APCalculusAB
Wednesday,January8,2014

FindtheMCpartoftheexam(youhavethis).Ihaveplacedyour answers(includingthecorrectanswers)onyourdesk.Pleasestartto looktheseover.

WewilltakeparttwooftheexamonFriday.ThiswillconsistofTWO freeresponsequestions;onecalculatoractiveandonecalculator inactive.

5. $f(x) = x^3 - 2x^2 + 8x + 4$

$g(x) = f^{-1}(x)$

Means $g(f(x)) = x$

Let's use imp. diff & find $g'(x)$

$g'(f(x)) \cdot f'(x) = 1$

This gives us $f'(x)$. We need $g'(x)$.

We need to think of the inverses in the other way.

$g(f(x)) = x$ then $f(g(x)) = x$.

Take deriv of

$f'(g(x)) \cdot g'(x) = 1$

Now we can solve for $g'(x)$.

$$g'(x) = \frac{1}{f'(g(x))}$$

We want $g'(5)$. Plug in 5 for x.

$$g'(5) = \frac{1}{f'(g(5))}$$

If (a, b) is on $f(x)$, $\underline{(b, a)}$ is on $g(x)$.

$5 = x^3 - 2x^2 + 8x + 4$

$0 = x^3 - 2x^2 + 8x - 1$

Poss. Rational Roots are ± 1

$1^3 - 2 \cdot 1^2 + 8 \cdot 1 - 1$

$1 - 2 + 8 - 1 \neq 0$

$(-1)^3 - 2(-1)^2 + 8(-1) - 1$

$-1 - 2 - 8 - 1 \neq 0$

Is there a relationship between the derivative and derivative of the inverse?

$$f(g(x))=x \qquad g(f(x))=x$$

$$f'(g(x))\cdot g'(x)=1 \qquad g'(f(x))\cdot f'(x)=1$$

$$f(x)=x^3-2x^2+8x+4$$

$$f(5)=5^3-2\cdot5^2+8\cdot5+4$$
$$=125-50+40+4$$
$$=119$$

$$f'(x)=3x^2-4x+8$$

$$f'(5)=3\cdot5^2-4\cdot5+8$$
$$=75-20+8$$
$$=63$$

??

$$\frac{1}{63}=g'(5)$$

$$\frac{1}{f'(5)}=g'(5)$$

(13) $C = 2\pi r$

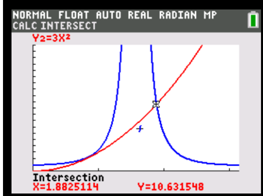
$\frac{dC}{dt} = 2\pi \cdot \frac{dr}{dt}$ Given $\frac{dr}{dt} = \frac{1}{2} \frac{m}{sec}$

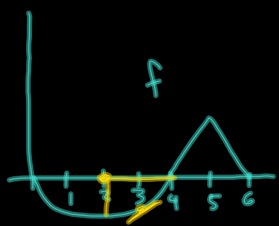
$\frac{dC}{dt} = 2\pi \cdot \frac{1}{2} m/sec = \pi m/sec$

(19) $f(x) = \tan x$ $g(x) = x^3$

$f'(x) = \sec^2 x$ $g'(x) = 3x^2$

$\sec^2 x = 3x^2$





$f'(3) = ?$

$f'(3)$ means slope of f @ $x=3$.

Circle: $(x-h)^2 + (y-k)^2 = r^2$

$(h,k) \rightarrow (2,0)$ $r=2$

$(x-2)^2 + y^2 = 4$

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

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

$f(x) = -1 \cdot \left(4 - (x^2-4x+4)\right)^{1/2}$

$f(x) = -1(-x^2+4x)^{1/2}$

$f'(x) = -1(-2x+4)(-x^2+4x)^{-1/2} \cdot \frac{1}{2}$

$f'(3) = \frac{-1(-6+4)}{\sqrt{3}} \cdot \frac{1}{2} = \frac{1}{\sqrt{3}}$

$$\text{accel} = \frac{\Delta \text{velocity}}{\text{time}}$$

$$a(6) \approx \frac{v(8) - v(4)}{8-4} = \frac{55.9 - 61.7}{4}$$

$$\approx -1.45 \ \frac{\text{ft}}{\text{sec}^2}$$

(24) Set 2nd deriv = 0

$$y' = 3x^2 + 8x + 5 + 2\sin x$$

$$y'' = 6x + 8 + 2\cos x$$

$$6x + 8 + 2\cos x = 0$$

have to solve by graphing