SAMPLE RESPONSE SET

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31 A patio consisting of two semicircles and a square is shown in the diagram below. The length of each side of the square region is represented by $2x$. Write an expression for the area of the entire patio, in terms of $x$ and $\pi$.

\[
\begin{align*}
(2x)(2x) &= 4x^2 \\
\pi(\frac{x^2}{2}) &= \frac{x^2\pi}{2}
\end{align*}
\]

Area = $4x^2 + \frac{x^2\pi}{2}$

Score 2: The student has a complete and correct response.
31 A patio consisting of two semicircles and a square is shown in the diagram below. The length of each side of the square region is represented by $2x$. Write an expression for the area of the entire patio, in terms of $x$ and $\pi$.

\[
\text{Area of } \bigcap \Theta = \pi r^2 = x^2 \pi \\
\text{Area of } \triangle = (2x)(2x) = 4x^2 \\
\text{Patio} = x^2 \pi + 4x^2 = x^2 (\pi + 4)
\]

**Score 2:** The student has a complete and correct response.
31 A patio consisting of two semicircles and a square is shown in the diagram below. The length of each side of the square region is represented by $2x$. Write an expression for the area of the entire patio, in terms of $x$ and $\pi$.

\[
2x + 2x = 4x^2, \text{ square area}
\]

\[
\pi x^2 = 2, \text{ semicircle area}
\]

\[
\pi \times 5x^2
\]

**Score 1:** The student made one computational error when combining the areas.
Question 31

31 A patio consisting of two semicircles and a square is shown in the diagram below. The length of each side of the square region is represented by $2x$. Write an expression for the area of the entire patio, in terms of $x$ and $\pi$.

\[
\text{Area} = \pi(2x)^2 + (2x)^2 = 4\pi x^2 + 4x^2
\]

Score 1: The student made one conceptual error by using a radius of $2x$ for the area of the semicircles.
31 A patio consisting of two semicircles and a square is shown in the diagram below. The length of each side of the square region is represented by $2x$. Write an expression for the area of the entire patio, in terms of $x$ and $\pi$.

\[
A = \pi r^2 + \pi x^2 + 4x
\]

\[
\frac{2x}{2} = x
\]

\[
A = L \times W
\]

Score 0: The student found the areas of two circles instead of two semicircles and then made one computational error when finding the area of the square.
31 A patio consisting of two semicircles and a square is shown in the diagram below. The length of each side of the square region is represented by $2x$. Write an expression for the area of the entire patio, in terms of $x$ and $\pi$.

\[ A = l \cdot w + \pi \cdot d = (2x)(2x) + \pi (2x) \]

\[ = 4x^2 + 2\pi x \]

\[ \frac{4x^2 + 2\pi x}{2x} \]

\[ = 2x + \pi \]

**Score 0:** The student made one conceptual error by finding the circumference of the semicircles and then made another conceptual error when squaring $2x$. 
32 Clayton is performing some probability experiments consisting of flipping three fair coins.

What is the probability that when Clayton flips the three coins, he gets two tails and one head?

Score 2: The student has a complete and correct response.
Clayton is performing some probability experiments consisting of flipping three fair coins. What is the probability that when Clayton flips the three coins, he gets two tails and one head?

\[ \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} = \frac{3}{8} \]

**Score 2:** The student has a complete and correct response.
32 Clayton is performing some probability experiments consisting of flipping three fair coins. What is the probability that when Clayton flips the three coins, he gets two tails and one head?

\[ \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \frac{3}{2} \]

\[ \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \frac{3}{2} \]

\[ \frac{1}{2} + \frac{1}{2} + \frac{1}{2} = \frac{3}{2} \]

\[ \frac{3}{4} + \frac{3}{4} + \frac{3}{2} = \frac{9}{2} \]

**Score 1:** The student made one conceptual error by adding \( \frac{1}{2} + \frac{1}{2} + \frac{1}{2} \) to get \( \frac{3}{2} \). This conceptual error resulted in a probability greater than 1.
32 Clayton is performing some probability experiments consisting of flipping three fair coins.

