac{x}{1076}$

$x = 1076(\cos 25)$

$x = 975.1871...$

$\cos 36 = \frac{y}{774}$

$y = 774(\cos 36)$

$y = 626.1791...$

$AB = x - y$

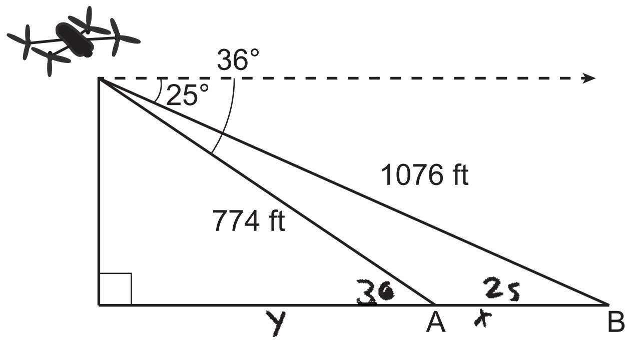
349.0

349

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

Question 32

32 A drone is used to measure the size of a brush fire on the ground. Segment *AB* represents the width of the fire, as shown below. The drone calculates the distance to point *B* to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point *A* to be 774 feet at an angle of depression of 36°.



Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

$\cos 36 = \frac{y}{774}$

$y = \cos 36(774)$

$y = 626.179$

$\cos 25 = \frac{x + 626.176}{1076}$

$x + 626.176 = \cos 25(1076)$

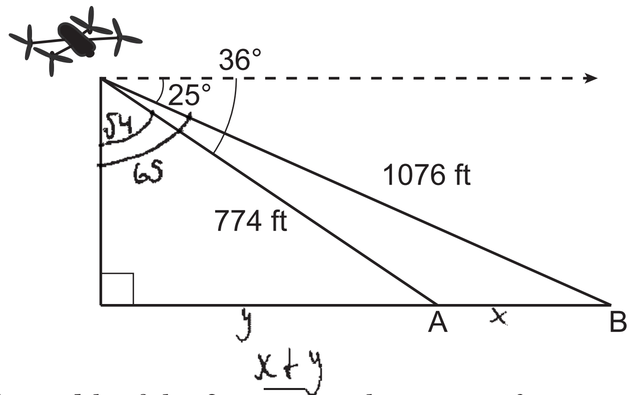
$x + 626.176 = 975.1871789$

$x = 349$

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

Question 32

32 A drone is used to measure the size of a brush fire on the ground. Segment *AB* represents the width of the fire, as shown below. The drone calculates the distance to point *B* to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point *A* to be 774 feet at an angle of depression of 36°.



Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

$$\frac{\sin 54}{1} = \frac{y}{774}$$

$$636.1791\ldots = y$$

$$\frac{\sin 65}{1} = \frac{x+y}{1076}$$

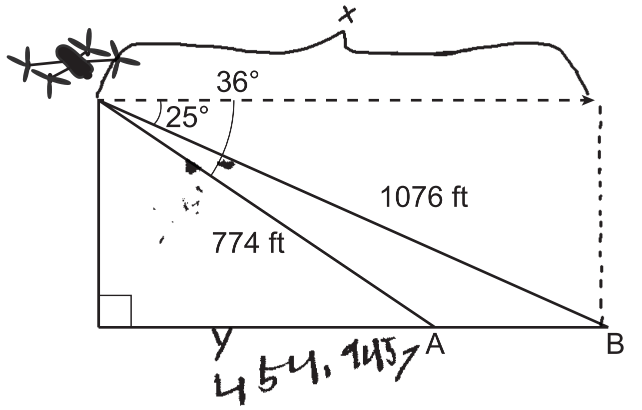
$$975.1871\ldots = x+y$$

$$\begin{array}{r} 975.1871\ldots \\ -\ 636.1791\ldots \\ \hline 349 \text{ ft} \end{array}$$

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

Question 32

32 A drone is used to measure the size of a brush fire on the ground. Segment *AB* represents the width of the fire, as shown below. The drone calculates the distance to point *B* to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point *A* to be 774 feet at an angle of depression of 36°.



$\sin 65 = \frac{x}{1076}$

$x = 975.1871$

$\underline{-454.9457}$

520.2414

Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

$\cos \cancel{65}\,54 = \frac{y}{774}$

$y = 454.9457$

$\boxed{AB = 520 \text{ ft}}$

Score 3: The student used an incorrect trigonometric equation to determine the horizontal length to *A*, but found an appropriate answer.

Question 32

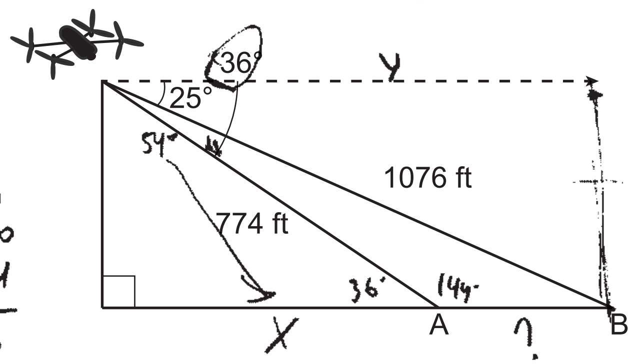
32 A drone is used to measure the size of a brush fire on the ground. Segment *AB* represents the width of the fire, as shown below. The drone calculates the distance to point *B* to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point *A* to be 774 feet at an angle of depression of 36°.

975.18

$\begin{array}{r} 180 \\ -36 \\ \hline 144 \end{array}$

$\begin{array}{r} 90° \\ -36° \\ \hline 54 \end{array}$

$\begin{array}{r} 180 \\ 144 \\ \hline 36 \end{array}$



Soh $= \frac{opp}{hyp}$

Cah $= \frac{adj}{hyp}$

toa $= \frac{opp}{adj}$

Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

$\sin(54°) = \frac{x}{774}$

$0.81 = \frac{x}{774}$

$x = 626.44$

$\begin{array}{r} 975.19 \\ -626.94 \\ \hline 348.25 \end{array}$

$\boxed{AB = 348}$

~~sin(25)=~~

$\cos(25) = \frac{y}{1076}$

$y = 975.19$

Score 3: The student made a rounding error in determining the sin 54°.

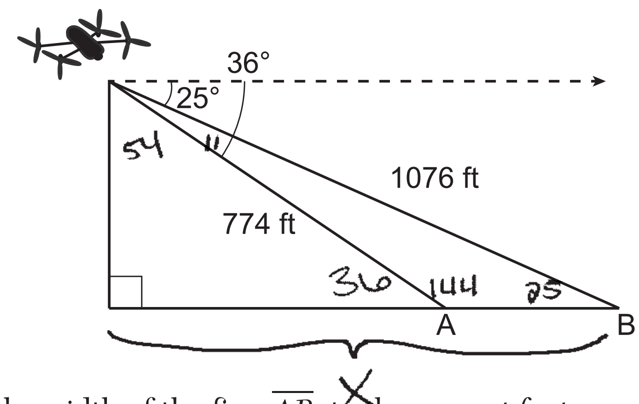
Question 32

32 A drone is used to measure the size of a brush fire on the ground. Segment AB represents the width of the fire, as shown below. The drone calculates the distance to point B to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point A to be 774 feet at an angle of depression of 36°.

$180 - 126 = 54$

$90 + 36 = 126$

$180 - 36 = 144$



Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

$$\frac{\cos(25)}{1} = \frac{x}{1076}$$

$$\cos(25)(1076) = x$$

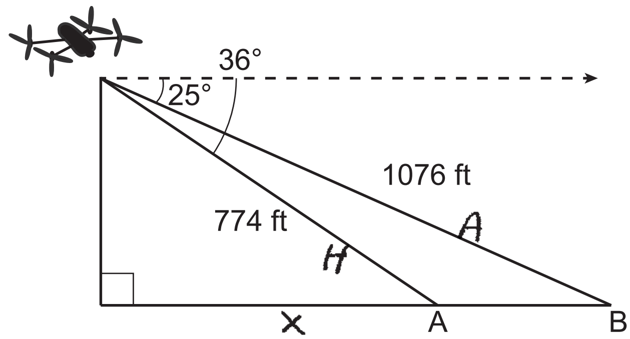
975ft

Score 2: The student correctly determined the horizontal distance to B.

Question 32

32 A drone is used to measure the size of a brush fire on the ground. Segment AB represents the width of the fire, as shown below. The drone calculates the distance to point B to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point A to be 774 feet at an angle of depression of 36°.

$S\frac{O}{H}\ C\frac{A}{H}\ T\frac{O}{A}$



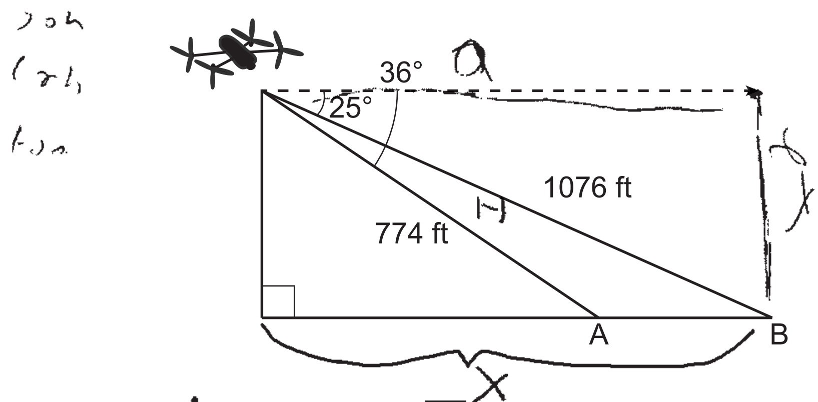
Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

$x = \cos(36)\cdot 774 = \boxed{626\text{ ft}}$

Score 2: The student correctly determined the horizontal distance to A.

