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25 Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point (2,6).

\[ y - 6 = \frac{2}{3} (x - 2) \]

Score 2: The student gave a complete and correct response.
25 Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point (2,6).

\[
\begin{align*}
3y + 7 &= 2x \\
3y &= 2x - 7 \\
\frac{3y}{3} &= \frac{2x - 7}{3} \\
y &= \frac{2}{3}x - \frac{7}{3} \\
6 &= \frac{2}{3}(2) + b \\
6 &= \frac{4}{3} + b \\
-\frac{4}{3} &= b \\
b &= \frac{-4}{3}
\end{align*}
\]

\[y = \frac{2}{3}x + \frac{14}{3}\]

**Score 2:** The student gave a complete and correct response.
25 Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point (2,6).

Score 1: The student made an error in determining the $y$-intercept.
25 Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point (2,6).

\[
y = \frac{2}{3}x + b \\
6 = \frac{2}{3}(2) + b \\
1.3 = 1.3 + b \\
b = 4.1 \\
y = \frac{2}{3}x + 4.7
\]

\[
\begin{align*}
3y + 7 &= 2x \\
\frac{3y}{3} &= \frac{2x - 7}{3} \\
y &= \frac{2}{3}x - \frac{7}{3}
\end{align*}
\]

**Score 1:** The student made one rounding error in determining the $y$-intercept.
Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point (2,6).

Score 1: The student made an error using the $y$-coordinate of the given point as the $y$-intercept.
25 Write an equation of the line that is parallel to the line whose equation is $3y + 7 = 2x$ and passes through the point (2,6).

\[ y = mx + b \]

\[ y = \frac{4}{3}x - \frac{7}{3} \]

Score 0: The student did not show enough correct relevant work to receive any credit.
Parallelogram $ABCD$ is adjacent to rhombus $DEFG$, as shown below, and $\overline{FC}$ intersects $\overline{AGD}$ at $H$.

If $\angle B = 118^\circ$ and $\angle AHC = 138^\circ$, determine and state $\angle GFH$.

$$m \angle GFH = 20^\circ$$

Score 2: The student gave a complete and correct response.
Parallelogram $ABCD$ is adjacent to rhombus $DEFG$, as shown below, and $FC$ intersects $AGD$ at $H$.

If $\angle B = 118^\circ$ and $\angle AHC = 138^\circ$, determine and state $\angle GFH$.

$\angle GFH = 20^\circ$

Score 2: The student gave a complete and correct response.
Parallelogram $ABCD$ is adjacent to rhombus $DEFG$, as shown below, and $\overline{FC}$ intersects $\overline{AGD}$ at $H$.

If $\angle B = 118^\circ$ and $\angle AHC = 138^\circ$, determine and state $\angle GFH$.

Score 2: The student gave a complete and correct response.
Parallelogram $ABCD$ is adjacent to rhombus $DEFG$, as shown below, and $FC$ intersects $AGD$ at $H$.

If $m \angle B = 118^\circ$ and $m \angle AHC = 138^\circ$, determine and state $m \angle GFH$.

$\angle GFH = 31^\circ$

**Score 1:** The student made an error that $CF$ bisects $\angle BCD$. 
Parallelogram $ABCD$ is adjacent to rhombus $DEFG$, as shown below, and $\overline{FC}$ intersects $\overline{AGD}$ at $H$.

If $\angle B = 118^\circ$ and $\angle AHC = 138^\circ$, determine and state $\angle GFH$.

Score 1: The student made a computational error in determining $\angle CHD$. 

$m\angle GFH = 30^\circ$
26 Parallelogram $ABCD$ is adjacent to rhombus $DEFG$, as shown below, and $\overline{FC}$ intersects $\overline{AGD}$ at $H$.

If $m\angle B = 118^\circ$ and $m\angle AHC = 138^\circ$, determine and state $m\angle GFH$.

$m\angle GFH = 138^\circ$ because opposite adjacent angles are congruent and because $\angle AHC = 138^\circ$, $\angle C = 138^\circ$ so $\angle GFH = 138^\circ$.

Score 0: The student did not show enough correct relevant work to receive any credit.
27 As shown in the diagram below, secants \( \overrightarrow{PWR} \) and \( \overrightarrow{PTS} \) are drawn to circle \( O \) from external point \( P \).

If \( m \angle RPS = 35^\circ \) and \( m \overrightarrow{RS} = 121^\circ \), determine and state \( m \overrightarrow{WT} \).

\[
\begin{align*}
2 \cdot \frac{121 - x}{2} &= 35 \cdot 2 \\
121 - x &= 70 \\
-x &= -51 \\
x &= 51
\end{align*}
\]

\( m \overrightarrow{WT} = 51^\circ \)

Score 2: The student gave a complete and correct response.
27 As shown in the diagram below, secants $\overrightarrow{PWR}$ and $\overrightarrow{PTS}$ are drawn to circle $O$ from external point $P$.

If $m\angle RPS = 35^\circ$ and $m\overline{RS} = 121^\circ$, determine and state $m\overline{WT}$.

\[ 3S = \frac{1}{2} \left( 121 - 35 \right) \]
\[ 3S = 60.5 - \frac{1}{2}x \]
\[ -20.5 = -\frac{1}{2}x \]
\[ 51 = x \]

**Score 2:** The student gave a complete and correct response.
27 As shown in the diagram below, secants $\overrightarrow{PWR}$ and $\overrightarrow{PTS}$ are drawn to circle $O$ from external point $P$.

If $\angle RPS = 35^\circ$ and $\overrightarrow{RS} = 121^\circ$, determine and state $\overrightarrow{WT}$.

Score 1: The student wrote a correct equation.
27 As shown in the diagram below, secants \( \overrightarrow{PWR} \) and \( \overrightarrow{PTS} \) are drawn to circle \( O \) from external point \( P \).

If \( \angle RPS = 35^\circ \) and \( \overarc{RS} = 121^\circ \), determine and state \( \overarc{WT} \).

\[
\frac{35 + 121}{2} = 78
\]

**Score 0:** The student gave a completely incorrect response.
On the set of axes below, $\triangle ABC$ is graphed with coordinates $A(-2, -1), B(3, -1),$ and $C(-2, -4)$. Triangle $QRS$, the image of $\triangle ABC$, is graphed with coordinates $Q(-5, 2), R(-5, 7),$ and $S(-8, 2)$.