What is the probability that when Clayton flips the three coins, he gets two tails and one head?

Score 1: The student made one conceptual error by using each branch of the tree diagram as the denominator.
Clayton is performing some probability experiments consisting of flipping three fair coins. What is the probability that when Clayton flips the three coins, he gets two tails and one head?

\[ TT H = \frac{2}{3} \]

**Score 0:** The student listed one correct outcome, but showed no work to support an incorrect answer.
33 Ross is installing edging around his pool, which consists of a rectangle and a semicircle, as shown in the diagram below.

Determine the length of edging, to the nearest tenth of a foot, that Ross will need to go completely around the pool.

\[
\frac{15 \sqrt{5}}{2} = 23.6 \text{ ft} \\
30 + 30 + 15 = 75 \\
+ 2\pi r = 78.6 \\
98.6 \text{ ft}
\]

**Score 2:** The student has a complete and correct response.
33 Ross is installing edging around his pool, which consists of a rectangle and a semicircle, as shown in the diagram below.

Determine the length of edging, to the nearest tenth of a foot, that Ross will need to go completely around the pool.

Score 1: The student made one conceptual error by finding the circumference of the circle instead of the semicircle.
33 Ross is installing edging around his pool, which consists of a rectangle and a semicircle, as shown in the diagram below.

Determine the length of edging, to the nearest tenth of a foot, that Ross will need to go completely around the pool.

\[ P = (2\pi r) + \frac{1}{2} \times \text{circumference of semicircle} \]

\[ P = 30 + 15 \]

\[ P = 45 \text{ ft} \]

\[ P = 113.6 \text{ ft} \]

Score 1: The student made one conceptual error by finding the perimeter of the rectangle instead of the sum of just three sides.
33 Ross is installing edging around his pool, which consists of a rectangle and a semicircle, as shown in the diagram below.

Determine the length of edging, to the nearest tenth of a foot, that Ross will need to go completely around the pool.

\[30 \times 15 = 450\]
\[\pi (7.5)^2 = 56.25\pi\]
\[176.7\]

Score 0: The student made more than one conceptual error.
33 Ross is installing edging around his pool, which consists of a rectangle and a semicircle, as shown in the diagram below.

Determine the length of edging, to the nearest tenth of a foot, that Ross will need to go completely around the pool.

\[30 + 30 + 15\]

Score 0: The student found 75, but did no further work.
34 Solve the following system of equations algebraically for all values of $x$ and $y$.

\begin{align*}
y &= x^2 + 2x - 8 \\
y &= 2x + 1
\end{align*}

\begin{align*}
y &= x^2 + 2x - 8 \\
y &= 2x + 1
\end{align*}

\begin{align*}
\frac{x^2 + 2x - 8}{-x - 1} &= \frac{2x + 1}{-x - 1} \\
x^2 - 9 &= 0 \\
(x - 3)(x + 3) &= 0 \\
x &= 3 \text{ or } x = -3
\end{align*}

\begin{align*}
y &= 2x + 1 \\
y &= 2(3) + 1 \\
y &= 7
\end{align*}

\begin{align*}
y &= 2x + 1 \\
y &= 2(-3) + 1 \\
y &= -5
\end{align*}

**Score 3:** The student has a complete and correct response.
34 Solve the following system of equations algebraically for all values of \( x \) and \( y \).

\[
\begin{align*}
y &= x^2 + 2x - 8 \\
y &= 2x + 1
\end{align*}
\]

\[
\begin{align*}
2x + 1 &= x^2 + 2x - 8 \\
-2x - 1 &= -2x - 9
\end{align*}
\]

\[x^2 - 9 = (x - 3)(x + 3) = 0\]

\[x = 3, x = -3\]

\[y = 2x + 1\]

\[\begin{align*}
y &= 2 \times 3 + 1 \\
y &= 2 \times (-3) + 1 \quad y = 7 \quad \text{and} \quad y = -5
\end{align*}\]

\[(3, 7) \text{ and } (-3, -5)\]

**Score 3:** The student has a complete and correct response.
34 Solve the following system of equations algebraically for all values of $x$ and $y$.

