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25 Solve algebraically for $y$:

$$4(y - 3) \leq 4(2y + 1)$$

\[
\begin{align*}
4y - 12 & \leq 8y + 4 \\
-4y & \\ -12 & \leq 4y + 4 \\
-4 & \\
-16 & \leq 4y \\
-4 & \\
-4 & \leq y
\end{align*}
\]

Score 2: The student gave a complete and correct response.
Question 25

25 Solve algebraically for $y$:

\[
\begin{align*}
4(y - 3) & \leq 4(2y + 1) \\
\frac{4}{4} & = \frac{4}{4} \\
-\frac{12}{4} & \leq \frac{8y + 4}{4} \\
-3 & \leq 2y + 1 \\
-4 & \leq 2y \\
-2 & \geq y
\end{align*}
\]

Score 2: The student gave a complete and correct response.
Question 25

Solve algebraically for $y$:

$$4(y - 3) \leq 4(2y + 1)$$

\[
\begin{align*}
4y - 12 & \leq 8y + 4 \\
-4y & \\
12 & \leq 4y + 4 \\
-4 & \\
y & = -4
\end{align*}
\]

Score 1: The student expressed their answer as an equality.
25 Solve algebraically for $y$:

$$4(y - 3) \leq 4(2y + 1)$$

$$4y - 12 \leq 8y + 4$$

Score 0: The student did not show enough work to receive any credit.
26 Graph the function \( f(x) = \left| \frac{1}{2}x + 3 \right| \) over the interval \(-8 \leq x \leq 0\).

Score 2: The student gave a complete and correct response.
26 Graph the function \( f(x) = \left| \frac{1}{2} x + 3 \right| \) over the interval \(-8 \leq x \leq 0\).

Score 1: The student did not graph the function over the correct interval.
26 Graph the function \( f(x) = \left| \frac{1}{2} x + 3 \right| \) over the interval \(-8 \leq x \leq 0\).

Score 0: The student made two graphing errors.
27. The table below shows the height in feet, $h(t)$, of a hot-air balloon and the number of minutes, $t$, the balloon is in the air.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>2</th>
<th>5</th>
<th>7</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (ft)</td>
<td>64</td>
<td>168</td>
<td>222</td>
<td>318</td>
<td>369</td>
</tr>
</tbody>
</table>

The function $h(t) = 30.5t + 8.7$ can be used to model this data table. Explain the meaning of the slope in the context of the problem.

Slope - The height of the hot air balloon increases 30.5 ft every minute.

Explain the meaning of the $y$-intercept in the context of the problem.

$y$-int. - The hot air balloon starts 8.7 ft off the ground.

Score 2: The student gave a complete and correct response.
Question 27

27 The table below shows the height in feet, $h(t)$, of a hot-air balloon and the number of minutes, $t$, the balloon is in the air.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>2</th>
<th>5</th>
<th>7</th>
<th>10</th>
<th>12</th>
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<td>Height (ft)</td>
<td>64</td>
<td>168</td>
<td>222</td>
<td>318</td>
<td>369</td>
</tr>
</tbody>
</table>

The function $h(t) = 30.5t + 8.7$ can be used to model this data table.

Explain the meaning of the slope in the context of the problem.

The slope represents the rate of change of the balloon, meaning how fast the balloon is rising.

Explain the meaning of the $y$-intercept in the context of the problem.

The $y$-intercept represents the height of the balloon at time 0.

Score 2: The student gave a complete and correct response.
Question 27

27 The table below shows the height in feet, $h(t)$, of a hot-air balloon and the number of minutes, $t$, the balloon is in the air.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>2</th>
<th>5</th>
<th>7</th>
<th>10</th>
<th>12</th>
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</thead>
<tbody>
<tr>
<td>Height (ft)</td>
<td>64</td>
<td>168</td>
<td>222</td>
<td>318</td>
<td>369</td>
</tr>
</tbody>
</table>

The function $h(t) = 30.5t + 8.7$ can be used to model this data table. Explain the meaning of the slope in the context of the problem.

Explain the meaning of the $y$-intercept in the context of the problem.

The $y$-intercept represents the starting height of the air balloon.

Score 1: The student gave one correct explanation.
27 The table below shows the height in feet, \( h(t) \), of a hot-air balloon and the number of minutes, \( t \), the balloon is in the air.