Describe a sequence of transformations that would map $\triangle ABC$ onto $\triangle QRS$.

Ans: A rotation of $90^\circ$ counterclockwise around point $A$, then a translation of 3 units up and finally a reflection over the line $x = -3.5$ would map $\triangle ABC$ onto $\triangle QRS$.

Score 2: The student gave a complete and correct response.
28 On the set of axes below, ΔABC is graphed with coordinates A(−2,−1), B(3,−1), and C(−2,−4). Triangle QRS, the image of ΔABC, is graphed with coordinates Q(−5,2), R(−5,7), and S(−8,2).

Describe a sequence of transformations that would map ΔABC onto ΔQRS.

Reflect over y=x then translate 4 left and 4 up.

Score 2: The student gave a complete and correct response.
On the set of axes below, \( \triangle ABC \) is graphed with coordinates \( A(-2,-1) \), \( B(3,-1) \), and \( C(-2,-4) \). Triangle \( QRS \), the image of \( \triangle ABC \), is graphed with coordinates \( Q(-5,2) \), \( R(-5,7) \), and \( S(-8,2) \).

Describe a sequence of transformations that would map \( \triangle ABC \) onto \( \triangle QRS \).

Reflection over \( y = x + 4 \)

Score 2: The student gave a complete and correct response.
28 On the set of axes below, \( \triangle ABC \) is graphed with coordinates \( A(-2, -1) \), \( B(3, -1) \), and \( C(-2, -4) \). Triangle \( QRS \), the image of \( \triangle ABC \), is graphed with coordinates \( Q(-5, 2) \), \( R(-5, 7) \), and \( S(-8, 2) \).

Describe a sequence of transformations that would map \( \triangle ABC \) onto \( \triangle QRS \).

Reflection over \( x \)-axis

Rotate about point \( A' \) \( 90^\circ \) counter clockwise, translate 3 left, and 1 up.

Score 2: The student gave a complete and correct response.
28 On the set of axes below, $\triangle ABC$ is graphed with coordinates $A(-2,-1)$, $B(3,-1)$, and $C(-2,-4)$. Triangle $QRS$, the image of $\triangle ABC$, is graphed with coordinates $Q(-5,2)$, $R(-5,7)$, and $S(-8,2)$.

Describe a sequence of transformations that would map $\triangle ABC$ onto $\triangle QRS$.

**Translation** $(-3,3)$

**Rotation** counter-clockwise $90^\circ$

**Reflection** over $x=-5$

Score 1: The student did not state the center of rotation.
Describe a sequence of transformations that would map $\triangle ABC$ onto $\triangle QRS$.

- $90^\circ$ counterclockwise rotation of $\triangle ABC$ on point $A$
- reflection across $x=3.5$
- translation of $(0,3)$

Score 1: The student wrote an incorrect line of reflection.
28 On the set of axes below, $\triangle ABC$ is graphed with coordinates $A(-2,-1)$, $B(3,-1)$, and $C(-2,-4)$. Triangle $QRS$, the image of $\triangle ABC$, is graphed with coordinates $Q(-5,2)$, $R(-5,7)$, and $S(-8,2)$.

Describe a sequence of transformations that would map $\triangle ABC$ onto $\triangle QRS$.

**Score 1:** The student demonstrated the sequence graphically and wrote an appropriate sequence of transformations, but no specific description was written.
28 On the set of axes below, △ABC is graphed with coordinates \(A(-2,-1), B(3,-1), \) and \(C(-2,-4)\). Triangle QRS, the image of △ABC, is graphed with coordinates \(Q(-5,2), R(-5,7), \) and \(S(-8,2)\).

Describe a sequence of transformations that would map △ABC onto △QRS.

\[ \text{reflection over X axis} \]

Score 0: The student wrote an incomplete description of a sequence of transformations.
Question 29

29 Given points $A, B,$ and $C$, use a compass and straightedge to construct point $D$ so that $ABCD$ is a parallelogram.

[Leave all construction marks.]

Score 2: The student gave a complete and correct response.
Given points $A$, $B$, and $C$, use a compass and straightedge to construct point $D$ so that $ABCD$ is a parallelogram.

[Leave all construction marks.]

**Score 2:** The student gave a complete and correct response.
29 Given points $A$, $B$, and $C$, use a compass and straightedge to construct point $D$ so that $ABCD$ is a parallelogram.

[Leave all construction marks.]

Score 2: The student gave a complete and correct response.
29 Given points $A$, $B$, and $C$, use a compass and straightedge to construct point $D$ so that $ABCD$ is a parallelogram.

[Leave all construction marks.]

Score 2: The student gave a complete and correct response.
Given points $A$, $B$, and $C$, use a compass and straightedge to construct point $D$ so that $ABCD$ is a parallelogram.

[Leave all construction marks.]

**Score 1:** The student constructed parallelogram $ADBC$ instead of parallelogram $ABCD$. 
Question 29

29 Given points A, B, and C, use a compass and straightedge to construct point D so that \( ABCD \) is a parallelogram.

[Leave all construction marks.]

Score 0: The student made an error by constructing \( ADBC \) and made an incorrect assumption that \( m\angle C = 90^\circ \).
30 On the set of axes below, $\triangle DEF$ has vertices at the coordinates $D(1,-1)$, $E(3,4)$, and $F(4,2)$, and point $G$ has coordinates $(3,1)$. Owen claims the median from point $E$ must pass through point $G$.

Is Owen correct? Explain why.

No, a median from point $E$ would intersect the midpoint of $DF$. The midpoint of $DF$ is $(\frac{5}{2}, \frac{1}{2})$, not point $G$ $(3,1)$.

Score 2: The student gave a complete and correct response.
30 On the set of axes below, \( \triangle DEF \) has vertices at the coordinates \( D(1, -1) \), \( E(3, 4) \), and \( F(4, 2) \), and point \( G \) has coordinates \( (3, 1) \). Owen claims the median from point \( E \) must pass through point \( G \).

Is Owen correct? Explain why.