Question 32

32 A drone is used to measure the size of a brush fire on the ground. Segment *AB* represents the width of the fire, as shown below. The drone calculates the distance to point *B* to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point *A* to be 774 feet at an angle of depression of 36°.



Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

$\cos(25) = \frac{x}{1076}$

$x = 975.187$

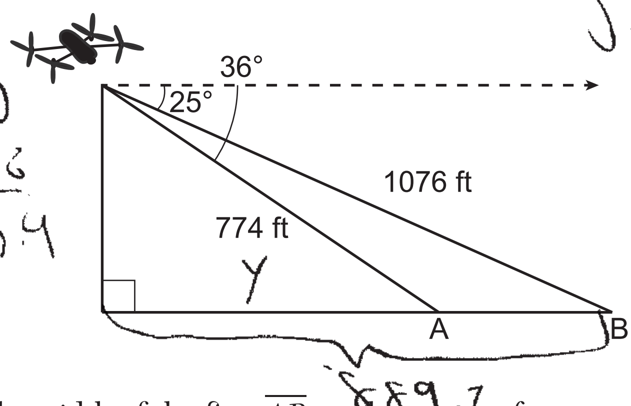
Score 2: The student correctly determined the horizontal distance to *B*.

Question 32

32 A drone is used to measure the size of a brush fire on the ground. Segment *AB* represents the width of the fire, as shown below. The drone calculates the distance to point *B* to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point *A* to be 774 feet at an angle of depression of 36°.

SohCahToa

$$\begin{array}{r} 76 \\ -25 \\ \hline 11 \end{array} \qquad \begin{array}{r} 90 \\ -36 \\ \hline 54 \end{array}$$



Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

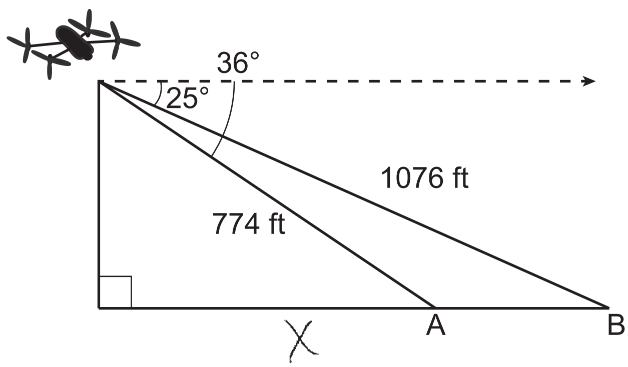
$$\frac{\sin(54)}{1} = \frac{Y}{774}$$

$$Y = 774\sin(54).$$

Score 1: The student wrote one correct relevant trigonometric equation.

Question 32

32 A drone is used to measure the size of a brush fire on the ground. Segment *AB* represents the width of the fire, as shown below. The drone calculates the distance to point *B* to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point *A* to be 774 feet at an angle of depression of 36°.



Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

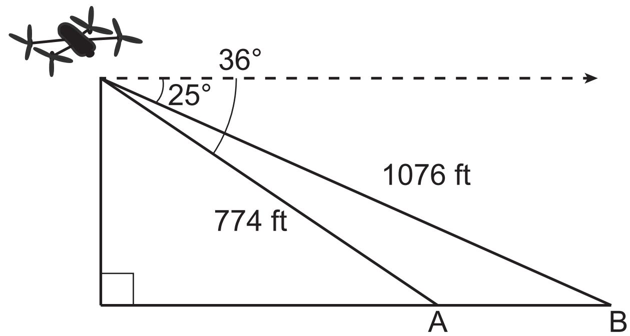
$C\frac{a}{H}$ $\quad \frac{\cos 90}{1} \frac{x}{1076}$

$x =$

Score 0: The student did not show enough course-level work to receive any credit.

Question 32

32 A drone is used to measure the size of a brush fire on the ground. Segment *AB* represents the width of the fire, as shown below. The drone calculates the distance to point *B* to be 1076 feet at an angle of depression of 25°. At the same point, the drone calculates the distance to point *A* to be 774 feet at an angle of depression of 36°.



Determine and state the width of the fire, $\overline{AB}$, to the *nearest foot*.

$$1076^2 - 774^2 = \overline{AB}^2$$

$$\sqrt{558700} = \overline{AB}^2$$

$$\overline{AB} = 747 \text{ ft}$$

Score 0: The student did not show enough course-level work to receive any credit.

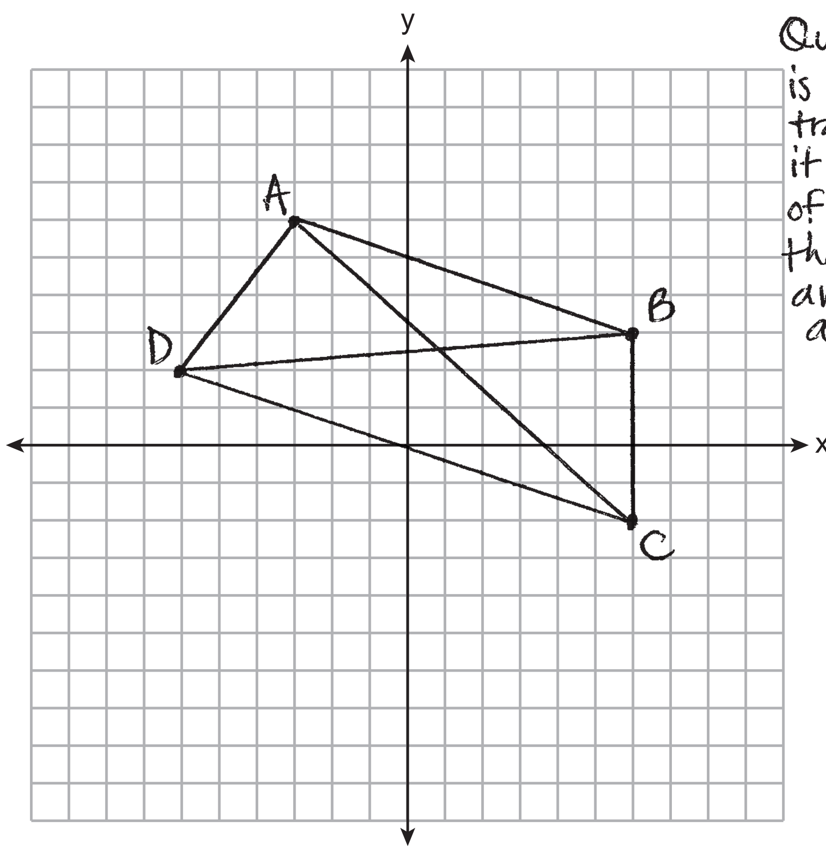
33 Quadrilateral *ABCD* has vertices with coordinates $A(-3,6)$, $B(6,3)$, $C(6,-2)$, and $D(-6,2)$.

Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove *ABCD* is an isosceles trapezoid.

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

$$\left.\begin{array}{l} m_{\overline{AB}} = \frac{3-6}{6-(-3)} = \frac{-3}{9} = -\frac{1}{3} \\ m_{\overline{CD}} = \frac{2-(-2)}{-6-6} = \frac{4}{-12} = -\frac{1}{3} \end{array}\right\} m_{\overline{AB}} = m_{\overline{CD}} \rightarrow \overline{AB} \parallel \overline{CD}$$

$$\left.\begin{array}{l} AC = \sqrt{(6-(-3))^2+(-2-6)^2} = \sqrt{81+64} = \sqrt{145} \\ BD = \sqrt{(-6-6)^2+(2-3)^2} = \sqrt{144+1} = \sqrt{145} \end{array}\right\} \rightarrow AC = BD \rightarrow \overline{AC} \cong \overline{BD}$$



Quadrilateral ABCD is an isosceles trapezoid because it has one pair of opposite sides that are parallel and its diagonals are congruent.

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

Question 33

33 Quadrilateral $ABCD$ has vertices with coordinates $A(-3,6)$, $B(6,3)$, $C(6,-2)$, and $D(-6,2)$.

Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove $ABCD$ is an isosceles trapezoid.

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

$m = \dfrac{\Delta y}{\Delta x}$

$m\overline{AB} = -\dfrac{3}{9} = -\dfrac{1}{3}$

$m\overline{CD} = -\dfrac{4}{12} = -\dfrac{1}{3}$

same slope $\overline{AB} \parallel \overline{CD}$

One pair of opp. sides are $\parallel$.

