

Mathematics 012A Test 1 October 12, 2007

Solutions

CODE 111

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
A	D	C	B	E	B	A	B	E	D	C	B	A	A	B	B	D	A	D	C

Long Answer for CODE 111

B1.

(a) $s(t) = 50 - 2t^2 = 0 \Rightarrow 2t^2 = 50 \Rightarrow t^2 = 25$ so $t = 5$

(b) $v_{ave} = \frac{s(4) - s(1)}{4 - 1} = \frac{18 - 48}{3} = \frac{-30}{3} = -10$

(c) $v(t) = s'(t) = (50 - 2t^2)' = -4t$ so $v(2) = -8$

(d) $a(t) = v'(t) = (-4t)' = -4$

B2.

(a) Need $f(x) = x^2 - 3x + 2 = (x - 1)(x - 2) = 0 \Rightarrow x = 1$ or $x = 2$.

(b) Need $f'(x) = 2x - 3 = 0 \Rightarrow x = \frac{3}{2}$.

(c) $m = f'(-1) = 2(-1) - 3 = -5 \Rightarrow y - 6 = -5(x - (-1)) \Rightarrow y = -5x + 1$

B3.

(a) $f(x) = x^4 - 3x^{-2} + 5 \Rightarrow f'(x) = 4x^3 + 6x^{-3}$

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

(c) $f'(x) = \frac{2x(3x + 5) - (x^2 - 1)(3)}{(3x + 5)^2}$

(d) $f'(x) = 5(x + x^{\frac{1}{2}})^4 (1 + \frac{1}{2}x^{\frac{-1}{2}})$

B4.

(a) $f(x+h) = (x+h)^2 = x^2 + 2xh + h^2$

(b) 1. $f(x+h) = (x+h)^2 = x^2 + 2xh + h^2$

2. $f(x+h) - f(x) = x^2 + 2xh + h^2 - x^2 = 2xh + h^2$

3. $\frac{f(x+h) - f(x)}{h} = \frac{2xh + h^2}{h} = 2x + h$

4. $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \rightarrow 0} (2x + h) = 2x$

B5.

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

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