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

\[
d_{DG} = \sqrt{(3 - 1)^2 + (1 + 1)^2}
\]

\[
d_{DG} = \sqrt{4 + 4}
\]

\[
d_{DG} = \sqrt{8}
\]

\[
d_{DG} = 2\sqrt{2}
\]

\[
d_{EG} = \sqrt{(3 - 4)^2 + (1 - 2)^2}
\]

\[
d_{EG} = \sqrt{1 + 1}
\]

\[
d_{EG} = \sqrt{2}
\]

Owen is not correct. The median intersects the midpoint of the segment opposite the side coming from. Using distance formula, I found that the distance of \( DG = 2\sqrt{2} \) and the distance of \( EG \) is \( \sqrt{2} \). They are not equal. \( G \) is not the midpoint.

Score 2: The student gave a complete and correct response.
30 On the set of axes below, \( \triangle DEF \) has vertices at the coordinates \( D(1,-1), E(3,4), \) and \( F(4,2) \), and point \( G \) has coordinates \((3,1)\). Owen claims the median from point \( E \) must pass through point \( G \).

Is Owen correct? Explain why.

Owen is incorrect. \( G \) is not the midpoint of \( DF \) so \( EG \) would not be a median.

Score 2: The student gave a complete and correct response. The student supported their claim graphically that \( G \) is not the midpoint.
Question 30

On the set of axes below, \( \triangle DEF \) has vertices at the coordinates \( D(1, -1), E(3, 4), \) and \( F(4, 2) \), and point \( G \) has coordinates \( (3, 1) \). Owen claims the median from point \( E \) must pass through point \( G \).

Is Owen correct? Explain why.

Owen is incorrect, the median from point \( E \) must pass through the midpoint of \( \overline{DF} \) and \( G \) is not the midpoint.

Score 1: The student did not support their claim that point \( G \) is not the midpoint.
30 On the set of axes below, \( \triangle DEF \) has vertices at the coordinates \( D(1,-1), E(3,4), \) and \( F(4,2), \) and point \( G \) has coordinates \( (3,1) \). Owen claims the median from point \( E \) must pass through point \( G \).

Is Owen correct? Explain why.

\[
\begin{align*}
m_{DE} &= \frac{5}{2} \\
m_{EF} &= -2 \\
m_{DF} &= 1
\end{align*}
\]

He is incorrect because \( EF \) and \( ED \) do not have opposite slopes, so because of that, \( G \) would not be on the line that would be the median for \( E \).

Score 0: The student did not show enough correct relevant work to receive any credit.
A walking path at a local park is modeled on the grid below where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the nearest square foot, the area of the walking path.

\[
A = L \times w \\
= 90 \times 60 \\
= 5400 \\
A = 5400 \text{ sq ft}
\]

\[
A = \pi r^2 \\
= \pi \times 30^2 \\
= 900\pi \\
= 2827 \text{ sq ft}
\]

\[
A = 5400 + 2827 = 8227 \text{ sq ft}
\]

Score 2: The student gave a complete and correct response.
Question 31

31 A walking path at a local park is modeled on the grid below where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the nearest square foot, the area of the walking path.

Score 1: The student made a scale error in determining the radii of the two concentric circles.
Question 31

31 A walking path at a local park is modeled on the grid below where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the nearest square foot, the area of the walking path.

\[
\begin{align*}
A &= lw \\
A &= 90 \cdot 10 \\
A &= 900 \text{ sq ft}
\end{align*}
\]

\[
A = \frac{\pi r^2}{2} \\
A = \frac{\pi \cdot 30^2}{2} \\
A = 900\pi \\
A \approx 2826 \text{ sq ft}
\]

\[
A = \frac{\pi r^2}{2} \\
A = \frac{\pi \cdot 25^2}{2} \\
A = 400\pi \\
A \approx 1256 \text{ sq ft}
\]

\[
A = 1413 \text{ sq ft}
\]

\[
\frac{900}{1800} + \frac{1570}{1800} = \frac{3370}{1800} \approx 1.8722
\]

\[
A = 185(2) \text{ sq ft}
\]

\[
A = 1570 \text{ sq ft}
\]

Score 1: The student rounded incorrectly by using \( \pi = 3.14 \), which resulted in an incorrect final answer.
Question 31

31 A walking path at a local park is modeled on the grid below where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the nearest square foot, the area of the walking path.

Score 1: The student found the correct areas of the two concentric circles.
Question 31

31 A walking path at a local park is modeled on the grid below where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the nearest square foot, the area of the walking path.

Score 1: The student found the correct areas of two concentric semicircles.
Question 31

31 A walking path at a local park is modeled on the grid below where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the nearest square foot, the area of the walking path.

\[ A = \pi (20)^2 \]
\[ A = 1256.64 \]
\[ A = \pi (30)^2 \]
\[ A = 2827.43 \]
\[ 2827.43 - 1256.64 \]
\[ 1570.79 \]

\[ 3600 \text{ ft}^2 \]
\[ 3600 - 180 \]
\[ 3420 \]
\[ 3420 + 1570.79 \]
\[ 4990.79 \]
\[ 4991 \text{ ft}^2 \]

Score 1: The student found appropriate areas of the two concentric circles.
Question 31

31 A walking path at a local park is modeled on the grid below where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the nearest square foot, the area of the walking path.

Score 0: The student did not show enough correct relevant work to receive any credit.
31 A walking path at a local park is modeled on the grid below where the length of each grid square is 10 feet. The town needs to submit paperwork to pave the walking path. Determine and state, to the nearest square foot, the area of the walking path.

\[
90(10)(2) = 1800
\]

**Score 0:** The student did not show enough correct relevant work to receive any credit.
Question 32

A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$.

Prove that $\triangle ABC$ is an isosceles right triangle.