$\therefore$ ABCD is a trapezoid

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

$8^2 + 9^2 = c^2$ $\quad$ $1^2 + 12^2 = c^2$

$145 = c^2$ $\quad$ $145 = c^2$

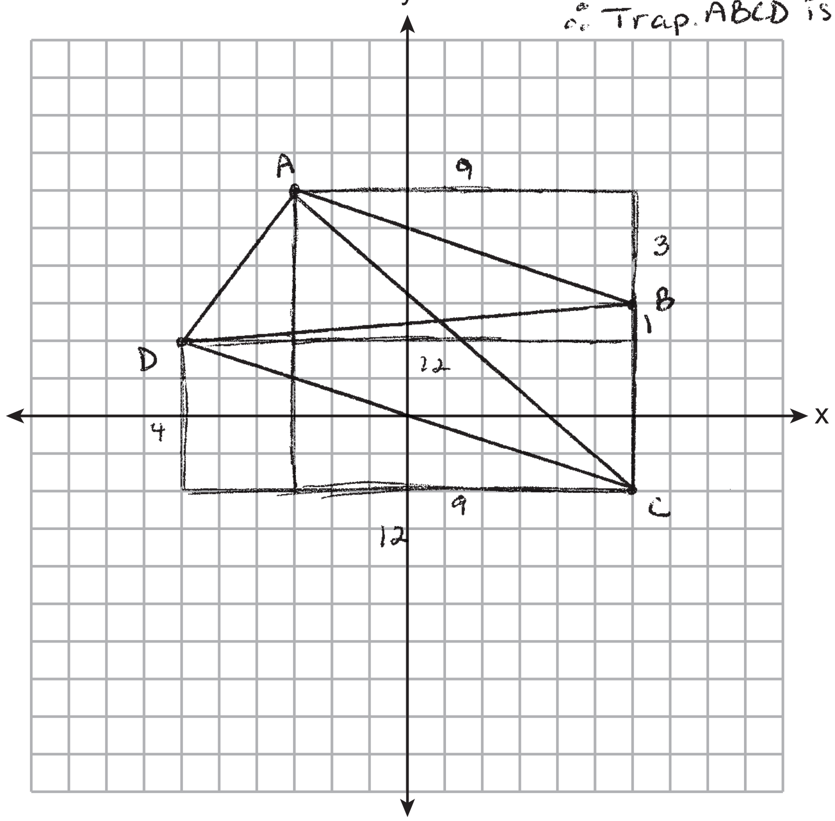
$c = \sqrt{145}$ $\quad$ $c = \sqrt{145}$

$AC = \sqrt{145}$ $\quad$ $BD = \sqrt{145}$

$\overline{AC} \cong \overline{BD}$

Diagonals are $\cong$

$\therefore$ Trap. ABCD is an isosceles trapezoid



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

Question 33

33 Quadrilateral *ABCD* has vertices with coordinates $A(-3,6)$, $B(6,3)$, $C(6,-2)$, and $D(-6,2)$.

Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove *ABCD* is an isosceles trapezoid.

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

ABCD is a trapezoid because it has parallel bases, each having a slope of $-\frac{1}{3}$. ABCD is an isosceles trapezoid because both diagonals are congruent This was found using the distance formula, and it was concluded each diagonal is $\sqrt{145}$ long, meaning they are congruent.

$\overline{AC}$ $d=\sqrt{(6-6)^2+(2-3)^2}$

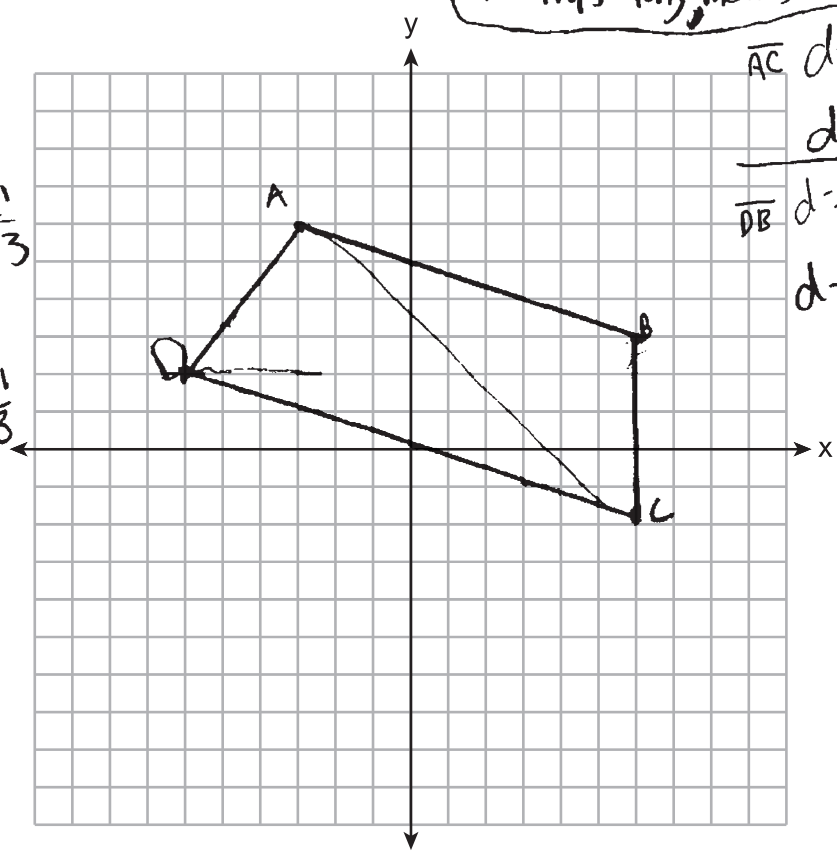
$d=\sqrt{145}$

$\overline{DB}$ $d=\sqrt{(6+3)^2+(-2-6)^2}$

$d=\sqrt{145}$

$M_{\overline{AB}}\ \frac{3-6}{6+3}=-\frac{1}{3}$

$M_{\overline{DC}}\ \frac{2+2}{-6-6}=-\frac{1}{3}$



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

Question 33

33 Quadrilateral *ABCD* has vertices with coordinates *A*(−3,6), *B*(6,3), *C*(6,−2), and *D*(−6,2).

Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove *ABCD* is an isosceles trapezoid.

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

$D_1 = \sqrt{(6-(-2))^2 + (-3-6)^2}$

$D_1 = \sqrt{(8)^2 + (-9)^2}$

$D_1 = \sqrt{64+81}$

$D_1 = \sqrt{145}$

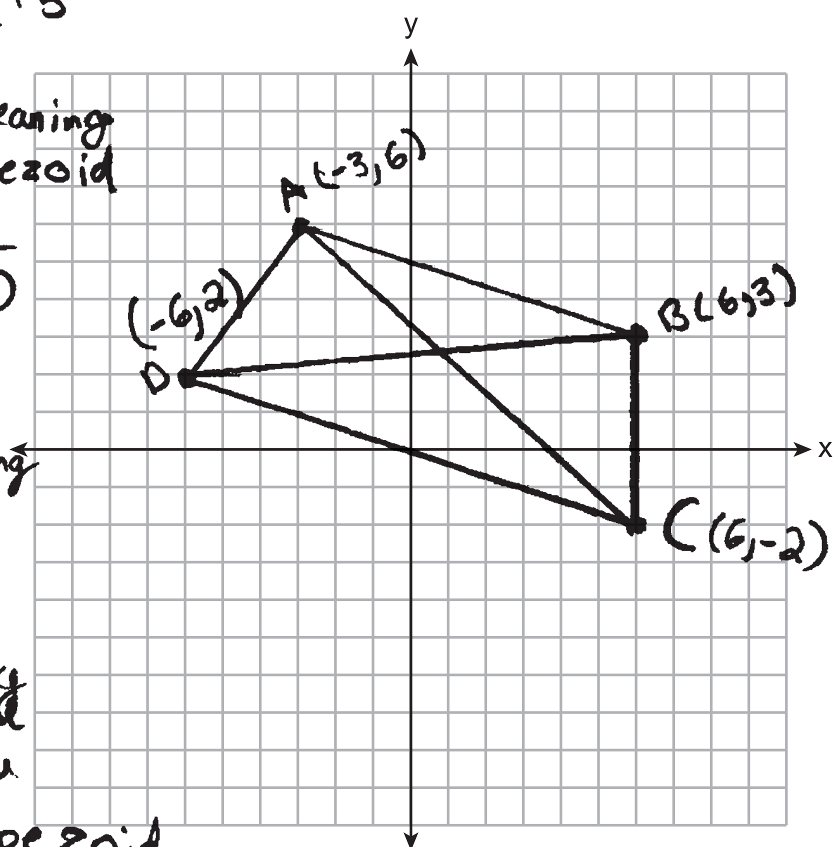
$D_2 = \sqrt{(3-(2))^2 + (6-(-6))^2}$

$D_2 = \sqrt{(1)^2 + (-12)^2}$

$D_2 = \sqrt{1+144}$

$D_2 = \sqrt{145}$

$\overline{AB}$ and $\overline{CD}$ are parallel meaning ABCD is a trapezoid Diagonals $\overline{AC}$ and $\overline{BD}$ both equal $\sqrt{145}$ meaning they are Congruent and meaning Quadrelateral ABCD is a isosceles trapezoid



$\frac{6-3}{-3-6} = \frac{3}{-9} = -\frac{1}{3}$

$\overline{AB}$

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

$\overline{CD}$

$\frac{2-(-2)}{-6-6} = \frac{4}{-12} = -\frac{1}{3}$

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

Score 3: The student did not write a concluding statement when proving $\overline{AB} \parallel \overline{DC}$.

Question 33

33 Quadrilateral *ABCD* has vertices with coordinates $A(-3,6)$, $B(6,3)$, $C(6,-2)$, and $D(-6,2)$.

Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove *ABCD* is an isosceles trapezoid.

