Making the Grade (College Algebra Version)

You, as the teaching assistant, are working with a class of students taking College Algebra. You have been doing a review of basic algebra and applications of algebra to solving word problems. Grade the sample student work below first on a 10-point scale, as if these were problems on a quiz or an exam, and then on a 3-point scale, as if these were problems on the homework. Write your scores next to the student work in the appropriate column.

1. Solve \(2(x - 10) - (12x - 4) = 20\).

Student A:

\[
2(x-10)-(12x-4)=20
2x-20-12x+4=20
-10x-16=26
-10x=42
x=-4.2
\]

10-point scale: 3 points

Student B:

\[
2(x-10)-(12x-4)=20
2x-10-12x-4=20
-10x-14=20
-10x=34
x=-\frac{34}{10}=-3\frac{4}{5}
\]

10-point scale: 3 points

Student C:

\[
2(x-10)-(12x-4)=20
2x-20-12x+4=20
-10x-16=20
-10x=36
x=-\frac{36}{10}
\]

\[
x=-3+\frac{3}{5}=-2\frac{2}{5}
\]

10-point scale: 3 points

3-point scale: 3 points
2. The sum of three consecutive odd integers is 81. Find the integers.

Student A:

\[
\begin{align*}
\text{Let } x &= \text{1st odd integer} \\
   x+1 &= \text{2nd odd integer} \\
   x+2 &= \text{3rd odd integer} \\
   x + x+1 + x+2 &= 81 \\
   3x + 3 &= 81 \\
   3x &= 78 \\
   x &= 26
\end{align*}
\]

The integers are \(26, 27, 28\).

Student B:

\[
\begin{align*}
   x &= \text{odd integer} \\
   x+2 &= \text{2nd} \\
   x+4 &= \text{3rd} \\
   x + x+2 + x+4 &= 81 \\
   9x &= 81 \\
   x &= 9
\end{align*}
\]

\((9, 11, 13)\)

Student C:

\[
\begin{array}{cccc}
9 & 19 & 27 & 25 \\
11 & 21 & 29 & 27 \\
13 & 23 & 31 & 29 \\
33 & 63 & 81 & 81
\end{array}
\]
Making the Grade (Calculus I Version)

You, as the teaching assistant, are working with a class of students taking Calculus I. Grade the sample student work below first on a 10-point scale, as if these were problems on a quiz or an exam, and then on a 3-point scale, as if these were problems on the homework. Write your scores next to the student work in the appropriate column.

1. Find the derivative of \( y = \sec^2(1 + 3x) \).

<table>
<thead>
<tr>
<th>Student A:</th>
<th>10-pt scale</th>
<th>3-pt scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>( y = (\sec u)^2 ) \hspace{1cm} u = 1 + 3x \</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( y' = 2(\sec(1 + 3x))(\sec x \tan x) \cdot 3 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( = 6 \sec x \tan x \sec(1 + 3x) )</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Student B:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>( y' = 2 \cdot 3 \sec(1 + 3x) \tan(1 + 3x) )</td>
<td></td>
</tr>
<tr>
<td>( = 6 \sec(1 + 3x) \tan(1 + 3x) )</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student C:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>( y = \sec(1 + 3x) \cdot \sec(1 + 3x) )</td>
<td></td>
</tr>
<tr>
<td>( \sec \tan(1 + 3x) \cdot 3 \cdot \sec(1 + 3x) \cdot 3 )</td>
<td></td>
</tr>
<tr>
<td>( \frac{18 \sec \tan(1 + 3x)}{18 \sec \tan(1 + 3x)} )</td>
<td></td>
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<thead>
<tr>
<th>Student D:</th>
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</thead>
<tbody>
<tr>
<td>( y' = \tan(1 + 3x) \cdot 3 )</td>
<td></td>
</tr>
</tbody>
</table>
2. Let \( f(x) = \sqrt{2x^2 - 4} \). Find \( \lim_{x \to 2} \frac{f(x) - f(2)}{x - 2} \).

Student A:

\[
\lim_{x \to 2} \frac{\sqrt{2x^2 - 4} - \sqrt{2(2)^2 - 4}}{x - 2} = \lim_{x \to 2} \frac{x - 2}{x - 2} = \frac{2}{2} = 1
\]

Student B:

\[
f(x) = \sqrt{2x^2 - 4}
\]

\[
x(2) = \sqrt{2(2)^2 - 4} = \sqrt{8 - 4} = 2
\]

\[
\lim_{x \to 2} \frac{\sqrt{2x^2 - 4} - 2}{x - 2} \cdot \frac{x - 2}{\sqrt{2x^2 - 4} + 2} = \lim_{x \to 2} \frac{2x^2 - 4}{(x - 2)(\sqrt{2x^2 - 4} + 2)}
\]

\[
= \lim_{x \to 2} \frac{2x^2}{x - 2(\sqrt{2x^2 - 4} + 2x)} = \frac{2(2)^2}{0 + 8 - 4} = \frac{8}{4} = 2
\]

Student C:

\[
\lim_{x \to 2} \frac{\sqrt{2x^2 - 4} - 2}{x - 2} = 0
\]

\[
\lim_{x \to 2} \frac{(2x^2 - 4)^{\frac{1}{2}} - 2}{x - 2} = \lim_{x \to 2} \frac{2(x^2 - 4) \cdot 4x}{(x - 2)(x + 2)}
\]

\[
= \lim_{x \to 2} \frac{2(2x^2 - 4) \cdot 4x}{1} = 2(8 - 4) = 64
\]