\[
\begin{align*}
y &= x^2 + 2x - 8 \\
y &= 2x + 1
\end{align*}
\]

\[
\begin{align*}
x^2 + 2x - 8 &= 2x + 1 \\
x^2 - 9 &= 0 \\
x^2 &= 9 \\
x &= 3
\end{align*}
\]

\[
\begin{array}{c}
x = 3 \\
y = 2(3) + 1 = 7
\end{array}
\]

**Score 2:** The student found only one pair of values for $x$ and $y$. 
Question 34

34 Solve the following system of equations algebraically for all values of $x$ and $y$.

\[
\begin{align*}
  y &= x^2 + 2x - 8 \\
  y &= 2x + 1
\end{align*}
\]

\[
\begin{align*}
  x^2 + 2x - 8 &= 2x + 1 \\
  -2x - 1 &= 0 \\
  x^2 - 9 &= 0 \\
  x^2 &= 9 \\
  x &= \pm 3
\end{align*}
\]

Score 2: The student showed correct work, but only found the $x$-values.
Question 34

Solve the following system of equations algebraically for all values of $x$ and $y$.

\[
\begin{align*}
y &= x^2 + 2x - 8 \\
y &= 2x + 1
\end{align*}
\]

\[
\begin{align*}
x^2 + 2x - 8 &= 2x + 1 \\
-1
\end{align*}
\]

\[
\begin{align*}
x^2 + 2x - 9 &= 2x - 2x \\
-2
\end{align*}
\]

\[
\begin{align*}
x^2 - 9 &= 0
\end{align*}
\]

Score 1: The student showed correct work to find $x^2 - 9 = 0$, but showed no further correct work.
Question 34

34 Solve the following system of equations algebraically for all values of \(x\) and \(y\).

\[
\begin{align*}
y &= x^2 + 2x - 8 \\
y &= 2x + 1
\end{align*}
\]

Score 1: The student found the correct answer using a graphical method.
34 Solve the following system of equations algebraically for all values of x and y.

\[ y = x^2 + 2x - 8 \]
\[ y = 2x + 1 \]

\[ y = x^2 + 2x - 8 \]
\[ y = (x+4)(x-2) \]
\[ y = 2x - 2 \]
\[ + 2 \]
\[ \frac{2y}{2} = \frac{4x}{2} \]
\[ y = 2x + 1 \]

Score 0: The student wrote incorrect and irrelevant work.
34. Solve the following system of equations algebraically for all values of $x$ and $y$.

\[
y = x^2 + 2x - 8 \\
y = 2x + 1
\]

\[
x^2 + 2x - 8 = 2x + 1 \\
+ 2x - 1 \\
+ 2 + 1
\]

\[
x^2 + 4x - 7 = 0
\]

**Score 0:** The student made one conceptual error and showed no further correct work to find the appropriate values.
A storage container in the form of a rectangular prism is measured to be 12 inches by 8 inches by 4 inches. Its actual measurements are 11.75 inches by 7.75 inches by 4 inches. Find the relative error in calculating the volume of the container, to the nearest thousandth.

\[
\frac{384 - 364.25}{364.25} = 0.054
\]

**Score 3:** The student has a complete and correct response.
35 A storage container in the form of a rectangular prism is measured to be 12 inches by 8 inches by 4 inches. Its actual measurements are 11.75 inches by 7.75 inches by 4 inches. Find the relative error in calculating the volume of the container, to the nearest thousandth.