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

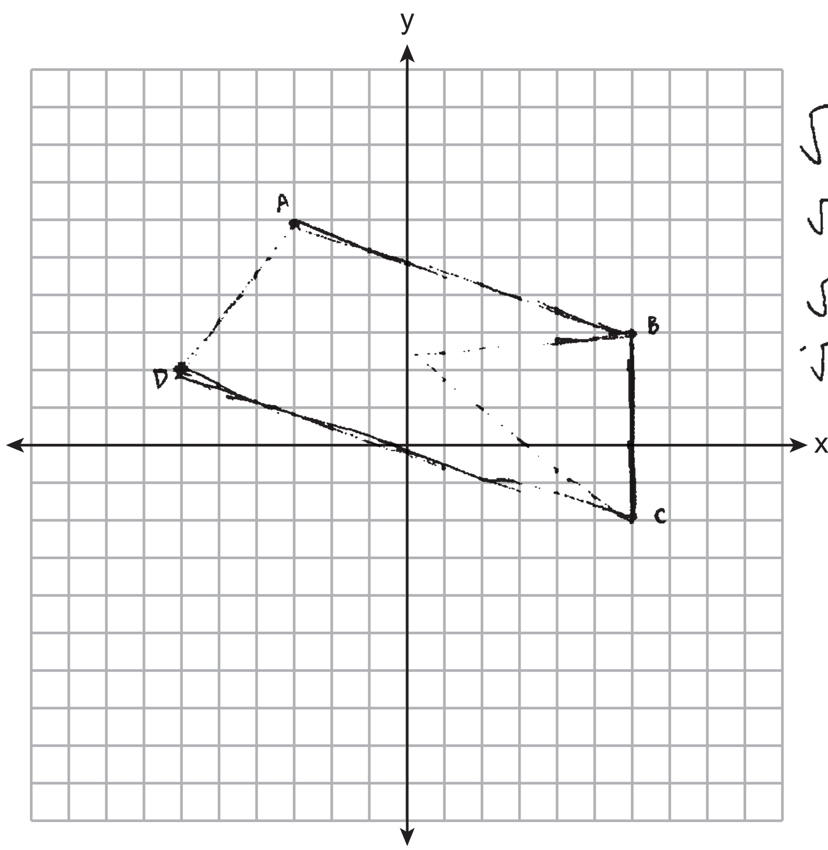
A trapezoid has 1 pair of $\parallel$ sides.

The slope of $\overline{AB}$ + $\overline{DC}$ are the same, and thus they're parallel.

Both diagonals have a length of $\sqrt{145}$. This matches Joe's definition of an isosceles trapezoid

$\frac{2-{-2}}{-6-6} = \frac{2+2}{-12} = \frac{4}{-12} = -3$ m $\overline{DC}$

$\frac{6-3}{-3-6} = \frac{3}{-9} = -3$ m $\overline{AB}$



$\sqrt{(6+6)^2+(3-2)^2}$

$\sqrt{145}$ = DB

$\sqrt{(-3-6)^2+(6+2)^2}$

$\sqrt{145}$ = AC

Score 3: The student made a computational error when determining the slopes of $\overline{AB}$ and $\overline{DC}$.

Question 33

33 Quadrilateral $ABCD$ has vertices with coordinates $A(-3,6)$, $B(6,3)$, $C(6,-2)$, and $D(-6,2)$.

Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove $ABCD$ is an isosceles trapezoid.

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

Slope:

$\overline{AB}$: $\frac{3-6}{6+3} = \frac{-3}{9} = -1/3$ > parallel

$\overline{DC}$: $\frac{-2-2}{6+6} = \frac{-4}{12} = -1/3$

Distance:

BC: $\sqrt{(6-6)^2 + (-2-3)^2} = \sqrt{0+25} = 5$

DA: $\sqrt{(-3+6)^2 + (6-2)^2} = \sqrt{9+16} = 5$

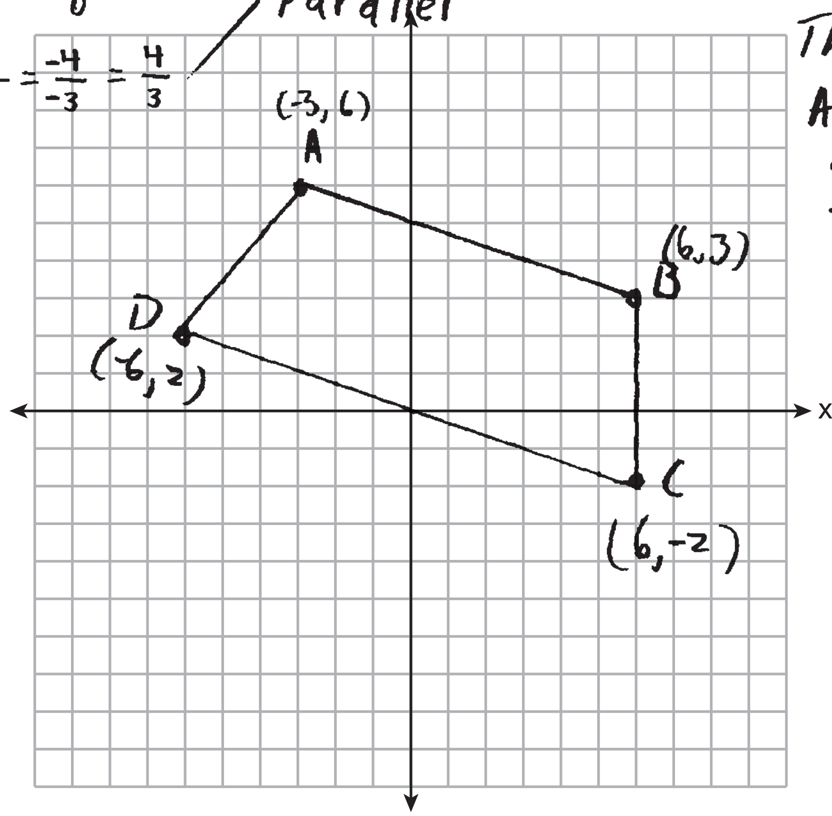
$\overline{BC}$ $\frac{-2-3}{6-6} = \frac{-5}{0}$

$\overline{AD}$ $\frac{2-6}{-6-3} = \frac{-4}{-3} = \frac{4}{3}$

not parallel

ABCD has at least one pair of parallel sides, $\overline{AB}$ and $\overline{DC}$, thus it is a trapezoid. ABCD also has only one pair of not parallel congruent sides.

Thus, all in all, ABCD is an isosceles Trapezoid



Score 3: The student proved trapezoid $ABCD$ was isosceles using a method other than congruent diagonals.

Question 33

33 Quadrilateral *ABCD* has vertices with coordinates $A(-3,6)$, $B(6,3)$, $C(6,-2)$, and $D(-6,2)$.

Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove *ABCD* is an isosceles trapezoid.

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

Top and bottom //

slope $= \frac{y_2 - y_1}{x_2 - x_1}$

$\overline{AB} = \frac{3-6}{6+3}$

$\overline{AB} = \frac{-1}{3}$

$\overline{AB} \parallel \overline{CD}$

$\overline{CD} = \frac{2--2}{-6-6}$

$\overline{CD} = \frac{-1}{3}$

congruent sides

$\overline{AD} = \sqrt{(-3+6)^2 + (6-2)^2}$

$\overline{AD} = \sqrt{(3)^2 + (4)^2}$

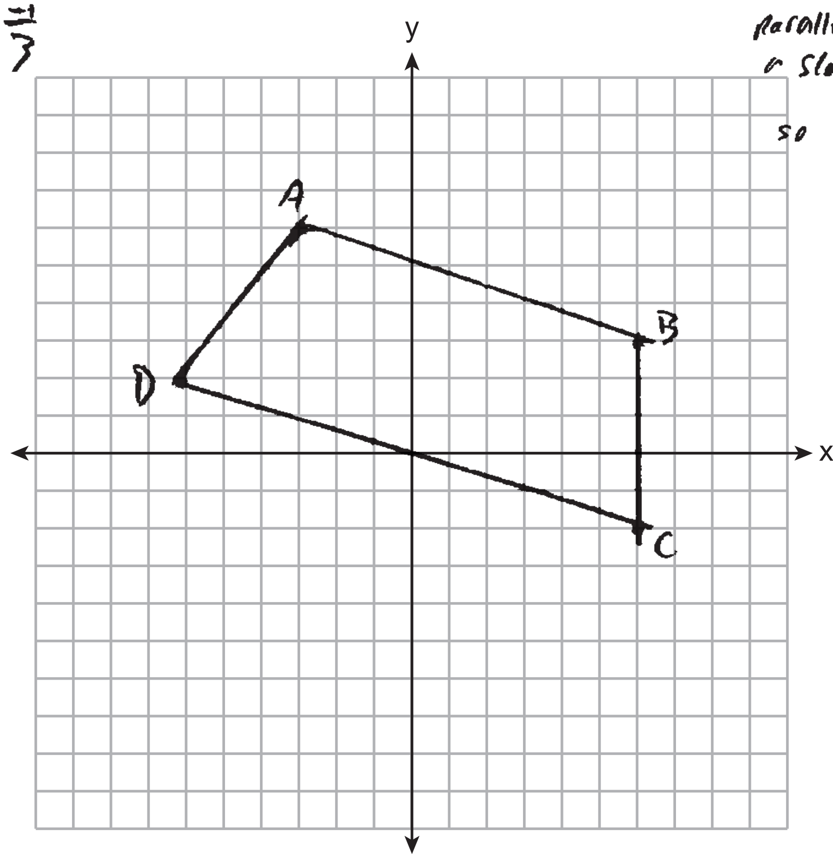
$\overline{AD} = 5$

$\overline{BC} = \sqrt{(6-6)^2 + (3+2)^2}$

$\overline{BC} = \sqrt{(0)^2 + (5)^2}$

$\overline{BC} = 5$

Using the slope formula, I found that quadrilateral ABCD has 1 pair of parallel sides with a slope of $\frac{-1}{3}$ so its a trapezoid



Score 2: The student proved *ABCD* was a trapezoid. The student used a method other than congruent diagonals to prove *ABCD* was isosceles, but the student did not prove $\overline{AD}$ is not parallel to $\overline{BC}$ and is missing a concluding statement.

Question 33

33 Quadrilateral *ABCD* has vertices with coordinates $A(-3,6)$, $B(6,3)$, $C(6,-2)$, and $D(-6,2)$.

Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove *ABCD* is an isosceles trapezoid.