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>2</th>
<th>5</th>
<th>7</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height (ft)</td>
<td>64</td>
<td>168</td>
<td>222</td>
<td>318</td>
<td>369</td>
</tr>
</tbody>
</table>

The function \( h(t) = 30.5t + 8.7 \) can be used to model this data table. Explain the meaning of the slope in the context of the problem.

The slope is 30.5 and the \( y \)-intercept is 8.7. The slope means the height in feet, \( h \), of a hot-air balloon.

Explain the meaning of the \( y \)-intercept in the context of the problem.

The \( y \)-intercept 8.7 is the number of minutes the balloon is in the air.

Score 0: The student gave an incorrect response.
28 Factor $x^4 - 16$ completely.

\[ x^4 - 16 = (x^2 - 4)(x^2 + 4) = (x - 2)(x + 2)(x^2 + 4) \]

**Score 2:** The student gave a complete and correct response.
Factor $x^4 - 16$ completely.

\[ x^4 - 16 = (x^2 - 4)(x^2 + 4) = (x - 2)(x + 2)(x^2 + 4) \]

**Score 1:** The student made a conceptual error, but factored $x^2 - 4$ correctly.
Question 28

28 Factor $x^4 - 16$ completely.

\[
(x^2 - 16)(x^2 + 16) = (x + 4)(x - 4)(x^2 + 16)
\]

**Score 1:** The student made one factoring error.
Factor $x^4 - 16$ completely.

\[(x-16)(x+16)(x-16)(x+16)\]

**Score 0:** The student gave a completely incorrect response.
### Question 29

29 Mike knows that \((3, 6.5)\) and \((4, 17.55)\) are points on the graph of an exponential function, \(g(x)\), and he wants to find another point on the graph of this function.

First, he subtracts 6.5 from 17.55 to get 11.05.
Next, he adds 11.05 and 17.55 to get 28.6.
He states that \((5, 28.6)\) is a point on \(g(x)\).

Is he correct? Explain your reasoning.

No, he is not correct. He found the next point as if it was a linear equation, not an exponential equation.

### Score 2: The student gave a complete and correct response.
29 Mike knows that (3,6.5) and (4,17.55) are points on the graph of an exponential function, \( g(x) \), and he wants to find another point on the graph of this function.

First, he subtracts 6.5 from 17.55 to get 11.05.
Next, he adds 11.05 and 17.55 to get 28.6.
He states that (5,28.6) is a point on \( g(x) \).

Is he correct? Explain your reasoning.

\[ y = (0.3302) \cdot (2.7)^x \]
\[ 28.6 = 0.3302 \cdot (2.7)^5 \]
\[ 28.6 \neq 47.3801 \]

He is incorrect because when you plug in 5 it does not equal 28.6.

Score 2: The student gave a complete and correct response.
Mike knows that (3, 6.5) and (4, 17.55) are points on the graph of an exponential function, $g(x)$, and he wants to find another point on the graph of this function.

First, he subtracts 6.5 from 17.55 to get 11.05.

Next, he adds 11.05 and 17.55 to get 28.6.

He states that (5, 28.6) is a point on $g(x)$.

Is he correct? Explain your reasoning.

\[
\begin{align*}
(3,6.5) & (4,17.55) \\
\frac{17.55 - 6.5}{4 - 3} &= \frac{11.05}{1} \\
y &= 11.05x + b \\
6.5 &= 11.05(3) + b \\
6.5 &= 33.15 + b \\
-26.65 &= b
\end{align*}
\]

Mike is correct because the equation would have the equation $g(x) = 11.05x - 26.65$ and the coordinate (5, 28.6) fits into the equation.

**Score 1:** The student wrote a correct justification for a linear function.
Mike knows that $(3,6.5)$ and $(4,17.55)$ are points on the graph of an exponential function, $g(x)$, and he wants to find another point on the graph of this function.

First, he subtracts 6.5 from 17.55 to get 11.05.
Next, he adds 11.05 and 17.55 to get 28.6.
He states that $(5,28.6)$ is a point on $g(x)$.

Is he correct? Explain your reasoning.

Yes, because the rate of change is increasing at a steady amount every time.

