22. $\int_0^1 f'(x)\,dx = 3$

$f(0) = 5$

$f(1) = f(0) + \int_0^1 f'(x)\,dx = 8$

16. $(1,7)$ $(-2,-2)$

$f'(1) = ?$ $m = \frac{7+2}{1+2} = \frac{9}{3} = 3$

26. $3y^2 - 2x^2 = 6 - 2xy$ $(3,2)$

$6y\frac{dy}{dx} - 4x = -2y - 2x\frac{dy}{dx}$

$6y\frac{dy}{dx} + 2x\frac{dy}{dx} = 4x - 2y$

$\frac{dy}{dx}(6y+2x) = 4x - 2y$

$\frac{dy}{dx} = \frac{4x-2y}{6y+2x}$

$\frac{dy}{dx} = \frac{4x-2y}{6y+2x}\Big|_{(3,2)} = \frac{12-4}{12+6} = \frac{8}{18} = \frac{4}{9}$

27. derivative & inverses

$f(a) = b \rightarrow f^{-1}(b) = a$

$f'(a) = c \rightarrow (f^{-1})'(b) = \frac{1}{c}$

$f(x) = x^3 + x$ $g(x) = f^{-1}(x)$ $g(\underset{b}{2}) = \underset{a}{1}$

$3x^2 + 1$ $g'(2) = \frac{1}{4}$

$f'(1) = 4$ $g'(2) = \frac{1}{4}$

77. $\int_{-3}^{3} (f(x) + 1)\,dx$

$= \int_{-3}^{3} f(x)\,dx + \int_{-3}^{3} 1\,dx$

$= -2 + x\Big|_{-3}^{3} = -2 + (3 - -3) = 4$

23. $\frac{d}{dx}\left(\int_0^{x^2} \sin(t^3)\,dt\right)$

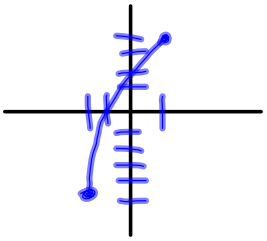
$\sin x^6 \cdot 2x$ chain rule

83. $\frac{1}{b-a}\int_a^b f(x)\,dx$

$= \frac{1}{3}\int_0^3 (e^t + te^t)\,dt$

A.

80. $f(-2) = -5$ $f(1) = 4$



A → True by IVT

B. – could be false

C. True by IVT

D. True by MVT

E. True has an abs. max.

84. $\int T'(t) = \int -110e^{-.4t}$

$T(t) = 275e^{-.4t}\Big|_0^5 = -237.783$

$+350$

$\approx 112°$

89. $g(x) = x \cdot f(x)$ $f(2) = 3$ $f'(2) = -5$

m: $g'(x) = f(x) + xf'(x)$

$g'(2) = f(2) + 2f'(2)$

$= 3 + 2(-5) = -7$

19. $\int f' = \int 2x + 3$ $(1, 2)$

$f = x^2 + 3x + C$

$2 = 1 + 3 + C$

$C = -2$