Score 3: The student has a complete and correct response.
35 A storage container in the form of a rectangular prism is measured to be 12 inches by 8 inches by 4 inches. Its actual measurements are 11.75 inches by 7.75 inches by 4 inches. Find the relative error in calculating the volume of the container, to the nearest thousandth.

\[ V = lwh \]
\[ = 12 \times 8 \times 4 \]
\[ = 384 \]

\[ V = lwh \]
\[ = 11.75 \times 7.75 \times 4 \]
\[ = 364 \]

\[ \frac{384 - 364}{364} = 0.055 \]

Score 2: The student made one error by prematurely rounding when computing the actual volume.
35 A storage container in the form of a rectangular prism is measured to be 12 inches by 8 inches by 4 inches. Its actual measurements are 11.75 inches by 7.75 inches by 4 inches. Find the relative error in calculating the volume of the container, to the nearest thousandth.

\[
\text{Actual} - \text{calculated} \\
\hline
\text{Actual} \\
12 \quad 11.75 \\
8\frac{3}{8} \\
4 \quad 7.75 \\
11.0625 \\
\text{calculated} \\
\frac{19.75}{364.25} \\
19.75 \\
\frac{364.25000000}{384.86} \\
\frac{384.86}{364.25} \\
19.75 \\
\text{The relative error is} \\
0.050.
\]

Score 2: The student made one computational error.
Question 35

35 A storage container in the form of a rectangular prism is measured to be 12 inches by 8 inches by 4 inches. Its actual measurements are 11.75 inches by 7.75 inches by 4 inches. Find the relative error in calculating the volume of the container, to the nearest thousandth.

Score 2: The student made one error by giving the answer as a percent by multiplying by 100.
A storage container in the form of a rectangular prism is measured to be 12 inches by 8 inches by 4 inches. Its actual measurements are 11.75 inches by 7.75 inches by 4 inches. Find the relative error in calculating the volume of the container, to the nearest thousandth.

\[
V = 2lh + 2wh + 2lh \quad l = 12
\]
\[
\frac{2 \cdot 12 \cdot 8 + 2 \cdot 12 \cdot 4 + 2 \cdot 8 \cdot 4}{352.000}
\]

\[
V = \frac{2 \cdot 11.75 \cdot 7.75 + 2 \cdot 11.75 \cdot 4 + 2 \cdot 7.75 \cdot 4}{338.125}
\]

\[
RE = \frac{m-a}{a}
\]

\[
RE = \frac{352.000-338.125}{338.125}
\]

\[
RE = 0.041
\]

**Score 1:** The student made one conceptual error by finding the relative error of the surface area.
35 A storage container in the form of a rectangular prism is measured to be 12 inches by 8 inches by 4 inches. Its actual measurements are 11.75 inches by 7.75 inches by 4 inches. Find the relative error in calculating the volume of the container, to the nearest thousandth.

\[ V = lwh = 12 \cdot 8 \cdot 4 = 384 \]
\[ V = 11.75 \cdot 7.75 \cdot 4 = \frac{880}{125} \]

\[ \frac{384 - \frac{880}{125}}{384} = \frac{20}{384} = 0.052 \]

**Score 0:** The student made one conceptual error by dividing by 384 and one error by prematurely rounding.
35 A storage container in the form of a rectangular prism is measured to be 12 inches by 8 inches by 4 inches. Its actual measurements are 11.75 inches by 7.75 inches by 4 inches. Find the relative error in calculating the volume of the container, to the nearest thousandth.

\[
\begin{align*}
2(4.8) + 2(12 \cdot 4) + 2(12 \cdot 4) &= 352 \\
2(11.75) + 2(4.1175) + 2(7.75 \cdot 11.75) &= 338.125
\end{align*}
\]

\[
\frac{352 - 338.125}{352} = 0.039
\]

**Score 0:** The student made two conceptual errors by using the surface area and dividing by 352.
Question 35

A storage container in the form of a rectangular prism is measured to be 12 inches by 8 inches by 4 inches. Its actual measurements are 11.75 inches by 7.75 inches by 4 inches. Find the relative error in calculating the volume of the container, to the nearest thousandth.