Score 0: The student gave a completely incorrect response.
30 Use the method of completing the square to determine the vertex of \( f(x) = x^2 - 14x - 15 \).
State the coordinates of the vertex.

\[
\begin{align*}
x^2 - 14x + 49 & \quad -49 - 15 \\
(x - 7)^2 & \quad -64 \\
\end{align*}
\]

\[
[-7, -64]
\]

Score 2: The student gave a complete and correct response.
30 Use the method of completing the square to determine the vertex of \( f(x) = x^2 - 14x - 15 \). State the coordinates of the vertex.

\[
\begin{align*}
&x^2 - 14x - 15 \\
x^2 - 14x + 49 - 15 - 49
\end{align*}
\]

\[ (x - 7)^2 - 64 \]

Score 1: The student did not state the coordinates of the vertex.
30 Use the method of completing the square to determine the vertex of \( f(x) = x^2 - 14x - 15 \).

State the coordinates of the vertex.

The vertex is \((-7, 64)\).

**Score 1:** The student used a method other than completing the square to find the vertex.
30 Use the method of completing the square to determine the vertex of $f(x) = x^2 - 14x - 15$. State the coordinates of the vertex.

\[
\begin{align*}
  x^2 - 14x &= 7.5 \\
  x^2 - 14x + 7.5 &= 7.5 \\
  (x - 7)^2 &= 7.5
\end{align*}
\]

Score 0: The student gave an incorrect response.
Question 31

31. The temperature inside a cooling unit is measured in degrees Celsius, \( C \). Josh wants to find out how cold it is in degrees Fahrenheit, \( F \).

Solve the formula \( C = \frac{5}{9}(F - 32) \) for \( F \) so that Josh can convert Celsius to Fahrenheit.

\[
\frac{\frac{9}{5}C}{\frac{9}{5}C + 32} = F
\]

**Score 2:** The student gave a complete and correct response.
31 The temperature inside a cooling unit is measured in degrees Celsius, $C$. Josh wants to find out how cold it is in degrees Fahrenheit, $F$.

Solve the formula $C = \frac{5}{9}(F - 32)$ for $F$ so that Josh can convert Celsius to Fahrenheit.

\[
C = \frac{5}{9} F - \frac{5}{9}(32)
\]

\[
C = \frac{5}{9} F - 17.7777...
\]

\[
C + 17.7777... = \frac{5}{9} F
\]

\[
\frac{9C + 160}{5} = F
\]

Score 2: The student gave a complete and correct response.
31 The temperature inside a cooling unit is measured in degrees Celsius, $C$. Josh wants to find out how cold it is in degrees Fahrenheit, $F$.

Solve the formula $C = \frac{5}{9}(F - 32)$ for $F$ so that Josh can convert Celsius to Fahrenheit.

$\frac{5}{9}C = \frac{5}{9}(F - 32)$

$\frac{5}{9}C = F - 32$

$\frac{5}{9}C + 32 = F$

**Score 1:** The student made a computational error.
31 The temperature inside a cooling unit is measured in degrees Celsius, $C$. Josh wants to find out how cold it is in degrees Fahrenheit, $F$.

Solve the formula $C = \frac{5}{9}(F - 32)$ for $F$ so that Josh can convert Celsius to Fahrenheit.

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

32 Solve $4w^2 + 12w - 44 = 0$ algebraically for $w$, to the nearest hundredth.

\[
4w^2 + 12w - 44 = 0
\]

\[
\frac{4w^2 + 12w - 44}{2w + 6} = 0
\]

\[
w = -\frac{-12 \pm \sqrt{(12)^2 - 4(4)(-44)}}{2(4)}
\]

\[
w = -\frac{-12 \pm \sqrt{144 + 44}}{8}
\]

\[
w = -\frac{-12 \pm \sqrt{188}}{8}
\]

\[
w = 2.14, -5.14
\]