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

AC:

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

$d=\sqrt{(6-3)^2+(-2-6)^2}$

$d=\sqrt{(9)^2+(-8)^2}$

$d=\sqrt{81+64}$

$d=\sqrt{145}$

BD:

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

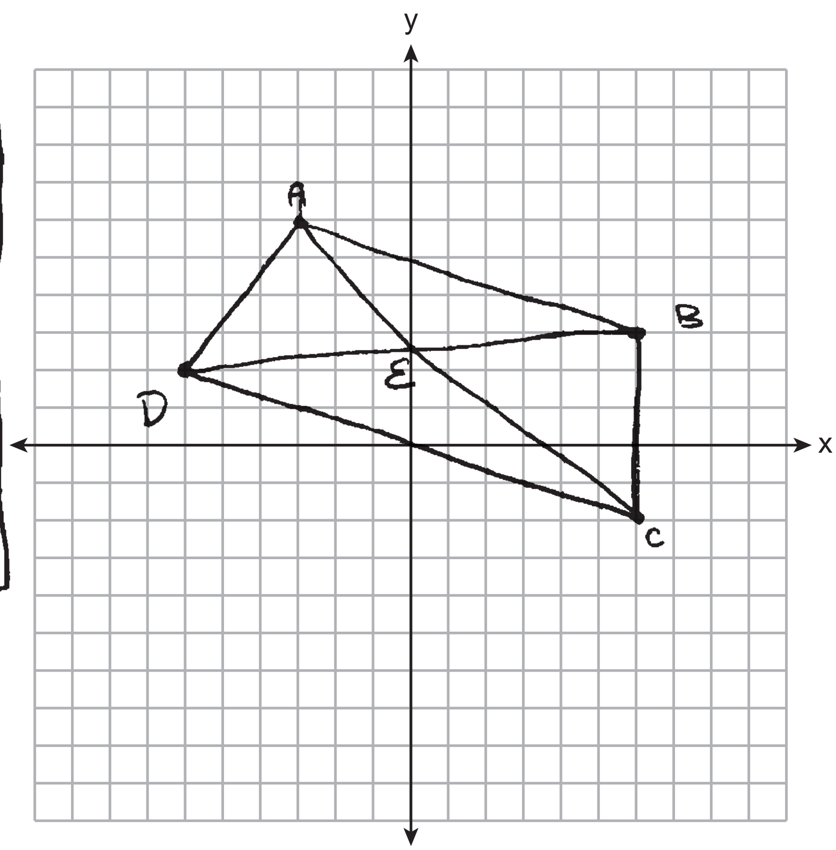
$d=\sqrt{(-6-6)^2+(2-3)^2}$

$d=\sqrt{(-12)^2+(-1)^2}$

$d=\sqrt{144+1}$

$d=\sqrt{145}$

Using Joe's definition, then ABCD is an isosceles trapezoid because of congruent diagnols



Score 2: The student proved $\overline{AC} \cong \overline{BD}$, but did not prove *ABCD* was a trapezoid.

Question 33

33 Quadrilateral *ABCD* has vertices with coordinates $A(-3,6)$, $B(6,3)$, $C(6,-2)$, and $D(-6,2)$.

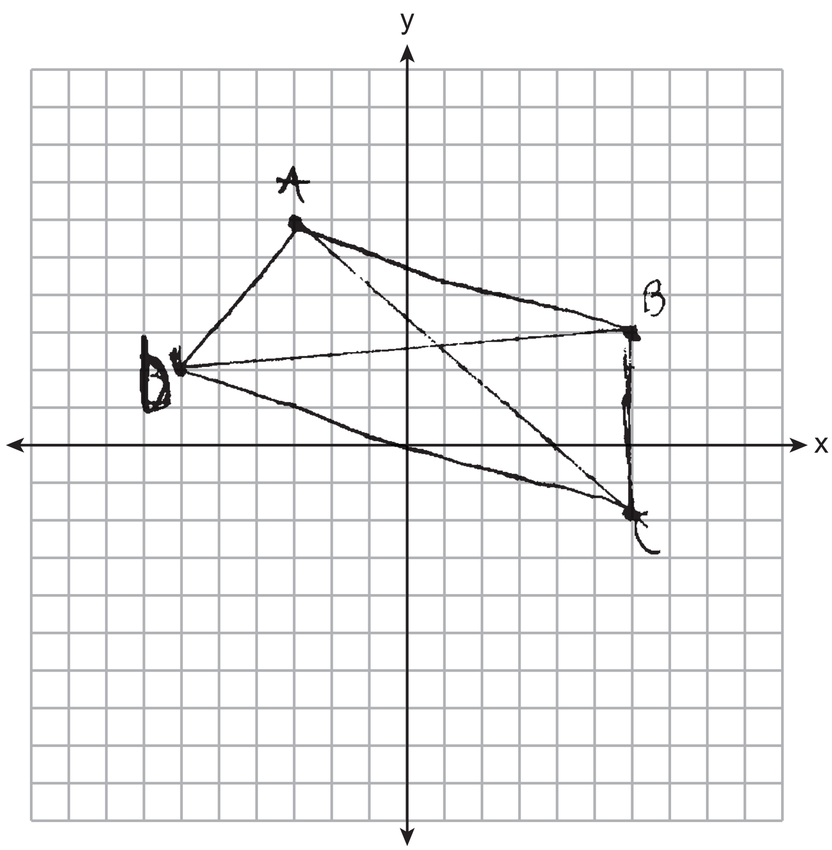
Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove *ABCD* is an isosceles trapezoid.

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

$AC\ \sqrt{(6--3)^2+(-2-6)^2}=\sqrt{145}$

$BD\ \sqrt{(-6-6)^2+(2-3)^2}=\sqrt{145}$

Diaganols are congruent



Score 1: The student correctly determined the length of the diagonals.

Question 33

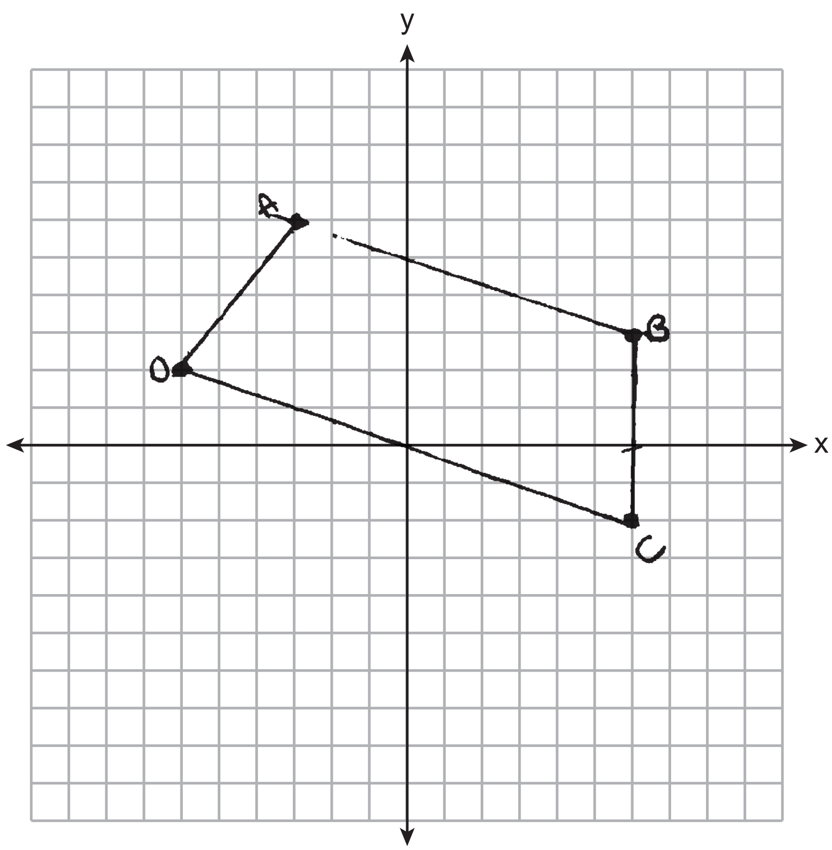
33 Quadrilateral *ABCD* has vertices with coordinates $A(-3,6)$, $B(6,3)$, $C(6,-2)$, and $D(-6,2)$.

Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove *ABCD* is an isosceles trapezoid.

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

$AC = d = \sqrt{(-3-6)^2+(6+2)^2} = \sqrt{(-9)^2+(8)^2} = \sqrt{81+72} = \sqrt{153}$

$BD = d = \sqrt{(6+6)^2+(3-2)^2} = \sqrt{(12)^2+(1)^2} = \sqrt{144+1} = \sqrt{145}$



Score 0: The student did not show enough correct relevant course-level work to receive any credit.

Question 33

33 Quadrilateral *ABCD* has vertices with coordinates *A*(−3,6), *B*(6,3), *C*(6,−2), and *D*(−6,2).

Joe defines an isosceles trapezoid as a trapezoid with congruent diagonals. Use Joe's definition to prove *ABCD* is an isosceles trapezoid.