Score 0: The student obtained a correct answer by an obviously incorrect procedure.
36 Perform the indicated operations and express the answer in simplest radical form.

\[ 3\sqrt[7]{14 + 4\sqrt{56}} \]

\[ 3\sqrt[7]{\sqrt{14} + 8\sqrt{14}} \]

\[ 3\sqrt[7]{(9\sqrt{14})} \]

\[ 18\sqrt{2} \]

**Score 3:** The student has a complete and correct response.
36 Perform the indicated operations and express the answer in simplest radical form.

\[ \frac{3\sqrt{7}(\sqrt{14} + 4\sqrt{56})}{3\sqrt{98} + 12\sqrt{392}} \]

\[ 3 \sqrt{16 \cdot 6} + 12 \sqrt{4 \cdot 98} \]

\[ 12 \sqrt{6} + 24 \sqrt{98} \]

\[ 12 \sqrt{6} + 24 \sqrt{16 \cdot 6} \]

\[ 12 \sqrt{6} + 96 \sqrt{6} \]

\[ 108 \sqrt{6} \]

**Score 2:** The student made one computational error in factoring 98 as 6 \( \cdot \) 16, but wrote an appropriate answer in simplest radical form.
36 Perform the indicated operations and express the answer in simplest radical form.

\[3\sqrt[3]{7} \left( \sqrt[3]{14} + 4\sqrt[3]{56} \right)\]

\[3\sqrt[3]{7} \left( \sqrt[3]{14} + 4\sqrt[3]{56} \right) = 3\sqrt[3]{98} + 12\sqrt[3]{392}\]
\[3\sqrt[3]{98} = 3\sqrt[3]{49 \cdot 2} = 3 \cdot 7\sqrt[3]{2} = 21\sqrt[3]{2}\]
\[12\sqrt[3]{392} = 12\sqrt[3]{16 \cdot 23} = 12 \cdot 2\sqrt[3]{23} = 24\sqrt[3]{23}\]

14\sqrt[3]{2} + 84\sqrt[3]{2} + 24\sqrt[3]{23} = 182\sqrt[3]{2} + 24\sqrt[3]{23}\]

**Score 2:** The student made one computational error, but wrote an appropriate answer in simplest radical form.
Question 36

Perform the indicated operations and express the answer in simplest radical form.

\[
3\sqrt{7}\left(\sqrt{14} + 4\sqrt{56}\right)
\]

\[
3\sqrt{7}\left(\sqrt{14} + 4\sqrt{9\cdot14}\right)
\]

\[
3\sqrt{7}\left(\sqrt{14} + 4(2\sqrt{14})\right)
\]

\[
3\sqrt{7}\left(\sqrt{14} + 8\sqrt{14}\right)
\]

\[
3\sqrt{7}\left(9\sqrt{14}\right)
\]

\[
3\sqrt{7}\left(9\cdot7\sqrt{2}\right)
\]

\[
27\sqrt{7}\sqrt{2}
\]

Score 2: The student made one computational error when multiplying \(\sqrt{7} \cdot \sqrt{7}\).
Perform the indicated operations and express the answer in simplest radical form.

\[ 3\sqrt{7} \left( \sqrt{14} + 4\sqrt{56} \right) \]

\[ = 3\sqrt{7} \left( \sqrt{7 \cdot 2} + 4\sqrt{8 \cdot 7} \right) \]
\[ = 3\sqrt{7} \left( 2\sqrt{7} \cdot 2 + 4\sqrt{2 \cdot 7} \right) \]
\[ = 3\sqrt{7} \left( \sqrt{7 \cdot 2} + 8\sqrt{7 \cdot 2} \right) \]
\[ = 3\sqrt{7} \left( 8\sqrt{2} \right) \]
\[ = 24\sqrt{14} \]
\[ = 24\sqrt{2 \cdot 7} \]
\[ = 24\sqrt{2} \cdot \sqrt{7} \]
\[ = 169\sqrt{2} \]

**Score 1:** The student made two computational errors: \( \sqrt{7 \cdot 2} + 8\sqrt{7 \cdot 2} = 8\sqrt{7 \cdot 2} \) and then \( 7 \cdot 24 = 169 \).
Question 36

36 Perform the indicated operations and express the answer in simplest radical form.

\[3\sqrt{7}\left(\sqrt{14} + 4\sqrt{56}\right)\]

\[3\sqrt{7}(\sqrt{14} + 4\sqrt{56})\]

\[3\sqrt{98} + 12\sqrt{392}\]

\[3\sqrt{98}\]

\[29.70\]

\[29.6984681\]

\[237.5878785\]

\[237.59\]