Score 2: The student gave a complete and correct response.
Question 32

32 Solve $4w^2 + 12w - 44 = 0$ algebraically for $w$, to the nearest hundredth.

$$
\frac{4w^2 + 12w - 44}{4} = 0
$$

\[
\begin{align*}
\frac{w^2 + 3w - 11}{11} &= 0 \\
\frac{w^2 + 3w + \frac{9}{4}}{11} &= 11 + \frac{9}{4} \\
(w + \frac{3}{2})^2 &= \frac{53}{4} \\
(w + \frac{3}{2})^2 &= \sqrt{\frac{53}{4}} \\
w + \frac{3}{2} &= \pm \sqrt{\frac{53}{4}} \\
w &= -\frac{3}{2} \pm \sqrt{\frac{53}{4}}
\end{align*}
\]

Score 1: The student did not round their answers to the nearest hundredth.
32 Solve $4w^2 + 12w - 44 = 0$ algebraically for $w$, to the *nearest hundredth*.

\[ x = \frac{-12 \pm \sqrt{12^2 - 4(4)(-44)}}{2(4)} \]

\[ x = \frac{-12 \pm \sqrt{848}}{8} \]

**Score 1:** The student did not round their answers to the nearest hundredth.
Question 32

32 Solve \(4w^2 + 12w - 44 = 0\) algebraically for \(w\), to the nearest hundredth.

\[
\begin{align*}
\frac{4w^2 + 12w - 44}{4} &= 0 \\
A &= 4, \quad b &= -3, \quad c &= -11 \\
w^2 + 3w - 11 &= 0 \\
-\frac{3w}{2} + 11 &= \sqrt{w^2} \\
\sqrt{w^2} &= 3w + 11 \\
\omega &= 3w + 11 \\
-8w &= -3w \\
-2w &= 11 \\
2 &= 11 \\
\omega &= -5.6
\end{align*}
\]

Score 0: The student gave an incorrect response.
Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

<table>
<thead>
<tr>
<th>Number of Jumping Jacks x</th>
<th>Heart Rate (bpm) y</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>68</td>
</tr>
<tr>
<td>10</td>
<td>84</td>
</tr>
<tr>
<td>15</td>
<td>104</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>30</td>
<td>120</td>
</tr>
</tbody>
</table>

State the linear regression equation that estimates the heart rate per number of jumping jacks.

Calculator:

\[ y = 1.72x + 69.4 \]

Stat edit, then calc lin reg

State the correlation coefficient of the linear regression equation, rounded to the nearest hundredth.

\[ r \approx 0.97 \]

Explain what the correlation coefficient suggests in the context of this problem.

The correlation coefficient being very close to 1 (perfect line of best fit) suggests that as the number of jumping jacks increases, the heart rate will also increase. There is a very strong correlation between them.

Score 4: The student gave a complete and correct response.
Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

<table>
<thead>
<tr>
<th>Number of Jumping Jacks</th>
<th>Heart Rate (bpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>y</td>
</tr>
<tr>
<td>0</td>
<td>68</td>
</tr>
<tr>
<td>10</td>
<td>84</td>
</tr>
<tr>
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<td>20</td>
<td>100</td>
</tr>
<tr>
<td>30</td>
<td>120</td>
</tr>
</tbody>
</table>

State the linear regression equation that estimates the heart rate per number of jumping jacks.

\[ y = 1.72x + 69.4 \]

State the correlation coefficient of the linear regression equation, rounded to the nearest hundredth.

\[ r = 0.97 \]

Explain what the correlation coefficient suggests in the context of this problem.

Correlation Coefficient suggests that the line is a good representation for the data due to the fact the correlation coefficient is close to 1.

**Score 3:** The student did not write an explanation in the context of the problem.
Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

<table>
<thead>
<tr>
<th>Number of Jumping Jacks x</th>
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<td>100</td>
</tr>
<tr>
<td>30</td>
<td>120</td>
</tr>
</tbody>
</table>

\[
y = a x + b
\]

\[
a = 1.989189189
\]

\[
b = 67.35135135
\]

\[
r^2 = 0.9261407156
\]

\[
r = 0.9623626582
\]

State the linear regression equation that estimates the heart rate per number of jumping jacks.

\[
y = 1.99x + 67.35
\]

State the correlation coefficient of the linear regression equation, rounded to the nearest hundredth.

\[0.96\]

Explain what the correlation coefficient suggests in the context of this problem.

As the number of jumping jacks increases, the heart rate increases.