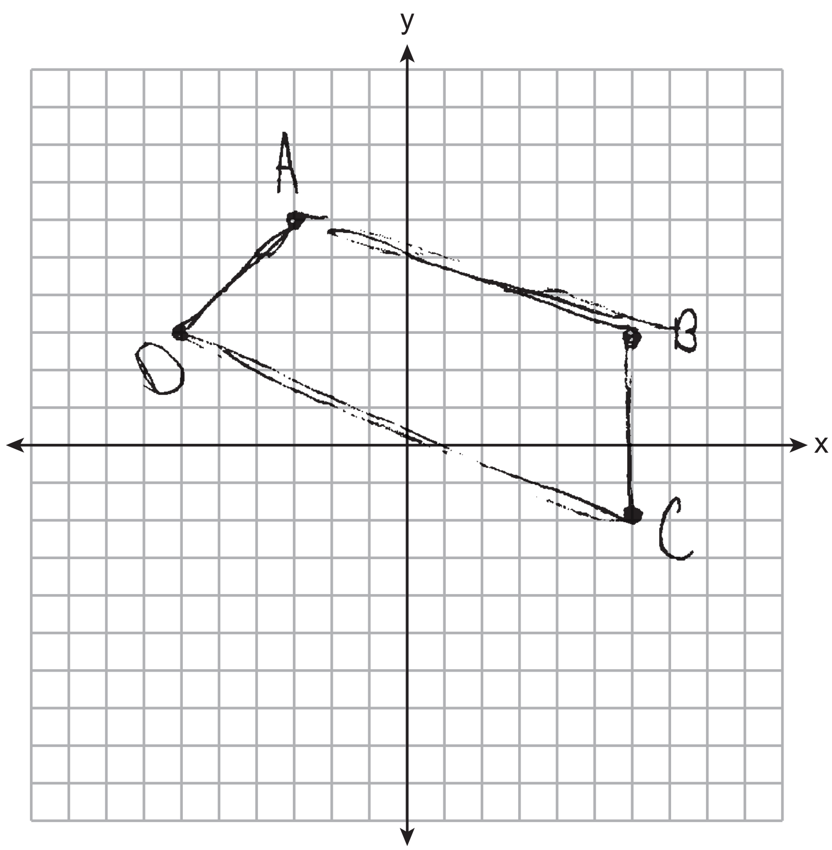
[The use of the set of axes below is optional.]

DA $= \frac{2-6}{-6--3} = \frac{-4}{-3} = \frac{4}{3}$

AB $\frac{3-3}{6-6} = \frac{6}{0} = 6$

BC $= \frac{-2-3}{6-6} = \frac{-5}{0} = -5$

CD $= \frac{2--2}{-6-6} = \frac{4}{-12} = \frac{4}{12} = \frac{2}{6} = 3$



Score 0: The student did not show enough correct relevant course-level work to receive any credit.

Question 34

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

$V_{sphere} = \frac{4}{3}\pi(2.5)^3$

$V_{sphere} = 65.4498 \text{ in}^3$

$65.4498 \text{ in}^3 \cdot 6 = 392.6990 \text{ in}^3$

$\frac{392.6990 \text{ in}^3}{1} \cdot \frac{1\text{ft}}{12\text{in}} \cdot \frac{1\text{ft}}{12\text{in}} \cdot \frac{1\text{ft}}{12\text{in}} \cdot \frac{68 \text{ lbs}}{1\text{ft}^3} =$

$\frac{26703.532}{1728} = 15.4534 \approx \boxed{15 \text{ lbs}}$

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

Question 34

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

25

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

$\frac{2.5}{12} = .208\bar{3}$

$V = \frac{4}{3}\pi .208\bar{3}^3$

$V = 0.0378760688$

$V \cdot 68 = 2.575572678$

$2.575572678 \cdot 6$

15.45343609

≈ 15

To the nearest pound, The total weight of six decorations is 15 pounds.

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

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

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

$V = \frac{4}{3}\pi (2.5)^3$

$V = \frac{4}{3}\pi (15.625)$

$V = 20.\cancel{8}5\ \pi$

$V = 65.44984694\ldots$

$65.44984694\ldots \cdot 6 = 392.6990816$

$\frac{392.6990816}{12} = 32.72492347$

$32.72492347 \cdot 68 = 2225.294796 \approx \boxed{2225 \text{ lbs}}$

Score 3: The student made an error converting cubic inches to cubic feet.

Question 34

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

The formula to find the volume of a sphere is $V=\frac{4}{3}\pi r^3$. The radius is 2.5 inches.

$$V=\frac{4}{3}\pi(2.5)^3$$

$$V=\frac{4}{3}\pi(39.0625)$$

$$V=52.0833\pi$$

$$V=163.625$$

The volume is 163.625 cubic inches. Since there are 1728 cubic inches in a cubic foot, and $\frac{163.625}{1728}$ is 0.0947, a decoration is 0.0947 cubic feet, and $0.0947*6=0.5682$, thus making 6 decorations 0.5682 cubic feet. Since every cubic foot is 68 pounds, and $0.5682\times 68=38.63$, which rounds to 39, the weight of 6 decorations is $\boxed{39 \text{ pounds}}$

Score 3: The student made a computational error when determining the volume of one sphere.

Question 34

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

$\frac{4}{3}\pi 2.5^3 = 65.449$

$\times\ 6$

392.699

$\times\ 68$

26704 Lbs

Score 3: The student made an error by not converting to cubic feet.

Question 34

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

$r = 2.5$ $\quad$ $68 \text{ lbs}/ft^3$ $\quad$ $V = \frac{4}{3}\pi r^3$

$\cancel{V = \frac{4}{3}\pi 2.5^3 = 65.4498}$

$\cancel{65.4498 \cdot 68 =}$

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

$\cancel{V = \frac{4}{3}\pi}$ $\quad$ $\cancel{V \neq}$

$\cancel{65.4498 = \frac{4}{3}\pi 68^3}$

$V = \frac{4}{3}\pi 2.5^3(6) = 392.6990$

$392.6990 * 68 = \boxed{26703}$

Score 2: The student did not convert to cubic feet and made a rounding error when determining the weight.

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

$$V = \frac{4}{3}\pi(2.5)^2$$

$$V = 26.17993878 \text{ in}^3 \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot$$

$$V = 2.181661565 \text{ ft}^3$$

$$\times 6$$

$$13.08996939 \text{ ft}^3 \cdot \frac{68 \text{ lb}}{\text{ft}^3}$$

$$890.1179185$$

890 Lbs

Score 2: The student made an error by squaring the radius and made an error converting cubic inches to cubic feet.

Question 34

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

$$v = \frac{4}{3}\pi 2.5^3$$

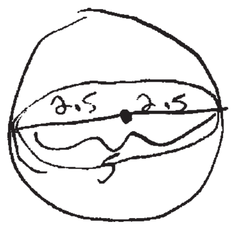
$$v = 65.44$$

Score 1: The student correctly determined the volume of one sphere in cubic inches.

Question 34

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.



$V = \frac{4}{3}\pi r^{2}$

$V = \frac{4}{3}\pi(2.5)^{3}$

65.4498

65

Score 1: The student correctly determined the volume of one sphere in cubic inches.

Question 34

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

$2.5 \cdot 6 = 9$ $\qquad \frac{9}{12} = .75$

$68 \cdot .75 = 51$

$51 \cdot 6 = 306$

$\boxed{306 \text{ lbs}}$

Score 0: The student did not show enough correct relevant work to receive any credit.

Question 34

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

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

$\frac{4}{3}\pi(2.5)^3$

$V = 5\text{ ft}$

Score 0: The student did not show enough correct relevant work to receive any credit.

Question 34

34 Ali made six solid spherical decorations out of modeling clay. Each decoration has a radius of 2.5 inches. The weight of clay is 68 pounds per cubic foot.

Determine and state, to the *nearest pound*, the total weight of the six decorations.

$V = 4/3 \pi r^2$

$V = 4/3 \pi (2.5)^2$

$V = 4/3 \pi (6.25)$

$V = 26.17993878$

$$\begin{array}{r} 26.17993878 \\ \times \quad 8 \\ \hline 209.4395102 \end{array}$$

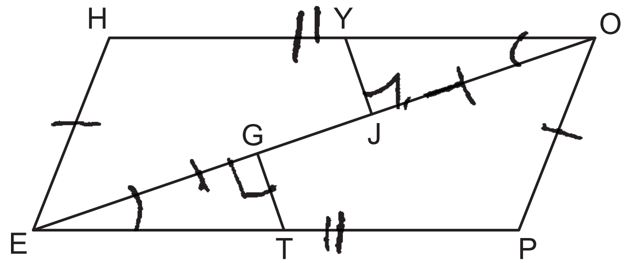
$68 \overline{)209.4395102}$

≈ 3 lbs

Score 0: The student did not show enough correct relevant work to receive any credit.

Question 35

35 In quadrilateral *HOPE* below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and J, respectively.



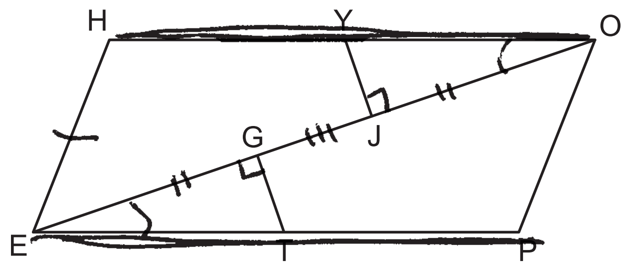
Prove that $\overline{TG} \cong \overline{YJ}$.

STATEMENT	REASON
QUAD HOPE ① $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$	① GIVEN
② HOPE IS A PARALLELOGRAM	② IN A QUAD IF BOTH PAIRS OF OPPOSITE SIDES ARE CONGRUENT THEN ITS A PARALLOGRAM
③ $\overline{HO} \parallel \overline{PE}$	③ OPP. SIDES OF A PARALLELOGRAM ARE PARALLEL
④ $\angle YOJ \cong \angle GET$	④ PARALLEL LINES CUT BY A TRANSVERSAL FORM CONGRUENT ALTERNATE INTERIOR ANGLES
⑤ $\overline{EJ} \cong \overline{OG}$	⑤ GIVEN
⑥ $\overline{GJ} \cong \overline{GJ}$	⑥ REFLEXIVE
⑦ $\overline{EG} \cong \overline{OJ}$	⑦ SUBTRACTION POSTULATE
⑧ $\overline{TG}$ & $\overline{YJ}$ ARE PERPENDICULAR TO $\overline{EO}$	⑧ GIVEN
⑨ $\angle EGT$ & $\angle YJO$ ARE RT ∠'S	⑨ PERPENDICULAR LINES FORM RIGHT ANGLES
⑩ $\angle EGT \cong \angle YJO$	⑩ RIGHT ANGLES ARE CONGRUENT
⑪ $\triangle EGT \cong \triangle OJY$	⑪ ASA
⑫ $\overline{TG} \cong \overline{YJ}$	⑫ CPCTC

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

Question 35

35 In quadrilateral $HOPE$ below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and J, respectively.



Prove that $\overline{TG} \cong \overline{YJ}$.