Score 1: The student showed correct work to find \(3\sqrt{98}\) and \(12\sqrt{392}\), but showed no further correct work.
36 Perform the indicated operations and express the answer in simplest radical form.

\[ 3\sqrt{7} \left( \sqrt{14} + 4\sqrt{56} \right) \]

Score 0: The student expressed the answer as a decimal, only.
Question 36

36 Perform the indicated operations and express the answer in simplest radical form.

\[ 3\sqrt[7]{14 + 4\sqrt{56}} \]

\[ 3\sqrt{21} + 12\sqrt{6}\frac{3}{2} \]

\[ 3\sqrt{21} + 12\cdot 3\sqrt{7} \]

\[ 3\sqrt{21} + 26\sqrt{7} \]

\[ 29\sqrt{28} \]

\[ 58\sqrt{7} \]

Score 0: The student wrote a completely incorrect response.
Question 37

37 During its first week of business, a market sold a total of 108 apples and oranges. The second week, five times the number of apples and three times the number of oranges were sold. A total of 452 apples and oranges were sold during the second week. Determine how many apples and how many oranges were sold the first week. [Only an algebraic solution can receive full credit.]

\[
\begin{align*}
\text{apples: } & \quad x = 64 \\
\text{oranges: } & \quad y = 44
\end{align*}
\]

\[
\begin{align*}
x + y &= 108 \\
6x + 3y &= 452
\end{align*}
\]

\[
\begin{align*}
-1x & \quad -1x \\
-5x & \quad -5x
\end{align*}
\]

\[
\begin{align*}
108 - x &= 452 - 5x \\
3(108 - x) &= 452 - 5x \\
324 - 3x &= 452 - 5x \\
-324 + 5x &= -324 + 5x \\
2x &= 128 \\
2x &= 128 \\
x &= 64
\end{align*}
\]

Score 4: The student has a complete and correct response.
During its first week of business, a market sold a total of 108 apples and oranges. The second week, five times the number of apples and three times the number of oranges were sold. A total of 452 apples and oranges were sold during the second week. Determine how many apples and how many oranges were sold the first week. [Only an algebraic solution can receive full credit.]

\[ 5a = \text{2nd week apples} \]
\[ 3b = \text{2nd week oranges} \]

\[ a + b = 108 \]
\[ 5a + 3b = 452 \]
\[ 3a + 3b = 324 \]
\[ 2a = 128 \]
\[ a = 64 \]

\[ \frac{a}{2} = 32 \text{ apples} \]
\[ \frac{b}{4} = 22 \text{ oranges} \]

They sold 64 apples and 44 oranges the first week.

Score 4: The student has a complete and correct response.
37 During its first week of business, a market sold a total of 108 apples and oranges. The second week, five times the number of apples and three times the number of oranges were sold. A total of 452 apples and oranges were sold during the second week. Determine how many apples and how many oranges were sold the first week. [Only an algebraic solution can receive full credit.]

\[
\begin{align*}
(a + o &= 108) \times 3 \\
(5a + 3o &= 452) - 1 \\
-5a - 3o &= -452 \\
+5a + 3o &= 324 \\
\hline \\
0 &= -128 \\
\frac{-128}{-2} &= 64 \\
\frac{a}{b} &= 64 \\
64 + o &= 108 \\
-64 &= -64 \\
\hline \\
0 &= 34
\end{align*}
\]

64 apples and 34 oranges were sold during the first week.

**Score 3:** The student made one computational error in subtracting 64 from 108.
During its first week of business, a market sold a total of 108 apples and oranges. The second week, five times the number of apples and three times the number of oranges were sold. A total of 452 apples and oranges were sold during the second week. Determine how many apples and how many oranges were sold the first week. [Only an algebraic solution can receive full credit.]

