

MINOR ALGEBRA MISTAKES FROM MIDTERM 2

$$\frac{1}{1+(t^4)^2} = \frac{1}{1+t^6}$$

$$5^{\arcsin 0} = 5$$

MAJOR ALGEBRA MISTAKES FROM MIDTERM 2

THESE SHOW A LACK OF UNDERSTANDING OF IMPORTANT FUNDAMENTALS

$$\ln(5^{\arcsin x} + \tan x) = \ln(5^{\arcsin x}) + \ln(\tan x)$$

$$\ln(5^{\arcsin x} + \tan x) = \ln(5^{\arcsin x}) \cdot \ln(\tan x)$$

$$\ln(5^{\arcsin x} + \tan x) = (\arcsin x) \ln(5 + \tan x)$$

$$\ln(5^{\arcsin x} + \tan x) = \arcsin(\ln(5 + \tan x))$$

$$\ln 5^{\arcsin x} = \arcsin(\ln 5)$$

$$\frac{d}{dx} \ln 5 = \frac{1}{5}$$

$$\arcsin x = \frac{1}{\sqrt{1-x^2}}$$

$$5^{\arcsin x} = 5^{\frac{1}{\sqrt{1-x^2}}}$$

$$\frac{d}{dx} \ln(\tan x) = \frac{1}{\sec^2 x}$$

$$\tan^{-1} t^3 = \frac{1}{\tan t^3}$$

$$\tan^{-1} t^3 = (\tan^{-1} x) \cdot t^3$$

$$\tan^{-1} t^3 = (\tan^{-1}) \cdot (t^3)$$

$$\ln(\sec t)^{\cot t} = (\sec t)(\ln \cot t)$$

$$\sec x = \frac{1}{\sin x}$$

$$\frac{1}{\sqrt[3]{x}} = x^{\frac{1}{3}}$$

$$\frac{(3x+5)^2}{\sqrt{x}} = \left(\frac{3x+5}{\sqrt{x}} \right)^2$$

COMMENTS ABOUT COMMON PROBLEMS

Most students who took the derivative of $f(x) = x^{\frac{2}{3}}(x-4)$ using the product rule got it wrong, or could not solve $f'(x) = 0$ because their derivative was so complicated.

Whereas, most students who rewrote the function as $f(x) = x^{\frac{5}{3}} - 4x^{\frac{2}{3}}$ before taking the derivative and factoring, were able to solve $f'(x) = 0$ easily.

Many students did not know that $16^{\frac{3}{4}} = (\sqrt[4]{16})^3 = 2^3 = 8$

MINOR MISTAKES FROM QUIZ 6

If $f(x) = x^{\frac{2}{3}}(x-4)$, then $f(0) = 0^{\frac{2}{3}}(0-4) = -4$

$$2(x-4) = 2x-4$$

$$2(-0.5) = 0.25$$

$$15.92 - 16 = .08 \text{ or } .92$$

MAJOR MISTAKES FROM QUIZ 6

THESE SHOW A LACK OF UNDERSTANDING OF IMPORTANT FUNDAMENTALS

$f(x) = x^{\frac{2}{3}}$ is a polynomial

$$\left(-\frac{8}{4}\right)(-0.5) = -2 - 0.5 = -2.5$$

$\sqrt[3]{1}$ is undefined

If $c^{\frac{1}{3}} = 2$, then $c = \sqrt[3]{2}$

$$\frac{3}{4\sqrt[4]{16}} = \frac{3}{4\sqrt{2}}$$

$$\frac{3}{4\sqrt[4]{16}} = \frac{3}{4\sqrt[4]{2}}$$

$$16^{-\frac{1}{4}} = \frac{1}{16^{\frac{1}{4}}} = \frac{1}{65536}$$

$$16^{-\frac{1}{4}} = 16^{\frac{3}{4}}$$

$$16^{-\frac{1}{4}} = \frac{1}{\sqrt{16}} = \frac{1}{4}$$

$$16^{-\frac{1}{4}} = \sqrt[4]{16}$$

$$16^{\frac{3}{4}} = \frac{3}{4}$$

$$\sqrt[3]{\frac{64}{25}} = \frac{\sqrt[3]{64}}{25}$$

$$\frac{2}{3}(x-4) + x = \frac{2}{3}(2x-4)$$

$$\frac{3}{4} + \frac{3}{16}(x-16) = \left(\frac{3}{4} + \frac{3}{16}\right)(x-16) = \frac{15}{16}(x-16) = \frac{15}{16}x - 15$$

$$\frac{d}{dx}[x^{\frac{2}{3}}(x-4)] = \left(\frac{d}{dx}x^{\frac{2}{3}}\right)\left(\frac{d}{dx}(x-4)\right)$$

$$\frac{d}{dx}[x^{\frac{2}{3}}(x-4)] = \left(\frac{d}{dx}x^{\frac{2}{3}}\right)(x-4)$$

MINOR MISTAKES FROM QUIZ 7

$$\frac{1-0+1}{0} \rightarrow \frac{0}{0}$$

$$(1 - \cos x)' = 1 + \sin x$$

$$(x - \sin x)' = -\cos x$$

$$\text{If } f''(x) = 12x^2 e^{-x} + 8x^3 e^{-x} + x^4 e^{-x}, \text{ then } f''(0) > 0$$

MINOR MISTAKES FROM QUIZ 8

$$\frac{1}{\frac{1}{2}} = \frac{1}{2}$$

$$\frac{d}{dx} x^{-1} = -2x^{-2}$$

MAJOR MISTAKES FROM QUIZ 8

THESE SHOW A LACK OF UNDERSTANDING OF IMPORTANT FUNDAMENTALS

$$\lim_{x \rightarrow 0^+} \ln x = 0 \text{ or } 1$$

$$\text{As } x \rightarrow 0^+, \cos x - 1 \rightarrow 0^+$$

$$\frac{\infty}{0} \text{ is an indeterminate form}$$

$$\frac{1}{0} \times 0 = 1$$

$$\text{If } x \text{ is the length of the base of a box, then } 0 > x > \infty.$$

$$\text{If you have 900 square inches of material, you can make a square base that is 900 inches} \times 900 \text{ inches.}$$

$$\sqrt{x} = x^{-2}$$

$$x^{-\frac{1}{2}} = \frac{1}{x^2}$$

$$x \sin \frac{2}{x} = \frac{\sin \frac{2}{x}}{x}$$

$$\frac{d}{dx} \tan x = \tan x \sin x$$

$$\frac{d}{dx} \sin \frac{2}{x} = \cos \frac{2}{x}$$

$$\frac{d}{dx} \ln(1+4x) = \frac{1}{1+4x}$$

$$\frac{d}{dx} \cos x \ln(1+4x) = (-\sin x) \left(\frac{4}{1+4x} \right)$$

$$\lim_{x \rightarrow 0^+} \cot x \ln(1+4x) = \lim_{x \rightarrow 0^+} \cot x \frac{1}{1+4x}$$

$$\text{L'Hopital's Rule says that } \lim_{x \rightarrow a} f(x)g(x) = \lim_{x \rightarrow a} f'(x)g'(x)$$

$$\text{L'Hopital's Rule says that } \lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \lim_{x \rightarrow a} \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$