

①

Math 102
Calculus Practice
Solutions

Sp 2010

1. a) $y' = (7x^3 - 9x^2 + 8x)(-36x^{-4} + \frac{17}{3}x^{-2/3}) + (12x^{-3} + 17x^{1/3} + 10)(21x^2 - 18x + 8)$

b) $y' = (10x^{1/2} + 14x^5)(-24x^3 - 18x^{-2}) + (-6x^4 + 18x^{-1})(5x^{-1/2} + 70x^4)$

c) $y' = \frac{(7 - 10x^3)(12x + 5) - (6x^2 + 5x + 1)(-30x^2)}{(7 - 10x^3)^2}$

d) $y' = \frac{[(4x^2 - 10x + 40)(-16x^{-2} + \frac{9}{5}x^{-4/5}) - (16x^{-1} + 9x^{1/5})(8x - 10)]}{(4x^2 - 10x + 40)^2}$

2. $s = -16t^2 + 16t + 96$

$v = -32t + 16$

a) $t = 1$

b) $v = -16$

c) $t = 3$

d) $v = -80$

e) $t = \frac{1}{2}$

f) $s = 100$

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3. $s = -16t^2 + 16t + 32$

$$v = -32t + 16$$

a) $t = 1$

b) $v = -16$

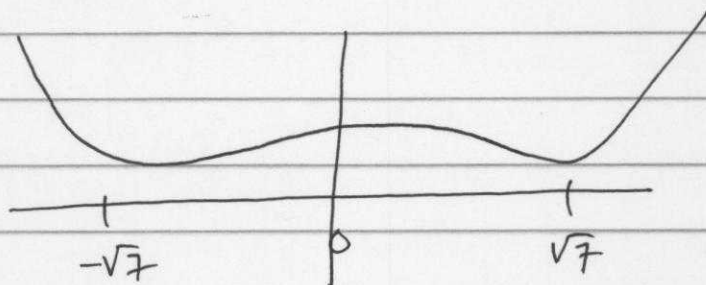
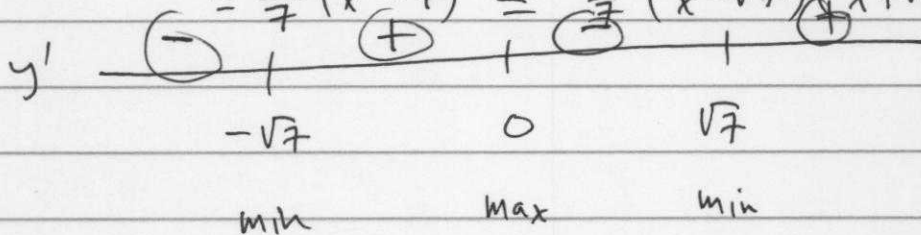
c) $t = 2$

d) $v = -48$

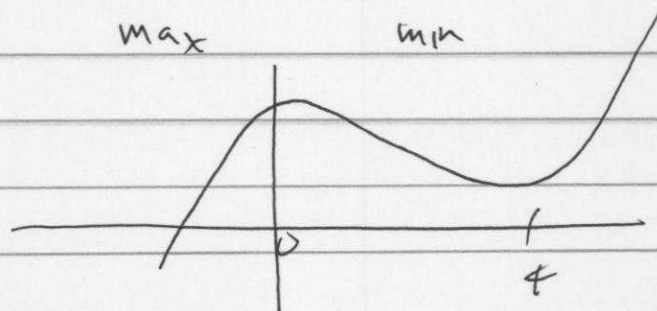
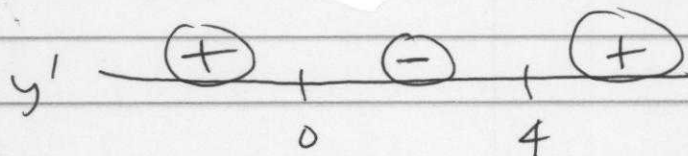
e) $t = \frac{1}{2}$

f) $s = 36$

4. a) $y' = -x + \frac{x^3}{7} = \frac{x(-1 + x^2)}{7}$
 $= \frac{x}{7}(x^2 - 1) = \frac{x}{7}(x - 1)(x + 1)$



b) $y' = 3x^2 - 12x = 3x(x - 4)$



④ 5. let $e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$

so $(e^x)' = 0 + 1 + \frac{2x}{2!} + \frac{3x^2}{3!} + \dots$

$$= 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

$$= e^x$$

Q.E.D