$\boxed{\overline{EH} \cong \overline{OP},\ \overline{EP} \cong \overline{OH}}$ Given

$\boxed{\overline{EO} \cong \overline{OE}}$ Reflexive

$\rightarrow \boxed{\triangle EHO \cong \triangle OPE}$ SSS $\cong$

$\rightarrow \boxed{\angle HOE \cong \angle PEO}$ CPCTC

$\boxed{\overline{EJ} \cong \overline{OG}}$ Given

$\boxed{\overline{GJ} \cong \overline{JG}}$ Reflexive

$\rightarrow \boxed{\overline{EG} \cong \overline{OJ}}$ Subtraction

$\boxed{\overline{TG} + \overline{YJ} \text{ perpendicular to } \overline{EO} \text{ at } G + J}$ Given

$\rightarrow \boxed{\angle TGE \cong \angle YJO}$ Perpendicular Segments form congruent right angles

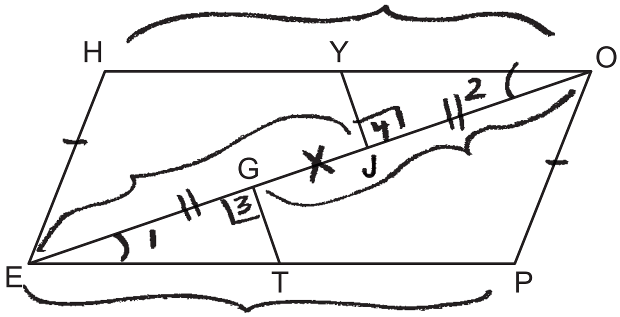
$\rightarrow \boxed{\triangle GET \cong \triangle JOY}$ ASA $\cong$

$\rightarrow \boxed{\overline{TG} \cong \overline{YJ}}$ CPCTC

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

Question 35

35 In quadrilateral $HOPE$ below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and J, respectively.



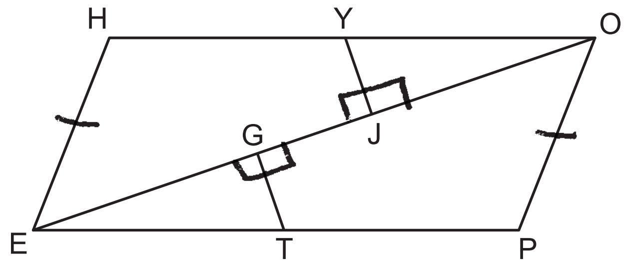
Prove that $\overline{TG} \cong \overline{YJ}$.

Statement	Reason
1. Quad Hope, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, $\overline{TG}$ and $\overline{YJ}$ are $\perp$ to $\overline{EO}$ at G and J	1 GIVEN
2. Quad. Hope is a parallelogram.	2 If both pairs of opp. sides of a quad are $\cong$, then it's a parallelogram.
3. $\angle 1 \cong \angle 2$	3 If 2 ∥ lines are cut by a transversal, the alt. int. $\angle$s are $\cong$
4. $\angle 3$ and $\angle 4$ are rt $\angle$s	4 $\perp$ lines form rt $\angle$s.
5. $\angle 3 \cong \angle 4$	5. rt $\angle$s are $\cong$.
6. $\overline{GJ} \cong \overline{GJ}$	6. Reflexive Postulate
7. $\overline{EG} \cong \overline{OJ}$	7. subtraction Postulate
8. $\triangle EGT \cong \triangle OJY$	8. ASA $\cong$ ASA
9. $\overline{TG} \cong \overline{YJ}$	9. CPCTC

Score 5: The student did not prove $\overline{HO} \parallel \overline{EP}$ to prove step 3.

Question 35

35 In quadrilateral *HOPE* below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and *J*, respectively.



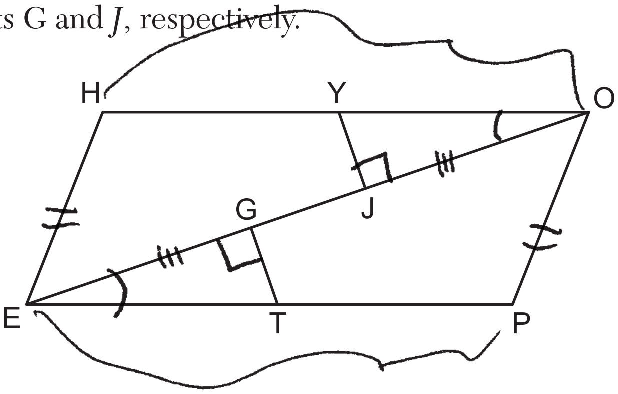
Prove that $\overline{TG} \cong \overline{YJ}$.

S	R
① Quad. HOPE with $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, $\overline{TG} \perp \overline{EO}$, and $\overline{YJ} \perp \overline{EO}$	① Given
② Quad. HOPE is a ▱	② A quad. with two pairs of opp. sides ≅ is a ▱
③ $\overline{OH} \parallel \overline{EP}$	③ Opp. sides of a ▱ are ∥.
④ $\angle YOJ \cong \angle TEG$	④ ∥ lines → ≅ alt. int. ∠s
⑤ $\overline{EG} \cong \overline{OJ}$	⑤ Subtraction
⑥ $\angle YJO$ and $\angle TGE$ are rt. ∠s	⑥ Definition of ⊥ lines
⑦ $\angle YJO \cong \angle TGE$	⑦ All right ∠s are ≅
⑧ $\triangle YJO \cong \triangle TGE$	⑧ ASA Postulate
⑨ $\overline{TG} \cong \overline{YJ}$	⑨ CPCTC

Score 5: The student did not prove $\overline{GJ} \cong \overline{GJ}$ to prove step 5.

Question 35

35 In quadrilateral *HOPE* below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and *J*, respectively.



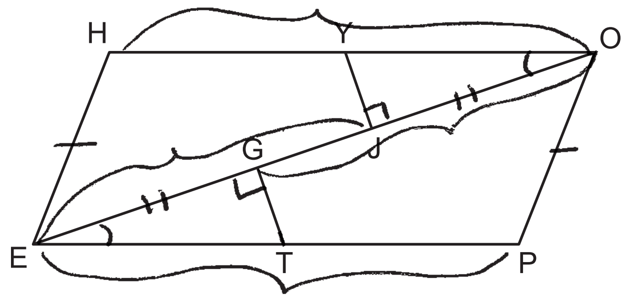
Prove that $\overline{TG} \cong \overline{YJ}$.

1. Quad HOPE, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, $\overline{TG}$ + $\overline{YJ}$ are perpendicular to $\overline{EO}$, at G and J	1. Given
2. $\overline{EO} \cong \overline{EO}$	2. Reflexive
3. $\triangle HEO \cong \triangle POE$	3. SSS ≅ SSS
4. $\angle YOJ \cong \angle TEG$	4. CPCTC
5. $\angle TGE \cong \angle YJO$	5. All right angles are ≅.
6. $\overline{EJ} - \overline{GJ} \cong \overline{OG} - \overline{GJ}$ or $\overline{EG} \cong \overline{JO}$	6. Subtraction
7. $\triangle EGT \cong \triangle OJY$	7. ASA ≅ ASA
8. $\overline{TG} \cong \overline{YJ}$	8. CPCTC

Score 4: The student did not prove $\angle TGE$ and $\angle YJO$ are right angles to prove step 5 and did not prove $\overline{GJ} \cong \overline{GJ}$ to prove step 6.

Question 35

35 In quadrilateral *HOPE* below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and *J*, respectively.



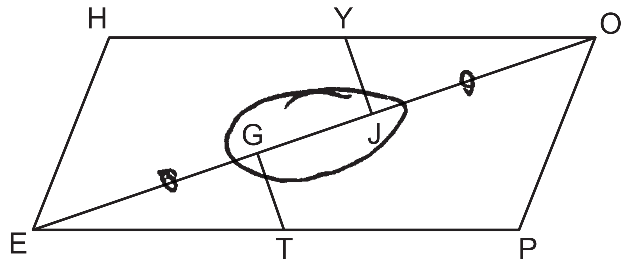
Prove that $\overline{TG} \cong \overline{YJ}$.

Statements	Reasons
① Quad HOPE, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$ and $\overline{TG}$ and $\overline{YJ}$ are $\perp$ to diagonal $\overline{EO}$ at G and J	① Given
② HOPE is a parallelogram	② When a Quad has 2 pairs of $\cong$ opp sides, it is a parallelogram
③ $\angle GET \cong \angle JOY$	③ Alternate interior $\angle$'s are $\cong$
④ $\overline{GJ} \cong \overline{GJ}$	④ Reflexive
⑤ $\overline{EG} \cong \overline{OJ}$	⑤ Subtraction Postulate
⑥ $\angle TGE$ and $\angle YJO$ are rt. $\angle$'s	⑥ Definition of $\perp$ lines
⑦ $\angle TGE \cong \angle YJO$	⑦ Rt. $\angle$'s are $\cong$
⑧ $\triangle TGE \cong \triangle YJO$	⑧ ASA
⑨ $\overline{TG} \cong \overline{YJ}$	⑨ CPCTC

Score 4: The student did not prove $\overline{EP} \parallel \overline{OH}$ to prove step 3 and wrote an incomplete reason in step 3.