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

\begin{align*}
\overline{AC} &= \sqrt{(1-(-2))^2 + (-1-4)^2} \\
&= \sqrt{3^2 + (-5)^2} \\
&= \sqrt{9 + 25} \\
&= \sqrt{34}
\end{align*}

\begin{align*}
\overline{BC} &= \sqrt{(1-6)^2 + (-1-2)^2} \\
&= \sqrt{(-5)^2 + (-3)^2} \\
&= \sqrt{25 + 9} \\
&= \sqrt{34}
\end{align*}

\begin{align*}
\overline{AB} &= \sqrt{(6-(-2))^2 + (2-4)^2} \\
&= \sqrt{8^2 + (-2)^2} \\
&= \sqrt{64 + 4} \\
&= \sqrt{68}
\end{align*}

\begin{align*}
\overline{AC} &= \overline{BC} \\
\left(\sqrt{34}\right)^2 + \left(\sqrt{34}\right)^2 &= \left(\sqrt{68}\right)^2 \\
34 + 34 &= 68 \\
68 &= 68
\end{align*}

\begin{align*}
&1. \overline{AC} \cong \overline{BC} \\
&2. \triangle ABC \text{ is a r} \Delta \\
&3. \triangle ABC \text{ is isos.} \\
&1. \text{ Distance formula} \\
&3. \text{ Isos. } \Delta \text{ have two congruent sides}
\end{align*}

Score 4: The student gave a complete and correct response.
Question 32

32 A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$.

Prove that $\triangle ABC$ is an isosceles right triangle.

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

\[ \frac{m_{AB}}{m_{BC}} = \frac{-1-4}{1-2} = \frac{-5}{-3} = \frac{5}{3} \]  
\[ \frac{m_{AC}}{m_{BC}} = \frac{-1-2}{1-6} = \frac{-3}{-5} = \frac{3}{5} \]  
\[ \therefore AC \perp BC \]  
\[ \therefore AC \text{ is a } \frac{3}{4} \angle \]  
\[ \therefore \triangle ABC \text{ is a } \frac{3}{4} \angle \text{s of } \frac{3}{4} \text{ at } C. \]

\[ AC = \sqrt{(-2-1)^2 + (4-(-1))^2} = \sqrt{3^2 + 5^2} = \sqrt{34} \]  
\[ BC = \sqrt{(6-1)^2 + (2-(-1))^2} = \sqrt{5^2 + 3^2} = \sqrt{34} \]  
\[ \therefore AC = BC \]

\[ \therefore \triangle ABC \text{ has } 2 = \text{sides} \]

\[ \therefore \triangle ABC \text{ is an } \text{isosceles} \triangle \]

Score 4: The student gave a complete and correct response.
Question 32

32 A triangle has vertices A(−2,4), B(6,2), and C(1,−1).

Prove that \(\triangle ABC\) is an isosceles right triangle.

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

\[
\begin{align*}
\text{I will prove } \triangle ABC \text{ an isosceles right triangle using slope + distance formulas.} \\
\text{ } \\
m(\overline{AC}): \quad d = \sqrt{(1-(-2))^2 + (-1-4)^2} = \sqrt{34} \\
m(\overline{BC}): \quad d = \sqrt{(1-6)^2 + (-1-2)^2} = \sqrt{34} \\
\text{slope } \overline{AC} : \quad \frac{-1-4}{1-(-2)} = \frac{-5}{3} \\
\text{slope } \overline{BC} : \quad \frac{-1-2}{1-6} = \frac{-3}{5} = \frac{3}{5} \\
\overline{AC} \perp \overline{BC} \quad \text{b/c slopes are opposite, }^* \\
\overline{AC} \equiv \overline{BC} \quad \text{b/c distance is the same.} \\
\text{Therefore, } \\
\triangle ABC \text{ is an isosceles right triangle.}
\end{align*}
\]

Score 3: The student wrote an incomplete conclusion when proving \(\triangle ABC\) is a right triangle. The student’s proof does not rely on the graph, therefore the graphing error is not penalized.
Question 32

32 A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$.

Prove that $\triangle ABC$ is an isosceles right triangle.
[The use of the set of axes below is optional.]

Since the distances of $\overline{AC}$ and $\overline{BC}$ are equal, and $\overline{AB}$ is different in value, triangle $ABC$ must be isosceles.

Score 2: The student correctly proved $\triangle ABC$ is isosceles, but no further correct work was shown.
32 A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$.

Prove that $\triangle ABC$ is an isosceles right triangle.

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

**Conclusion:**
- Using the slope formula:
  - $\text{slope } \overline{AB} = \frac{\Delta y}{\Delta x} = \frac{4-2}{-2-6} = \frac{-2}{-8} = \frac{1}{4}$
  - $\text{slope } \overline{BC} = \frac{\Delta y}{\Delta x} = \frac{2-2}{6-1} = \frac{0}{5} = 0$
  - $\text{slope } \overline{CA} = \frac{\Delta y}{\Delta x} = \frac{-1-4}{1+2} = \frac{-5}{3}$
- If two lines have negative reciprocal slopes, then they are $\perp$.
  - $\therefore \overline{CA} \perp \overline{BC}$
- If two $\perp$ lines intersect, then they form a right $\angle$.
  - $\therefore \angle C$ is a right $\angle$
- If a triangle has one right $\angle$, then it is a right $\triangle$.
  - $\therefore \triangle ABC$ is a right $\triangle$

**Score 2:** The student correctly proved $\triangle ABC$ is a right triangle, but no further correct work was shown.
A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$.

Prove that $\triangle ABC$ is an isosceles right triangle.

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

I will prove $\triangle ABC$ is an isosceles right triangle using slope and distance formulas.

\[ AC: y = \frac{-1-4}{1-(-2)} = \frac{-5}{3} \]
\[ BC: y = \frac{-1-2}{1-6} = \frac{-3}{5} = \frac{3}{5} \]

\[ AC: d = \sqrt{(1-2)^2 + (-1-4)^2} = \sqrt{9 + 25} = \sqrt{34} \]
\[ BC: d = \sqrt{(1-6)^2 + (-1-2)^2} = \sqrt{25 + 9} = \sqrt{34} \]

\[ AC \perp BC \text{ b/c slopes are opposite reciprocal, } \]
\[ AC \perp BC \text{ b/c distance is the same. } \]
\[ \therefore \triangle ABC \text{ is a isosceles right triangle} \]

**Score 2:** The student wrote one incomplete conclusion and one incorrect conclusion.
32 A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$.

Prove that $\triangle ABC$ is an isosceles right triangle.