Score 3: The student made a mistake putting the data in the calculator, but used the values that they got on their calculator display appropriately.
Question 33

33 Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

<table>
<thead>
<tr>
<th>Number of Jumping JACKS ( x )</th>
<th>Heart Rate (bpm) ( y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>68</td>
</tr>
<tr>
<td>10</td>
<td>84</td>
</tr>
<tr>
<td>15</td>
<td>104</td>
</tr>
<tr>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>30</td>
<td>120</td>
</tr>
</tbody>
</table>

State the linear regression equation that estimates the heart rate per number of jumping jacks.

\[
y = a x + b
\]

\[
a = 1.72
\]

\[
b = 68.4
\]

\[
y = 1.72x + 68.4
\]

State the correlation coefficient of the linear regression equation, rounded to the nearest hundredth.

\[r = .96\]

Explain what the correlation coefficient suggests in the context of this problem.

Score 2: The student wrote a correct linear regression equation, but no further correct work was shown.
33 Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

<table>
<thead>
<tr>
<th>Number of Jumping Jacks $x$</th>
<th>Heart Rate (bpm) $y$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<tr>
<td>10</td>
<td>84</td>
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<td>15</td>
<td>104</td>
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<tr>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>30</td>
<td>120</td>
</tr>
</tbody>
</table>

State the linear regression equation that estimates the heart rate per number of jumping jacks.

$$y = 1.72(x) + 69.41$$

State the correlation coefficient of the linear regression equation, rounded to the nearest hundredth.

$$0.98$$

Explain what the correlation coefficient suggests in the context of this problem.

Score 1: The student wrote a correct expression, but no further correct work was shown.
Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

<table>
<thead>
<tr>
<th>Number of Jumping Jacks $x$</th>
<th>Heart Rate (bpm) $y$</th>
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<tbody>
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<td>20</td>
<td>100</td>
</tr>
<tr>
<td>30</td>
<td>120</td>
</tr>
</tbody>
</table>

State the linear regression equation that estimates the heart rate per number of jumping jacks.

$$y = 20x + b$$

State the correlation coefficient of the linear regression equation, rounded to the nearest hundredth.

Explain what the correlation coefficient suggests in the context of this problem.

**Score 0:** The student gave a completely incorrect response.
34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If \( x \) represents the number of pens Hannah bought, write an equation in terms of \( x \) that can be used to find how many of each item she bought.

\[
\begin{align*}
6 + x &= \text{pencils} \\
x - 2 &= \text{erasers} \\
x &= \text{pens}
\end{align*}
\]

Use your equation to determine algebraically how many pens Hannah bought.

\[
\begin{align*}
1.25x + 0.55(x + 4) + 0.75(x - 2) &= 16 \\
1.25x + 2.2 + 0.55x - 1.5 &= 16 \\
2.8x + 0.7 &= 16 \\
\frac{2.8x}{2.8} &= \frac{15.3}{2.8} \\
x &= 6
\end{align*}
\]

6 pens

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

34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If \(x\) represents the number of pens Hannah bought, write an equation in terms of \(x\) that can be used to find how many of each item she bought.

\[
1.25x + .55(x+4) + .75(x-2) = 16
\]

Use your equation to determine algebraically how many pens Hannah bought.

\[
x = 3
\]

\[
1.25(3) + .55(3+4) + .75(3-2) \neq 16
\]

\[
x = 2
\]

\[
1.25(4) + .55(4+4) + .75(4-2) \neq 16
\]

\[
x = 5
\]

\[
1.25(5) + .55(5+4) + .75(5-2) \neq 16
\]

\[
x = 6
\]

\[
1.25(6) + .55(6+4) + .75(6-2) = 16
\]

Score 3: The student wrote a correct equation, but used a method other than algebraic to find 6.
Question 34

34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If \( x \) represents the number of pens Hannah bought, write an equation in terms of \( x \) that can be used to find how many of each item she bought.

\[
1.25x + 0.55(x+4) + 0.75(x-2) = 16
\]

Use your equation to determine algebraically how many pens Hannah bought.

