

Name: \_\_\_\_\_ I.D.#: \_\_\_\_\_ Serial #: \_\_\_\_\_

Section #:

15

17

Question #	1	2	3	4	5	6	7	8	9	Total
Grade	/4	/5	/5	/4	/4	/6	/4	/4	/5	/40

**Show all of your work****Solve all questions**

Q 1 The side of a cube is measured to be  $80 \text{ cm}$ , with a possible error of  $1 \text{ cm}$ . Use differential to find the error in calculating the volume.

Q 2 Let  $f(x) = 3x^3 - 6x + 7$ , and let  $P(2, 1)$  be a point on the graph of  $f^{-1}(x)$ . Find the slope of the tangent to  $f^{-1}(x)$  at  $P$ .

Q 3 A point  $P$  is moving along the curve  $y = \sqrt{x}$ . Suppose that  $x$  is increasing at the rate of  $4 \text{ units/s}$  when  $x = 3$ . Find the rate at which the angle between the  $x$ -axis and the line segment from  $P$  to the point  $(2, 0)$  is changing at this instant.

Q 4  $\lim_{x \rightarrow 0} \frac{8^x - 1}{x}$

Q 5 Find  $\frac{df(x)}{dx}$  where  $f(x) = \tan x + x^2$ .

Q 6 Find equations of the tangent lines to the curve  $f(x) = e^{\frac{1}{x}}$  that passes through  $(2, 0)$ .

Q 7 Find  $\frac{dy}{dx}$ , by using implicit differentiation, where  $x \tan y = x^2 + \cos^2 y$

Q 8 Find  $f^{-1}(x)$  where  $f(x) = \frac{3x - 1}{2x + 3}$ .

Q 9 Find  $\frac{d}{dx} f(x)$ , if  $\frac{d}{dx} f(x^2) = 7x^3$