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

\[ AB = \sqrt{(-2-6)^2 + (4-2)^2} \]
\[ BC = \sqrt{(6-1)^2 + (2-(-1))^2} \]
\[ AC = \sqrt{(-2-1)^2 + (4-(-1))^2} \]

\[ AB = \sqrt{64} = 8 \]
\[ BC = \sqrt{13} \approx 3.61 \]
\[ AC = \sqrt{34} \]

**Score 1:** The student wrote an incomplete conclusion when proving $\triangle ABC$ is isosceles. No further correct work was shown.
A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$.

Prove that $\triangle ABC$ is an isosceles right triangle.

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

$\triangle ABC$ is an isosceles right triangle because $\overline{AC} \cong \overline{CB}$, they have the same length of $4$.

$\overline{AC}$ and $\overline{CB}$ make up a $90^\circ$ angle, so $\triangle ABC$ is an isosceles right triangle.

**Score 1:** The student used a Pythagorean Triple incorrectly, but made an appropriate conclusion.

No further correct work was shown.
32 A triangle has vertices $A(-2,4)$, $B(6,2)$, and $C(1,-1)$.

Prove that $\triangle ABC$ is an isosceles right triangle.

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

When the slopes are opposite it means that the lines are perpendicular meaning $\triangle ABC$ is a right triangle.

Score 0: The student did not show enough correct relevant work to receive any credit.
33 Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of $3.95 per 100 gallons of water.

Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of $200 per 6000 gallons.

If Theresa and Nancy both fill their pools 6 inches from the top of the pool, determine and state who paid more to fill her pool. [1 ft³ water = 7.48 gallons]

\[
\begin{align*}
V &= l \times w \times h \\
V &= 30 \times 15 \times 3.5 \\
V &= 1575 \text{ ft}^3 = 11781 \text{ g} \\
V &= \pi r^2 h \\
V &= \pi \times 12^2 \times 3.5 \\
V &= 1583.36 \text{ ft}^3 = 11843.56 \text{ g} \\
(\pi \times 12^2 \times 3.5 \times 7.48) &\times 0.033 = 394.79 \\
3.95 \frac{\text{g}}{100} &= 0.0395 \frac{\text{g}}{\text{g}} \\
200 \frac{\text{g}}{6000} &= 0.033 \frac{\text{g}}{\text{g}} \\
\end{align*}
\]

Theresa paid more to fill her pool than Nancy did.

**Score 4:** The student gave a complete and correct response.
Question 33

33 Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of $3.95 per 100 gallons of water.

Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of $200 per 6000 gallons.

If Theresa and Nancy both fill their pools 6 inches from the top of the pool, determine and state who paid more to fill her pool. [1 ft³ water = 7.48 gallons]

\[
V = 30(15)(3.5) \\
V = 1575 \\
1575(7.48) = 11781 \\
11781(3.95) \div 100 = 465.35
\]

\[
V = \pi(24^2)(3.5) \\
V = 2016\pi \\
2016\pi(7.48) = 47374.21191 \\
\frac{47374.21191(200)}{6000} = 1579.14
\]

Nancy

Score 3: The student used 24, the diameter, as the radius of Nancy’s pool.
Question 33

33 Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of $3.95 per 100 gallons of water.

Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of $200 per 6000 gallons.

If Theresa and Nancy both fill their pools 6 inches from the top of the pool, determine and state who paid more to fill her pool. [1 ft³ water = 7.48 gallons]

---

Score 2: The student made an error in using 4 feet for the depth. The student made a transcription error by using 7.84 when converting to gallons.
33 Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of $3.95 per 100 gallons of water.

Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of $200 per 6000 gallons.

If Theresa and Nancy both fill their pools 6 inches from the top of the pool, determine and state who paid more to fill her pool. [1 ft\(^3\) water = 7.48 gallons]

Score 1: The student found both volumes using 4 feet for the depth.
33 Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of $3.95 per 100 gallons of water.

Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of $200 per 6000 gallons.

If Theresa and Nancy both fill their pools 6 inches from the top of the pool, determine and state who paid more to fill her pool. [1 ft$^3$ water = 7.48 gallons]

Score 1: The student made a conceptual error using the volume of a cone for the volume of the cylinder. The student made a computational error using 4 feet for the depth.
33 Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of $3.95 per 100 gallons of water.

Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of $200 per 6000 gallons.

If Theresa and Nancy both fill their pools 6 inches from the top of the pool, determine and state who paid more to fill her pool. [1 ft³ water = 7.48 gallons]

\[
V = 30 \times (15 \times 3.5) = 1675 \text{ ft}^3
\]

\[
\# \text{gallons} = \frac{1675 \text{ ft}^3}{7.48} = 221.5 \text{ gallons}
\]

\[
\text{Cost} = 210.52 \times \$3.95 = 831.72
\]

\[
V = \frac{1}{3} \pi (24 \text{ ft})^2 (3.5 \text{ ft})
\]

\[
V = 2111.56 \text{ ft}^3
\]

\[
\# \text{gallons} = \frac{2111.56 \text{ ft}^3}{7.48} = 282.23 \text{ gallons}
\]

\[
\text{Cost} = \frac{282.23 \times \$0.68}{6000} = \$9.41
\]

**Score 1:** The student found the correct volume of water in one pool, but no further correct work was shown.
Question 33

Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of $3.95 per 100 gallons of water.

Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of $200 per 6000 gallons.

If Theresa and Nancy both fill their pools 6 inches from the top of the pool, determine and state who paid more to fill her pool. [1 ft³ water = 7.48 gallons]

\[
\begin{align*}
\text{Theresa} &= 531.828 \\
\text{Nancy} &= 4151.829
\end{align*}
\]

Theresa paid more to fill her pool because the depth of each pool would have been the same and when you compare volume to cost, Theresa paid $9,299.

Score 0: The student did not show enough correct relevant work to receive any credit.
33 Theresa has a rectangular pool 30 ft long, 15 ft wide, and 4 ft deep. Theresa fills her pool using city water at a rate of $3.95 per 100 gallons of water.

Nancy has a circular pool with a diameter of 24 ft and a depth of 4 ft. Nancy fills her pool with a water delivery service at a rate of $200 per 6000 gallons.

If Theresa and Nancy both fill their pools 6 inches from the top of the pool, determine and state who paid more to fill her pool. [$1 \text{ ft}^3 \text{ water} = 7.48 \text{ gallons}$]

Score 0: The student gave a completely incorrect response.
Question 34

As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.

