

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 $2(x - 10) - (12x - 4) = 20$. 10-point scale 3-point scale

Student A:

$$\begin{aligned}2(x-10) - (12x-4) &= 20 \\2x - 20 - 12x + 4 &= 20 \\-10x - 16 &= 20 \\-10x &= 24 \\x &= -4.2\end{aligned}$$

Student B:

$$\begin{aligned}2(x-10) - (12x-4) &= 20 \\2x - 10 - 12x - 4 &= 20 \\-10x - 14 &= 20 \\-10x &= 34 \\x &= -\frac{34}{10} = \underline{\underline{-3\frac{2}{5}}}\end{aligned}$$

Student C:

$$\begin{aligned}2(x-10) - (12x-4) &= 20 \\2x - 20 - 12x + 4 &= 20 \\-10x - 16 &= 20 \\-10x &= 36 \\x &= -\frac{36}{10} \\x &= -3 + \frac{3}{5} = -2\frac{2}{5} \\x &= -2\frac{2}{5}\end{aligned}$$

2. The sum of three consecutive odd integers is 81. Find the integers.

10-point scale 3-point scale

Student A:

let $x = 1^{\text{st}}$ odd integer
 $x+1 = 2^{\text{nd}}$ odd integer
 $x+2 = 3^{\text{rd}}$ odd integer

$$x + x + 1 + x + 2 = 81$$

$$3x + 3 = 81$$

$$3x = 78$$

$$x = 26$$

The integers are 26, 27, 28

Student B:

$x = \text{odd integer}$

$x+2 = 2^{\text{nd}}$

$x+4 = 3^{\text{rd}}$

$$x + x + 2 + x + 4 = 81$$

$$3x = 81$$

$$x = 9$$

9, 11, 13

Student C:

~~$$\begin{array}{r} 9 \\ 11 \\ 13 \\ \hline 33 \end{array}$$~~

~~$$\begin{array}{r} 19 \\ 21 \\ 23 \\ \hline 63 \end{array}$$~~

~~$$\begin{array}{r} 27 \\ 29 \\ 31 \\ \hline 87 \end{array}$$~~

$$\begin{array}{r} 25 \\ 27 \\ 29 \\ \hline 81 \end{array}$$

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 $y = \sec^2(1 + 3x)$.

10-pt scale

3-pt scale

Student A:

$$y = (\sec u)^2 \quad u = 1 + 3x$$

$$y' = 2(\sec(1+3x))(\sec x \tan x) \cdot 3$$

$$= 6 \sec x \tan x \sec(1+3x)$$

Student B:

$$y' = 2 \cdot 3 \sec(1+3x) \tan(1+3x)$$

$$= 6 \sec(1+3x) \tan(1+3x)$$

Student C:

$$y = \sec(1+3x) \cdot \sec(1+3x)$$

$$\sec \tan(1+3x) \cdot 3 \cdot \sec \tan(1+3x) \cdot 3$$

$$\boxed{18 \sec \tan(1+3x)}$$

Student D:

$$y' = \tan(1+3x) \cdot 3$$

2. Let $f(x) = \sqrt{2x^2 - 4}$. Find $\lim_{x \rightarrow 2} \frac{f(x) - f(2)}{x - 2}$.

10-pt scale 3-pt scale

Student A:

$$\lim_{x \rightarrow 2} \frac{\sqrt{2x^2 - 4} - \sqrt{2(2)^2 - 4}}{x - 2}$$

$$\lim_{x \rightarrow 2} \frac{\sqrt{2x^2 - 4} - 2}{x - 2} = \frac{\sqrt{4} - 2}{2 - 2} = \frac{2 - 2}{0} = \frac{0}{0}$$

Student B:

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

$$f(2) = \sqrt{2(2)^2 - 4} = \sqrt{8 - 4} = 2$$

$$\lim_{x \rightarrow 2} \frac{\sqrt{2x^2 - 4} - 2}{x - 2} \cdot \frac{\sqrt{2x^2 - 4} + 2}{\sqrt{2x^2 - 4} + 2}$$

$$= \lim_{x \rightarrow 2} \frac{2x^2 - 4 - 4}{(x - 2)(\sqrt{2x^2 - 4} + 2) + 2(x - 2)}$$

$$= \lim_{x \rightarrow 2} \frac{2x^2}{(x - 2)\sqrt{2x^2 - 4} + 2x^2 - 4}$$

$$= \frac{2(2)^2}{0 + 8 - 4} = \frac{8}{4} = \boxed{2}$$

Student C:

$$\lim_{x \rightarrow 2} \frac{\sqrt{2x^2 - 4} - 2}{x - 2} \stackrel{0}{=} \lim_{x \rightarrow 2} \frac{(2x^2 - 4)^2 - 2}{x - 2}$$

$$\stackrel{L'H}{=} \lim_{x \rightarrow 2} \frac{2(2x^2 - 4) \cdot 4x}{1} = 2(8 - 4) \cdot 8 = \boxed{64}$$