**Score 2:** The student used a method other than algebraic to find the number of apples and oranges.
During its first week of business, a market sold a total of 108 apples and oranges. The second week, five times the number of apples and three times the number of oranges were sold. A total of 452 apples and oranges were sold during the second week. Determine how many apples and how many oranges were sold in the first week. [Only an algebraic solution can receive full credit.]

\[ \begin{align*}
1^{st} \text{ week: total} &= 108 \\
2^{nd} &= 5a + 3x, \text{ total} = 452 \\
5a + 3x &= 452 \\
+3(a + x &= 108) \\
5a + 3x &= 452 \\
3a + 3x &= 324 \\
8a &= 776 \\
a &= 97 \\
108 &= 97 \\
-97 &= 11 \\
x &= 11
\end{align*} \]

**Score 2:** The student made one conceptual error in solving the system of equations.
During its first week of business, a market sold a total of 108 apples and oranges. The second week, five times the number of apples and three times the number of oranges were sold. A total of 452 apples and oranges were sold during the second week. Determine how many apples and how many oranges were sold the first week. [Only an algebraic solution can receive full credit.]

Score 1: The student wrote a correct system of equations, but showed no further correct work.
37 During its first week of business, a market sold a total of 108 apples and oranges. The second week, five times the number of apples and three times the number of oranges were sold. A total of 452 apples and oranges were sold during the second week. Determine how many apples and how many oranges were sold the first week. [Only an algebraic solution can receive full credit.]

Let $x =$ apples
Let $y =$ oranges

\[x + y = 108\]
\[5x + 3y = 452\]
\[6x + 4y = 560\]

Score 1: The student wrote a correct system of equations.
37 During its first week of business, a market sold a total of 108 apples and oranges. The second week, five times the number of apples and three times the number of oranges were sold. A total of 452 apples and oranges were sold during the second week. Determine how many apples and how many oranges were sold the first week. [Only an algebraic solution can receive full credit.]

\[
5x + 3x + 108 = 452 \\
8x + 108 = 452 \\
-108 -108 \\
8x = 344 \\
\frac{8x}{8} = \frac{344}{8} \\
x = 43 \text{ apples}
\]

**Score 0:** The student wrote a completely incorrect response.
38 On the set of axes below, solve the following system of inequalities graphically.

Label the solution set $S$.

\[ 2x + 3y < -3 \]
\[ y - 4x \geq 2 \]

Score 4: The student has a complete and correct response.
38 On the set of axes below, solve the following system of inequalities graphically.

Label the solution set $S$.

\[\begin{align*}
2x + 3y &\leq -3 \\
\frac{3y}{2} &\leq -\frac{2x - 3}{2} \\
y &\leq -\frac{2x}{3} - 1 \\
y &\geq 4x + 2
\end{align*}\]

Score 3: The student did not label at least one graph.
On the set of axes below, solve the following system of inequalities graphically.

Label the solution set $S$.

$$2x + 3y < -3$$
$$y - 4x \geq 2$$

Score 3: The student made one graphing error in graphing the $y$-intercept on the $x$-axis.
38 On the set of axes below, solve the following system of inequalities graphically.
Label the solution set $S$.

\[
\begin{align*}
2x + 3y &< -3 \\
y - 4x &\geq 2 \\
\end{align*}
\]

\[
\begin{align*}
\frac{2x + 3y}{3} &< -\frac{2x - 3}{3} \\
y &< -\frac{2}{3}x - 1 \\
\end{align*}
\]

**Score 2:** The student made three graphing errors by drawing a solid line and shading incorrectly for $2x + 3y < -3$. The student graphed a slope of 2 instead of 4 for $4 - 4x > 2$. 
Question 38

38 On the set of axes below, solve the following system of inequalities graphically.
Label the solution set $S$.

\[
\begin{align*}
2x + 3y &< -3 \\
y - 4x &\geq 2
\end{align*}
\]

Score 2: The student made two graphing errors. The student used a solid line in graphing $2x + 3y < -3$ and also shaded incorrectly.
Question 38

38 On the set of axes below, solve the following system of inequalities graphically.

Label the solution set $S$.

\[
\begin{align*}
2x + 3y &< -3 \\
-x - y &\geq 2 \\
+ \frac{y}{3} &\leq \frac{2x}{3} \\
\frac{y}{3} &\geq \frac{1 - 2x}{3} \\
\end{align*}
\]

Score 2: The student graphed, labeled, and shaded one inequality correctly.
38 On the set of axes below, solve the following system of inequalities graphically.

