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 $f(0) = 0^{\frac{2}{3}}(0-4) = -4$

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

$2(-0.5) = 0.25$

$15.92 - 16 = .08$ 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 $c = \sqrt[3]{2}$

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

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

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

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

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

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

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

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

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

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

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

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

MINOR MISTAKES FROM QUIZ 7

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

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

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

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

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

As $x \to 0^+$, $\cos x - 1 \to 0^+$

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

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

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

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

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

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

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

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

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

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

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

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

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

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