Question 35

35 In quadrilateral *HOPE* below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and *J*, respectively.



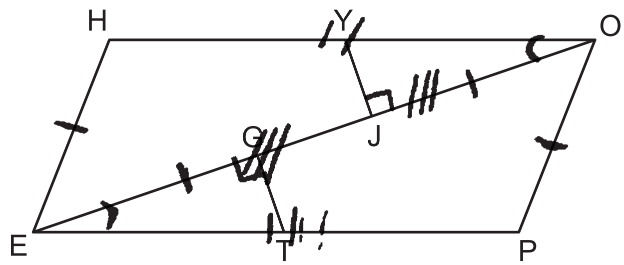
Prove that $\overline{TG} \cong \overline{YJ}$.

$\triangle EOP \cong \triangle OEH$ by SSS. So by CPCTC $\angle OEP \cong \angle EOH$.
Perpendicular lines form congruent right angles so $\angle TGE \cong \angle YJO$. By subtraction $\overline{OJ} \cong \overline{EG}$
Therefore by AAS $\triangle GET \cong \triangle JOY$ and
$\overline{TG} \cong \overline{YJ}$ by CPCTC

Score 3: The student did not prove $\overline{EO} \cong \overline{EO}$ to prove $\triangle EOP \cong \triangle OEH$, did not prove $\overline{GJ} \cong \overline{GJ}$ to prove $\overline{OJ} \cong \overline{EG}$, and had an incorrect reason to prove $\triangle GET \cong \triangle JOY$.

Question 35

35 In quadrilateral $HOPE$ below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and J, respectively.



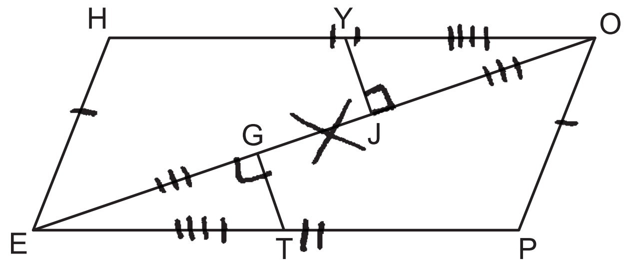
Prove that $\overline{TG} \cong \overline{YJ}$.

Statements	Reasons
1. $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$ $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and J perspectively.	1. Given
2. $\triangle EHO \cong \triangle EPO$	2. SSS $\cong$
3. $\overline{EG} \cong \overline{OJ}$	3. CPCTC
4. $\angle HOE \cong \angle PEO$	4. CPCTC
5. $\angle EGT$ and $\angle OJY$ are right angles	5. Perpendicular lines form right angles
6. $\angle EGT \cong \angle OJY$	6. All right angles are congruent
7. $\triangle EGT \cong \triangle OJY$	7. ASA $\cong$
8. $\overline{TG} \cong \overline{YJ}$	8. CPCTC

Score 3: The student did not prove $\overline{EO} \cong \overline{EO}$ to prove step 2. The student made a conceptual error in step 3.

Question 35

35 In quadrilateral *HOPE* below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and *J*, respectively.



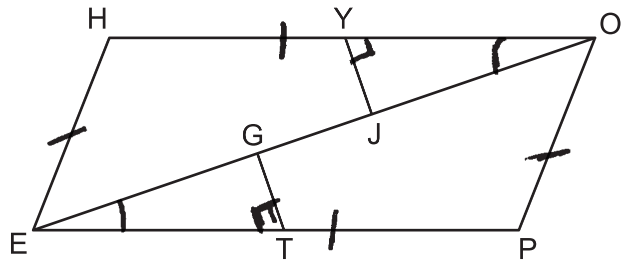
Prove that $\overline{TG} \cong \overline{YJ}$.

statement	Reason
1. $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, $\overline{TG}$ & $\overline{YJ} \perp$ to $\overline{EO}$	1. given
2. HOPE is a parallelogram	2. opposite sides
3. $\measuredangle G$ and $\measuredangle J$ are 90°	3. perpindicular lines
4. $\overline{EO} \cong \overline{EO}$	4. Reflexive property
5. $\triangle EHO \cong \triangle OPE$	5. SSS≅SSS
6. $\overline{EG} \cong \overline{OJ}$	6. given
7. $\triangle EGT \cong \triangle OJY$	7. SAS≅SAS
8. $\overline{TG} \cong \overline{YJ}$	8. CPCTC

Score 2: The student proved $\triangle EHO \cong \triangle OPE$.

Question 35

35 In quadrilateral *HOPE* below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and *J*, respectively.



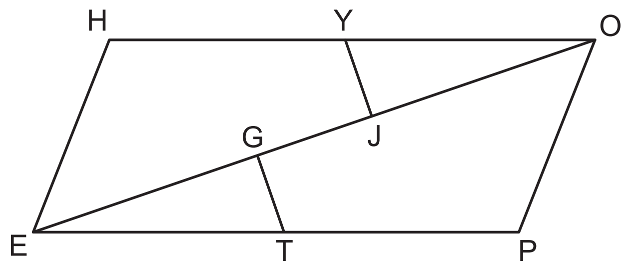
Prove that $\overline{TG} \cong \overline{YJ}$.

Claim	Proof
1 $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ @ points G and J	1 Given
2 $\angle GTE$ is a right angle $\angle JYO$ is a right angle	2 perpendicular lines create right angles
3 ~~$\angle GTE$~~ $\angle YOJ \cong \angle TEG$	3 parallel lines create alternate angles
4 $\overline{EO} \cong \overline{EO}$	4 reflexive
5 $\overline{OJ} \cong \overline{EG}$	5 subtraction postulate
6 $\triangle OYJ \cong \triangle ETG$	6 ASA
7 $\overline{TG} \cong \overline{YG}$	7 CPCTC

Score 2: The student had two correct statements and reasons in steps 4 and 5.

Question 35

35 In quadrilateral *HOPE* below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and *J*, respectively.



Prove that $\overline{TG} \cong \overline{YJ}$.

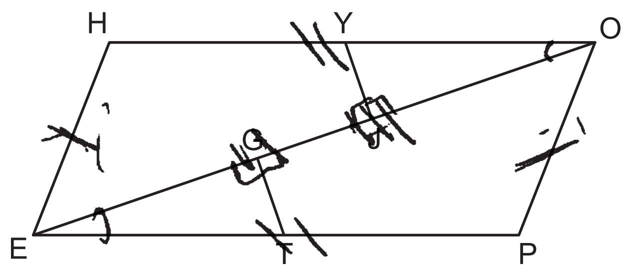
Statements	Reasons
① Quad HOPE, $\overline{EH} \cong \overline{OP}$ $\overline{EJ} \cong \overline{OG}$, $\overline{EP} \cong \overline{OH}$ $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and J	① Given
② HOPE is a parallelogram	② If a quad has 2 pairs of opp. sides $\cong$, then the quad is a parallelogram.
③ $\overline{TG} \cong \overline{YJ}$	③ CPCTC

Score 1: The student had one correct statement and reason in step 2.

Question 35

35 In quadrilateral *HOPE* below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and *J*, respectively.

Given



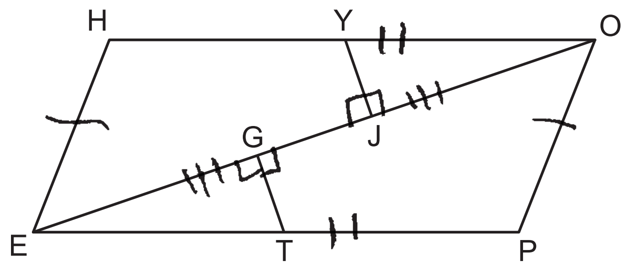
Prove that $\overline{TG} \cong \overline{YJ}$.

Statement	Reason
1. ∡ EOY ≅ ∡ OGT	1. Parallel lines cut by a transversal form congruent alternating angles
2. ∡ OJY & TGE are right angles	2. perpendicular lines form right angles
3. ∡OJY ≅ ∡EGT	3. All right angles are congruent
4.	
. $\overline{TG} \cong \overline{YJ}$	. CPCTC

Score 1: The student correctly proved $\angle OJY \cong \angle EGT$.

Question 35

35 In quadrilateral *HOPE* below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and *J*, respectively.



Prove that $\overline{TG} \cong \overline{YJ}$.

ΔEGT and ΔOJY are both right triangles (right angle)

$\overline{EG} \cong \overline{OJ}$ (Given)

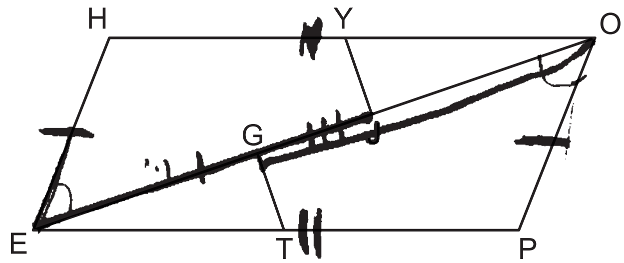
$\Delta EGT \cong \Delta OJY$ (HL)

$\overline{TG} \cong \overline{YJ}$ (CPCTC)

Score 0: The student did not show enough correct relevant work to receive any credit.

Question 35

35 In quadrilateral $HOPE$ below, $\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, and $\overline{TG}$ and $\overline{YJ}$ are perpendicular to diagonal $\overline{EO}$ at points G and J, respectively.



Prove that $\overline{TG} \cong \overline{YJ}$.

	Statement
$\overline{EH} \cong \overline{OP}$, $\overline{EP} \cong \overline{OH}$, $\overline{EJ} \cong \overline{OG}$, TG and YJ are perpendictr to diagnol EO at points G and J, respectively	Given
$\angle HEO \cong \angle POE$	Alternate Interior angles are congruent.
$\Delta HEO \cong \angle POE$ are congruent	All Right angles are congruent.

Score 0: The student did not show enough correct relevant work to receive any credit.