CH 3 AB CALC REVIEW

1. Let $f(x) = x^2 + \frac{2}{x^2}$, then $f'(-2) =$

$f'(x) = 2x - \frac{4}{x^3}$ $\quad f'(-2) = -4 - \frac{4}{-8}$

$= -\frac{7}{2}$

(A) $\frac{-9}{2}$ (B) 5 (C) $\frac{-7}{2}$ (D) -8 (E) none of these

2. $\lim_{h \to 0}\left[\frac{5(x+h)^2 - 5x^2}{h}\right]$ (fast!!)= $\frac{d}{dx}(5x^2) = 10x$

(A) 5x (B) 10x (C) $5x^2$ (D) 10x + 5h (E) none of these

3. If $y = \cos^2\frac{x}{2} - \sin^2\frac{x}{2}$,

then $y' = 2\cos\left(\frac{x}{2}\right)\left(-\sin\left(\frac{x}{2}\right)\right)\left(\frac{1}{2}\right) - 2\sin\left(\frac{x}{2}\right)\cos\left(\frac{x}{2}\right)\left(\frac{1}{2}\right) = -2\sin\frac{x}{2}\cos\frac{x}{2}$

$= -\sin x$

(A) 0 (B) $\cos x$ (C) $\sin x$ (D) $-4\sin\frac{x}{2}\cos\frac{x}{2}$ (E) $-\sin x$

4. If $f(x) = 2\sin\frac{x}{2} + 8\cos\frac{x}{2}$, then $f'\left(\frac{\pi}{2}\right) =$

$f'(x) = \left(2\cos\frac{x}{2}\right)\frac{1}{2} - \left(8\sin\frac{x}{2}\right)\left(\frac{1}{2}\right)$

$f'\left(\frac{\pi}{2}\right) = \cos(\pi/4) - 4\sin\pi/4$

(A) $5\sqrt{2}$ (B) $-3\sqrt{2}$ (C) $\frac{-3\sqrt{2}}{2}$ (D) $3\sqrt{2}$ (E) $\frac{3}{\sqrt{2}}$

$= \frac{\sqrt{2}}{2} - 4\left(\frac{\sqrt{2}}{2}\right) = -\frac{3\sqrt{2}}{2}$.

5. If $f(x) = (2x+1)^4$, then the 4th derivative of $f(x)$ at x = 0 is

$f'(x) = 4(2x+1)^3(2)$

$f''(x) = 24(2x+1)^2(2)$

$f'''(x) = 96(2x+1)(2)$

$f^{iv}(x) = 96(2)(2)$

(A) 0 (B) 24 (C) 48 (D) 240 (E) 384

6. If $y = \frac{3}{4+x^2}$, then $\frac{dy}{dx} = -3(4+x^2)^{-2}(2x)$

$y = 3(4+x^2)^{-1}$ $\quad = \frac{-6x}{(4+x^2)^2}$

(A) $\frac{-6x}{(4+x^2)^2}$ (B) $\frac{3x}{(4+x^2)^2}$ (C) $\frac{6x}{(4+x^2)^2}$

(D) $\frac{-3}{(4+x^2)^2}$ (E) $\frac{3}{2x}$

7. if $f(x) = x$, then $f'(5) =$

(A) 0 (B) $\frac{1}{5}$ (C) 1 (D) 5 (E) $\frac{25}{2}$

8. The function defined by $f(x) = x^3 - 3x^2$ for all real numbers, x has a relative maximum at x =

$f'(x) = 3x^2 - 6x = 0$

$3x(x-2) = 0$

+ | − | +

0 2

relative max

(A) -2 (B) 0 (C) 1 (D) 2 (E) 4

9. If $\frac{dy}{dx} = \cos(2x)$, then y =

(A) $-\frac{1}{2}\cos(2x) + c$ (B) $-\frac{1}{2}\cos^2(2x) + c$ (C) $\frac{1}{2}\sin(2x) + c$

(D) $\frac{1}{2}\sin^2(2x) + c$ (E) $-\frac{1}{2}\cos(2x) + c$

Answers:

Multiple Choice :

1. c 2. b 3. e 4. c 5. e 6. a 7. c 8. b 9. c

Free Response:

1. a) t = 5 ; b) velocity = 50ft/sec, speed = 50ft/sec, acceleration = $0 ft/s^2$; c) $0 < t < 4$ d) (5, 6)

2. a) 8x-4 b) $4x\cos(2x^2+1)$; c) $\frac{5}{2} + \frac{3}{x^2} - \frac{8}{x^3}$

3. a) $v = -6t^2 + 12t$; b) $a = -12t + 12$; c) -4; d) -18; e) 18; f) -24; g) speeding up; h) left

4. a) $-10x^{-2}$; b) $y = -10x^{-2} + c$; c) $y = -10x^{-2} + 11$

5. $y - 5 = \frac{-1}{12}(x - 1)$

6. check with other students