If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the nearest tenth of a foot.

\[ \sin 4.76° = \frac{1.5}{R} \]

\[ R = \frac{1.5}{\sin 4.76°} \]

\[ R = 18.07617886 \]

Determine and state, to the nearest tenth of a foot, the horizontal distance, \( d \), from the bottom of the stairs to the bottom of the ramp.

\[ \cos 4.76° = \frac{X}{18.1} \]

\[ X = 18.1 \cos 4.76° \]

\[ X = 18.03757373 \]

\[ d = 18.03757373 - 1.3 \]

\[ d = 16.70424039 \]

\[ 16.7 \]

Score 4: The student gave a complete and correct response.
As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.

If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the nearest tenth of a foot.

\[ \sin 4.76° = \frac{18}{x} \]

\[ x = \frac{18}{\sin 4.76°} \]

\[ x = 216.9141463\,\text{in} \]

\[ x = 18.0761786\,\text{ft} \]

Determine and state, to the nearest tenth of a foot, the horizontal distance, \( d \), from the bottom of the stairs to the bottom of the ramp.

\[ \tan 4.76° = \frac{18}{y} \]

\[ d = \frac{216.1660169}{\tan 4.76°} \]

\[ d = 200.1660169\,\text{in} \]

\[ d = 16.6805041\,\text{ft} \]

Score 4: The student gave a complete and correct response.
Question 34

34 As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.

If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the nearest tenth of a foot.

\[ \tan 4.76° = \frac{18}{y} \]

Length in inches
\[ \frac{18}{\tan 4.76} \times \frac{\tan 4.76}{\tan 4.76} \]

\[ y = \frac{216.160169}{12} \]

Score 3: The student incorrectly subtracted 2 feet in determining the horizontal distance.
Question 34

34 As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.

If the angle of elevation of the ramp is $4.76^\circ$, determine and state the length of the ramp, to the nearest tenth of a foot.

\[
\sin 4.76^\circ = \frac{18}{x} \\
\sin 4.76^\circ \cdot (18) = 18 \\
x = \frac{18}{\sin 4.76^\circ} \\
2.16.014.114 \text{ in} \\
18.01 \text{ ft.}
\]

Determine and state, to the nearest tenth of a foot, the horizontal distance, \(d\), from the bottom of the stairs to the bottom of the ramp.

\[
1.5^2 + y^2 = 18.1^2 \\
2.25 + y^2 = 327.61 \\
-2.25 = -2.25 \\
y^2 = 325.36 \\
y = 18.03 \\
\sqrt{18.03} \text{ FEET}
\]

Score 3:  The student did not subtract 16 inches when determining the horizontal distance.
Question 34

34 As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.

If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the nearest tenth of a foot.

\[
\sin(4.76°) = \frac{18}{x}
\]

\[
x = 216.9 \text{ in} \approx 18.1 \text{ ft}
\]

Determine and state, to the nearest tenth of a foot, the horizontal distance, \( d \), from the bottom of the stairs to the bottom of the ramp.

\[
\cos(4.76°) = \frac{2}{18}
\]

\[
d = 17.9
\]

Score 2: The student found the correct length of the ramp, but no further correct work was shown.
34 As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.

If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the nearest tenth of a foot.

\[ \tan 4.76^\circ = \frac{18}{x} \]

\[ x = \frac{18}{\tan 4.76^\circ} = \frac{216.16 \text{ inches}}{12 \text{ inches}} = 18.013 \text{ feet} \]

Determine and state, to the nearest tenth of a foot, the horizontal distance, \( d \), from the bottom of the stairs to the bottom of the ramp.

\[ \cos 4.76^\circ = \frac{d}{18} \]

\[ \frac{204}{12} = 17 \text{ feet} \]

\[ d = \cos 4.76^\circ (17) = 16.9413 \text{ feet} \]

Score 2: The student used an incorrect trigonometric equation when determining the length of the ramp. The student incorrectly subtracted 12 inches when determining the horizontal distance.
As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.

If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the nearest tenth of a foot.

\[
\sin 4.76 = \frac{18}{R} \quad R \sin 4.76 = 18 \\
R = 216.9 \text{ ft}
\]

Determine and state, to the nearest tenth of a foot, the horizontal distance, \(d\), from the bottom of the stairs to the bottom of the ramp.

\[
(4.76)^2 + (d)^2 = (216.9)^2 \\
22.6576 + d^2 = 47045.61 \\
22.6576 + d^2 = 47045.61 - 22.6576 \\
22.6576 + d^2 = 46822.9524 \\
d = 216.8
\]

**Score 1:** The student wrote one correct trigonometric equation, but no further correct work was shown.
Question 34

34 As modeled in the diagram below, an access ramp starts on flat ground and ends at the beginning of the top step. Each step is 6 inches tall and 8 inches deep.

If the angle of elevation of the ramp is 4.76°, determine and state the length of the ramp, to the nearest tenth of a foot.

\[ \tan(x) = \frac{18}{24} \]
\[ \tan^{-1}(\frac{18}{24}) = 36.8699 \]

[36.9 ft]

Determine and state, to the nearest tenth of a foot, the horizontal distance, \( d \), from the bottom of the stairs to the bottom of the ramp.

\[ \sin(x) = \frac{18}{36.9} \]
\[ \sin^{-1}(\frac{18}{36.9}) = 29.1694 \]

[29.2 ft]

**Score 0:** The student gave a completely incorrect response.
Question 35

35 In the diagram of quadrilateral $ABCD$ with diagonal $\overline{AC}$ shown below, segments $GH$ and $EF$ are drawn, $\overline{AE} \cong \overline{CG}$, $\overline{BE} \cong \overline{DG}$, $\overline{AH} \cong \overline{CF}$, and $\overline{AD} \cong \overline{CB}$.

Prove: $\overline{EF} \cong \overline{GH}$

Given $\overline{AE} \cong \overline{CG}$ and $\overline{BE} \cong \overline{DG}$. $\overline{AH} \cong \overline{CF}$. If we add the parts $\overline{AE} + \overline{EB} \cong \overline{CG} + \overline{CD}$ by the addition postulate $\overline{AB} \cong \overline{CD}$. We were also given $\overline{AD} \cong \overline{BC}$.