6

Score 3:  The student wrote a correct equation and stated 6, but no algebraic work was shown to find 6.
34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If $x$ represents the number of pens Hannah bought, write an equation in terms of $x$ that can be used to find how many of each item she bought.

\[
10 = 1.25x + 0.55(x+4) + 0.75(x-2)
\]

Use your equation to determine algebraically how many pens Hannah bought.

\[
\begin{align*}
1.25x + 0.55(x+4) + 0.75(x-2) &= 10 \\
1.25x + 0.55x + 2.2 + 0.75x - 1.5 &= 10 \\
2.55x + 12.8 &= 11.5 \\
-12.8 &= -12.8 \\
2.55x &= 2.7 \\
x &= \frac{2.7}{2.55} \\
x &= 1.065 \\
x &\approx 1.07
\end{align*}
\]

Score 2: The student made multiple errors.
34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If \(x\) represents the number of pens Hannah bought, write an equation in terms of \(x\) that can be used to find how many of each item she bought.

\[
\begin{align*}
\text{pen} & \quad \text{pencil} \quad \text{eraser} \\
1.25 & \quad 0.55 & \quad 0.75 \\
\text{\underbrace{1.25x + 0.55\(y\) + 0.75\(z\)} = 16} \\
\end{align*}
\]

Use your equation to determine algebraically how many pens Hannah bought.

\[
\begin{align*}
8 \text{ pencils} & = 4.4 \\
4 \text{ pens} & = 5 \\
2 \text{ erasers} & = 1.5 \\
1.25(4) + 0.55(5) + 0.75(3) & = 16 \\
7.5 & + 5.5 & + 3 & = 16 \\
\end{align*}
\]

hannah bought 6 pens

Score 1: The student stated 6, but no further correct work was shown.
Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If $x$ represents the number of pens Hannah bought, write an equation in terms of $x$ that can be used to find how many of each item she bought.

$$125x + 0.55 + 0.75 = 16$$

Use your equation to determine algebraically how many pens Hannah bought.

$$1.25x + 0.55 + 0.75 = 16.00$$
$$1.25x + 1.30 = 16.00$$
$$2.55x = 16.00$$
$$x = 6.2745098$$

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

35 Graph the system of inequalities on the set of axes below:

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

\[
y \leq -\frac{3}{4}x + 5
\]

Is (6,3) a solution to the system of inequalities? Explain your answer.

\textbf{No, (6,3) does not lie in the solution set of the system of inequalities.}

\textbf{Score 4:} The student gave a complete and correct response.
Graph the system of inequalities on the set of axes below:

\[ y \leq -\frac{3}{4}x + 5 \]
\[ m = -\frac{3}{4} \]
\[ b = (0, 5) \]
\[ 3x - 2y > 4 \]
\[ m = \frac{3}{2} \]
\[ b = (0, -2) \]
\[ y < \frac{3}{2}x - 2 \]

Is \((6,3)\) a solution to the system of inequalities? Explain your answer.

No, this point is not a solution to the system of inequalities, because the point does not work.

Score 3: The student wrote an incomplete explanation.
Graph the system of inequalities on the set of axes below:

\[ y \leq -\frac{3}{4}x + 5 \]

\[ 3x - 2y > 4 \]

Is (6,3) a solution to the system of inequalities? Explain your answer.

\[ 3 \leq -\frac{3}{4} (6) + 5 \]
\[ 3 \leq -18 + 5 \]
\[ 3 \leq -12 \] False

\[ 3(6) - 2(3) > 4 \]
\[ 18 - 6 > 4 \]
\[ 12 > 4 \] True

The point (6,3) is not a solution to the system of inequalities because the point is only true for \( 3x - 2y > 4 \).
Graph the system of inequalities on the set of axes below:

\[
\begin{align*}
y &\leq -\frac{3}{4}x + 5 \\
3x - 2y &> 4 \\
y &\geq 1,5x - 2
\end{align*}
\]

Is (6,3) a solution to the system of inequalities? Explain your answer.

**Score 1:** The student graphed and labeled the equations \( y = -\frac{3}{4}x + 5 \) and \( 3x - 2y = 4 \) correctly, but no further correct work was shown.
35 Graph the system of inequalities on the set of axes below:

\[
\begin{align*}
  y &\leq -\frac{3}{4}x + 5 \\
  3x - 2y &> 4
\end{align*}
\]

Is (6,3) a solution to the system of inequalities? Explain your answer.