Label the solution set $S$.

\[
\begin{align*}
2x + 3y &< -3 \\
y - 4x &\geq 2 \\
y &\leq 4x - 2
\end{align*}
\]

Score 0: The student gave a completely incorrect and incoherent response.
38 On the set of axes below, solve the following system of inequalities graphically.

Label the solution set $S$.

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

\[
\begin{align*}
2x + 3y &< -3 \\
\frac{-2x - 4x}{2} &\geq \frac{2x}{2} \\
y &\leq -2x \\
4y &\geq 4x + 2 \\
\end{align*}
\]

\textbf{Score 0:} The student made one conceptual error in solving $2x + 3y < -3$. The student made a graphing error by drawing a solid line for $2x + 3y < -3$ and another graphing error by shading incorrectly for $y - 4x \geq 2$. Neither graph was labeled.
Question 39

During the last 15 years of his baseball career, Andrew hit the following number of home runs each season.

35, 24, 32, 36, 40, 32, 40, 38, 36, 33, 11, 20, 19, 22, 8

State and label the values of the minimum, 1st quartile, median, 3rd quartile, and maximum.

- Min: 8
- 1st quartile: 20
- Median: 32
- 3rd quartile: 36
- Max: 40

Using the line below, construct a box-and-whisker plot for this set of data.

Score 4: The student has a complete and correct response.
39 During the last 15 years of his baseball career, Andrew hit the following number of home runs each season.

35, 24, 32, 36, 40, 32, 40, 38, 36, 33, 11, 20, 19, 22, 8

State and label the values of the minimum, 1st quartile, median, 3rd quartile, and maximum.

\[
\begin{align*}
\text{min} & \quad 8 \\
\text{1st quartile} & \quad 20 \\
\text{median} & \quad 32 \\
\text{3rd quartile} & \quad 36 \\
\text{max} & \quad 40 \\
\end{align*}
\]

Using the line below, construct a box-and-whisker plot for this set of data.

Score 3: The student did not correctly graph the median.
During the last 15 years of his baseball career, Andrew hit the following number of home runs each season.

35, 24, 32, 36, 40, 32, 40, 38, 36, 33, 11, 20, 19, 22, 8

State and label the values of the minimum, 1st quartile, median, 3rd quartile, and maximum.

Using the line below, construct a box-and-whisker plot for this set of data.

Score 2: The student stated an appropriate five-number summary, but excluded one value from the data. The student also made an incorrect box-and-whisker plot.
During the last 15 years of his baseball career, Andrew hit the following number of home runs each season.

35, 24, 32, 36, 40, 32, 40, 38, 36, 33, 11, 20, 19, 22, 8

State and label the values of the minimum, 1st quartile, median, 3rd quartile, and maximum.

Using the line below, construct a box-and-whisker plot for this set of data.

Score 2: The student drew a correct box-and-whisker plot, but did not state or label any values.
39 During the last 15 years of his baseball career, Andrew hit the following number of home runs each season.

35, 24, 32, 36, 40, 32, 40, 38, 36, 33, 11, 20, 19, 22, 8

State and label the values of the minimum, 1st quartile, median, 3rd quartile, and maximum.

- Minimum - 8
- 1st Quartile - 20
- Median - 33
- 3rd Quartile - 38
- Maximum - 40

Using the line below, construct a box-and-whisker plot for this set of data.

Score 1: The student stated and labeled three values and drew an incorrect box-and-whisker plot.
During the last 15 years of his baseball career, Andrew hit the following number of home runs each season.

35, 24, 32, 36, 40, 32, 40, 38, 36, 33, 11, 20, 19, 22, 8

State and label the values of the minimum, 1st quartile, median, 3rd quartile, and maximum.

Mean - 32.5
Lower - 21
Upper - 26

Using the line below, construct a box-and-whisker plot for this set of data.

Score 0: The student wrote a completely incorrect response.