Therefore $ABCD$ is a parallelogram as it has opposite sides $\cong$.

Therefore $\overline{AB} \parallel \overline{DC}$ and $\overline{AC}$ is a diagonal so the alternate interior angles along this diagonal $\angle EAF \cong \angle HCG$ are $\cong$. By reflexive property $\overline{HF} \cong \overline{HF}$ using the addition postulate again, $\overline{AH} + \overline{HF} \cong \overline{HF} + \overline{FC} (\overline{AF} \cong \overline{CF})$.

So, along with given $\overline{CG} \cong \overline{AE}$, by $\text{SAS} \cong \text{SAS}$ $\triangle AEF \cong \triangle CGH$. Their corresponding parts $\overline{EF} \cong \overline{GH}$ are congruent as well by $\text{COCT}$.

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

Score 6: The student gave a complete and correct response.
35 In the diagram of quadrilateral $ABCD$ with diagonal $AC$ shown below, segments $GH$ and $EF$ are drawn, $AE \equiv CG$, $BE \equiv DG$, $AH \equiv CF$, and $AD \equiv CB$.

Prove: $EF \equiv GH$

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $\angle ABC \equiv \angle CDA$, $AC$ is a diagonal. $GH + EF, AE \equiv CG, BE \equiv DG$, $AH \equiv CF, AD \equiv CB$</td>
<td>Given</td>
</tr>
<tr>
<td>2. $AH \equiv HF$, $AC \equiv AC$</td>
<td>Reflexive (Ref.)</td>
</tr>
<tr>
<td>3. $AH + HF \equiv CF + AH$, $AF \equiv CH$</td>
<td>Addition (1,2)</td>
</tr>
<tr>
<td>4. $AE + BE \equiv CB + DG$, $AB \equiv CB$</td>
<td>Addition (1)</td>
</tr>
<tr>
<td>5. $\triangle ABC \equiv \triangle CDA$</td>
<td>SSS $\equiv$ SSS $(1,2,4)$</td>
</tr>
<tr>
<td>6. $\angle 1 \equiv 4, 2$</td>
<td>CPCTC (5)</td>
</tr>
<tr>
<td>7. $\triangle AEF \equiv \triangle CGH$</td>
<td>SAS $\equiv$ SAS $(1,2,3)$</td>
</tr>
<tr>
<td>8. $EF \equiv GH$</td>
<td>CPCTC (7)</td>
</tr>
</tbody>
</table>

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

Score 6: The student gave a complete and correct response.
Question 35

35 In the diagram of quadrilateral $ABCD$ with diagonal $AC$ shown below, segments $GH$ and $EF$ are drawn, $AE \equiv CG$, $BE \equiv DG$, $AH \equiv CF$, and $AD \equiv CB$.

Prove: $EF \equiv GH$

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

Score 6: The student gave a complete and correct response.
Question 35 continued

\[ \begin{align*}
AE \cong CG & \quad \text{given} \\
BE \cong DG & \quad \text{given} \\
AD \cong BC & \quad \text{given} \\
HF \cong FH & \quad \text{reflexe} \\
AH \cong CF & \quad \text{given}
\end{align*} \]

\[ AB \cong CD \quad \text{Addition} \]

\[ \square ABCD \quad \text{Quadrilateral with opp. sides } \cong \text{ is a } \square \]

\[ AB \parallel CD \quad \text{opp. sides of a } \square \text{ are } \parallel \]

\[ \angle EAF \cong \angle GCH \quad \text{\parallel lines form } \cong \text{ alt. interior } \angle \text{s} \]

\[ \triangle EAF \cong \triangle GCH \quad \text{SAS} \]

\[ EF \cong GH \quad \text{CPCTC} \]
Question 35

35 In the diagram of quadrilateral $ABCD$ with diagonal $AC$ shown below, segments $GH$ and $EF$ are drawn, $AE \cong CG$, $BE \cong DG$, $AH \cong CF$, and $AD \cong CB$.

Prove: $EF \cong GH$

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

Score 5: The student had an incomplete reason in step 6.
35 In the diagram of quadrilateral $ABCD$ with diagonal $AC$ shown below, segments $GH$ and $EF$ are drawn, $AE \cong CG$, $BE \cong DG$, $AH \cong CF$, and $AD \cong CB$.

Prove: $EF \cong GH$

<table>
<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\overline{AH} \cong \overline{CF}$</td>
<td>given</td>
</tr>
<tr>
<td>$\overline{HF} \cong \overline{AF}$</td>
<td>reflexive prop.</td>
</tr>
<tr>
<td>$\overline{AF} \cong \overline{CH}$</td>
<td>addition, possible equality</td>
</tr>
<tr>
<td>$\overline{AB} \parallel \overline{CD}$</td>
<td>given</td>
</tr>
<tr>
<td>$\overline{AB} \parallel \overline{CD}$</td>
<td>given</td>
</tr>
<tr>
<td>$\overline{CD} \parallel \overline{AB}$</td>
<td>given</td>
</tr>
<tr>
<td>$\overline{AE} \cong \overline{CG}$</td>
<td>given</td>
</tr>
<tr>
<td>$\triangle AFE \cong \triangle CHG$</td>
<td>S.A.S.</td>
</tr>
<tr>
<td>$\overline{EF} \cong \overline{GH}$</td>
<td>CPCTC</td>
</tr>
</tbody>
</table>

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

Score 4: The student made a conceptual error by claiming parallel sides came from the quadrilateral in step 5.
Question 35

35 In the diagram of quadrilateral $ABCD$ with diagonal $AC$ shown below, segments $GH$ and $EF$ are drawn, $AE \cong CG$, $BE \cong DG$, $AH \cong CF$, and $AD \cong CB$.