**Score 0:** The student did not show enough correct work to receive any credit.
36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function \( f(t) = -16t^2 + 96t + 112 \), where \( t \) is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

\[ \text{112 feet} \]

State the coordinates of the vertex. Explain what it means in the context of the problem.

\[ (3, 256) \]

At 3 seconds, the ball is 256 feet in the air.

State the entire interval over which the ball’s height is decreasing.

\[ \text{Decreas}[3, 7] \]

Score 4: The student gave a complete and correct response.
Question 36

36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function \( f(t) = -16t^2 + 96t + 112 \), where \( t \) is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

\[ 112 \text{ft} \]

State the coordinates of the vertex. Explain what it means in the context of the problem.

\( t = \frac{-b}{2a} = \frac{-96}{2 \cdot -16} = 3 \)
\( y = -16 \cdot 3^2 + 96 \cdot 3 + 112 = 256 \)

It takes 3 seconds for the ball to reach its maximum height, 256 ft.

State the entire interval over which the ball’s height is decreasing.

\[ 3 < t < 7 \]
\[ 0 = -16x^2 + 96x + 112 \]
\[ 0 = -16(x^2 - 6x - 7) \]
\[ 0 = -(6x - 7)(x + 1) \]
\[ x = \frac{7}{6}, -1 \]
\[ x = 7 \]

Score 4: The student gave a complete and correct response.
Question 36

A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function \( f(t) = -16t^2 + 96t + 112 \), where \( t \) is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

112 feet

State the coordinates of the vertex. Explain what it means in the context of the problem.

\[(3, 256)\]

At 3 seconds the ball reaches a maximum height of 256 feet.

State the entire interval over which the ball’s height is decreasing.

from 3 to 7 seconds

Score 4: The student gave a complete and correct response.
36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function \( f(t) = -16t^2 + 96t + 112 \), where \( t \) is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

\[ \text{the platform is 112 feet} \]

State the coordinates of the vertex. Explain what it means in the context of the problem.

\[
\begin{array}{c|c|c|c}
\hline
\text{\( t \)} & \text{\( f(t) \)} \\
\hline
0 & 112 \\
1 & 142 \\
2 & 240 \\
3 & 256 \\
4 & 240 \\
5 & 142 \\
6 & 112 \\
\hline
\end{array}
\]

\( f(3) = 256 \)  

\( (3, 256) \) 

This is the highest height the ball will reach off the ground (256 ft) over a certain amount of time (3 seconds).

State the entire interval over which the ball’s height is decreasing.

\[ x > 3 \]

Score 3: The student did not state a correct interval.
A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function \( f(t) = -16t^2 + 96t + 112 \), where \( t \) is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

\(?\)

State the coordinates of the vertex. Explain what it means in the context of the problem.

\((3, 256)\) - vertex

This point means after 3 seconds, the ball will be at its maximum height of 256 feet.

State the entire interval over which the ball’s height is decreasing.

Score 2: The student correctly stated the coordinates of the vertex and wrote an explanation in the context of the problem, but no further correct work was shown.
Question 36

36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function \( f(t) = -16t^2 + 96t + 112 \), where \( t \) is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

\[
7 \text{ feet}
\]

State the coordinates of the vertex. Explain what it means in the context of the problem.

\[
(2, 256) \text{ feet. All we are looking for is turning point. That's your answer.}
\]

State the entire interval over which the ball’s height is decreasing.

\[
(2, -1)
\]

Score 1: The student correctly stated the coordinates of the vertex, but no further correct work was shown.
A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function \( f(t) = -16t^2 + 96t + 112 \), where \( t \) is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

State the coordinates of the vertex. Explain what it means in the context of the problem.

State the entire interval over which the ball’s height is decreasing.

Score 0: The student gave an incorrect response.
Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If $l$ is the cost of a large plant and $m$ is the cost of a medium plant, write a system of equations that models this situation.

\[
\begin{align*}
4l + 8m &= 40 \\
5l + 2m &= 28
\end{align*}
\]

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

\[
27.5 + 4.5m = 28 \quad \Rightarrow \quad 32 \neq 28
\]

No, if incorrect. Not true.