Prove: $EF \cong GH$

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quadrilateral $ABCD$ with diagonal $AC$, segments $GH$ and $EF$ $AE \cong CG$, $AH \cong CF$, $BE \cong DG$, $AD \cong CB$</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. $HF \cong HF$</td>
<td>2. Reflexive property</td>
</tr>
<tr>
<td>3. $AF \cong HC$</td>
<td>3. Addition postulate</td>
</tr>
<tr>
<td>4. $AB \cong DC$</td>
<td>4. Addition postulate</td>
</tr>
<tr>
<td>5. $ABCD$ is a parallelogram</td>
<td>5. Both pairs of opposite sides are congruent</td>
</tr>
<tr>
<td>6. $AD \parallel BC$</td>
<td>6. $ABCD$ is a parallelogram with $AD$ and $BC$ parallel</td>
</tr>
<tr>
<td>7. $\angle EAF \cong \angle ACG$</td>
<td>7. Alternate exterior angles are congruent</td>
</tr>
<tr>
<td>8. $\triangle AFE \cong \triangle ACG$</td>
<td>8. SAS \cong SAS</td>
</tr>
<tr>
<td>9. $EF \cong GH$</td>
<td>9. CPCTC</td>
</tr>
</tbody>
</table>

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

Score 4: The student stated the wrong parallel sides in step 6, followed by an incorrect reason in step 7.
35 In the diagram of quadrilateral $ABCD$ with diagonal $AC$ shown below, segments $GH$ and $EF$ are drawn, $AE \cong CG$, $BE \cong DG$, $AH \cong CF$, and $AD \cong CB$.

Prove: $EF \cong GH$

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. $AE \cong GC$</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. $AH \cong FC$</td>
<td>2. Given</td>
</tr>
<tr>
<td>3. $HF \cong HF$</td>
<td>3. Reflexive</td>
</tr>
<tr>
<td>4. $AH + HF = AF$, $FC + HF = HC$</td>
<td>4. Partition</td>
</tr>
<tr>
<td>5. $AH + HF = HF + FC$</td>
<td>5. Addition property of equality</td>
</tr>
<tr>
<td>6. $AF \cong HC$</td>
<td>6. Substitution</td>
</tr>
<tr>
<td>7. $GH \parallel EF$</td>
<td>7. Given</td>
</tr>
<tr>
<td>8. $\angle HAE \cong \angle HCG$</td>
<td>8. If 2 ( \parallel ) lines crossed by transversal, ( \angle )s ( \cong ) opposite interior ( \angle )s, $AE \cong CG$</td>
</tr>
<tr>
<td>9. $\triangle FAE \cong \triangle HCG$</td>
<td>9. SSS, CPCTC</td>
</tr>
<tr>
<td>10. $EF \cong GH$</td>
<td>10. CPCTC</td>
</tr>
</tbody>
</table>

Score 3: The student made a conceptual error by assuming $GH \parallel EF$ in step 7 and wrote an incorrect statement in step 8 based on the wrong parallel sides.
35 In the diagram of quadrilateral $ABCD$ with diagonal $\overline{AC}$ shown below, segments $GH$ and $EF$ are drawn, $\overline{AE} \cong \overline{CG}$, $\overline{BE} \cong \overline{DG}$, $\overline{AH} \cong \overline{CF}$, and $\overline{AD} \cong \overline{CB}$.

Prove: $\overline{EF} \cong \overline{GH}$

\begin{align*}
S & \quad R \\
1. \overline{AE} \cong \overline{CG}, \overline{AH} \cong \overline{CF} & 2. \text{Given} \\
2. \overline{BE} \cong \overline{DG}, \overline{AD} \cong \overline{CB} & 3. \text{segment addition postulate} \\
3. \overline{AB} \cong \overline{CD} & 3. \text{opposite sides are congruent,} \\
4. \square ABCD & \quad \text{then it's a parallelogram} \\
5. \overline{AC} \cong \overline{AC} & 4. \text{reflexive property} \\
6. \square ABCD \cong \triangle BCA & 5. \text{SSS} \\
6. \overline{G} \overline{H} \cong \overline{E} \overline{F} & 6. \text{CPCTC}
\end{align*}

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

**Score 2:** The student combined two different approaches by proving $ABCD$ is a parallelogram and $\triangle ADC \cong \triangle BCA$, but no further relevant work was shown.
35 In the diagram of quadrilateral $ABCD$ with diagonal $\overline{AC}$ shown below, segments $GH$ and $EF$ are drawn, $\overline{AE} \equiv \overline{CG}$, $\overline{BE} \equiv \overline{DG}$, $\overline{AH} \equiv \overline{CF}$, and $\overline{AD} \equiv \overline{CB}$.

Prove: $\overline{EF} \equiv \overline{GH}$

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Quad $ABCD$ with diagonal $\overline{AC}$, $\overline{GH} &amp; \overline{EF}$</td>
<td>1. Given</td>
</tr>
<tr>
<td>$\overline{AE} \equiv \overline{CG}$, $\overline{BE} \equiv \overline{DG}$</td>
<td>2. Addition Postulate</td>
</tr>
<tr>
<td>$\overline{AH} \equiv \overline{CF}$, $\overline{AD} \equiv \overline{CB}$</td>
<td>3. Reflexive</td>
</tr>
<tr>
<td>2. $\overline{AB} \equiv \overline{DC}$</td>
<td>4. SSS</td>
</tr>
<tr>
<td>3. $\overline{AC} \equiv \overline{AC}$</td>
<td>5. CPCTC</td>
</tr>
<tr>
<td>4. $\triangle ACD \equiv \triangle CAB$</td>
<td></td>
</tr>
<tr>
<td>5. $\overline{GH} \equiv \overline{EF}$</td>
<td></td>
</tr>
</tbody>
</table>

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

Score 2: The student proved $\triangle ACD \equiv \triangle CAB$, but no further correct work was shown.
35 In the diagram of quadrilateral $ABCD$ with diagonal $AC$ shown below, segments $GH$ and $EF$ are drawn, $AE \cong CG$, $BE \cong DG$, $AH \cong CF$, and $AD \cong CB$.

Prove: $EF \cong GH$

Score 1: The student had one correct relevant statement and reason.
Question 35

35 In the diagram of quadrilateral $ABCD$ with diagonal $AC$ shown below, segments $GH$ and $EF$ are drawn, $AE \cong CG$, $BE \cong DG$, $AH \cong CF$, and $AD \cong CB$.

![Diagram of quadrilateral ABCD with diagonal AC and segments GH and EF drawn.]

Prove: $EF \cong GH$

---

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