Determine algebraically both the cost of a large plant and the cost of a medium plant.

\[
\begin{align*}
l &= 4.5 \\
m &= 2.75
\end{align*}
\]

Score 6: The student gave a complete and correct response.
Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If \( L \) is the cost of a large plant and \( m \) is the cost of a medium plant, write a system of equations that models this situation.

\[
\begin{align*}
1L + m &= C \\
L &= \# \text{ of large plants} \\
m &= \# \text{ of medium plants}
\end{align*}
\]

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

Determine algebraically both the cost of a large plant and the cost of a medium plant.

\[
\begin{align*}
4L + 8m &= 40 \\
5L + 2m &= 28
\end{align*}
\]

\[
\begin{align*}
4L + 8m &= 40 \\
5L + 2m &= 28 \\
1L &= \frac{14}{3} \\
m &= \frac{8}{3}
\end{align*}
\]

\[
\begin{align*}
4L + 8m &= 40 \\
-1L &= -\frac{14}{3} \\
3L &= \frac{10}{3} \\
L &= \frac{10}{9}
\end{align*}
\]

\[
\begin{align*}
4L + 8m &= 40 \\
-18 + 8m &= 18 \\
8m &= 26 \\
m &= \frac{13}{4}
\end{align*}
\]

Score 5: The student made one computational error when substituting in 2.50 for the cost of a medium plant instead of 2.25.
Question 37

At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If \( l \) is the cost of a large plant and \( m \) is the cost of a medium plant, write a system of equations that models this situation.

\[
\begin{align*}
4l + 8m &= 40 \\
5l + 2m &= 28
\end{align*}
\]

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

\[
\begin{align*}
&\overbrace{(4 \times 5.50) + (8 \times 2.25) = 40}^\text{4l + 8m} \\
&\overbrace{22 + 18 = 40}^\text{22 + 18} \\
&\overbrace{\cancel{40} = 40}^\text{40 -40}
\end{align*}
\]

Determine algebraically both the cost of a large plant and the cost of a medium plant.

\[
\begin{align*}
&\overbrace{5(5.50) + 2(2.25) = 28}^\text{5l + 2m} \\
&\overbrace{27.50 + 4.50 = 28}^\text{27.50 + 4.50} \\
&\overbrace{32 = 28}^\text{32 = 28} \\
&\overbrace{32 \neq 28}^\text{32 \neq 28}
\end{align*}
\]

Score 4:  The student did not solve the system of equations algebraically to determine the cost of a large plant and the cost of a medium plant.
37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If \( l \) is the cost of a large plant and \( m \) is the cost of a medium plant, write a system of equations that models this situation.

\[
\begin{align*}
4l + 8m &= 40 \\
5l + 2m &= 28
\end{align*}
\]

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

\[
\begin{align*}
4l + 8m &= 40 \\
4(5.50) + 8(2.25) &= 22 + 18 \\
40 &= 40 \quad \text{Yes!}
\end{align*}
\]

Determine algebraically both the cost of a large plant and the cost of a medium plant.

\[
m = 5 - 4 \]

Score 3: The student wrote a correct system of equations, but a justification indicating a positive response was given based upon substituting in only the first equation.
At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If \( l \) is the cost of a large plant and \( m \) is the cost of a medium plant, write a system of equations that models this situation.

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

\[
4(5.50) + 8(2.25) \\
= 22 + 8 \\
= 40
\]

Determine algebraically both the cost of a large plant and the cost of a medium plant.

\[
5(5.50) + 2(2.25) \\
= 27.50 + 4.50 \\
= 32
\]

No!  

Score 2: The student showed a correct justification, but no further correct work was shown.
Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If $l$ is the cost of a large plant and $m$ is the cost of a medium plant, write a system of equations that models this situation.

\[
\begin{align*}
4l + 8m &= 40 \\
5l + 2m &= 28
\end{align*}
\]

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

Determine algebraically both the cost of a large plant and the cost of a medium plant.

Score 1: The student wrote an appropriate system of equations, but not in terms of $l$ and $m.$
Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If \( l \) is the cost of a large plant and \( m \) is the cost of a medium plant, write a system of equations that models this situation.

\[
4l + 10m = 48
\]

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

No because it does not all add up to the final amount of money.

Determine algebraically both the cost of a large plant and the cost of a medium plant.

\[
10(l.85) + 9(5.50) = 68
\]

The cost of a large plant is $5.50

And the cost of a medium plant is $1.85

Score 0: The student gave a completely incorrect response.