AdA

NORTH SOUTH UNIVERSITY

MAT 120 (Calculus I)

Final Examination, Section: 18, **Semester:** Fall 2020

Total marks: 20 **Time:** 1 hour.

Numbers in the right margin indicate full marks of questions: Marks

(Answer any FOUR questions from FIVE)

1. Find the local linear approximation of the function $f(x) = \sqrt{1+x}$ at $x_0 = 0$, and use it to approximate $\sqrt{0.9}$ and $\sqrt{1.1}$. 5

2. Show that the radius of the right circular cylinder of greatest curved surface, which can be inscribed in a given cone is half that of the base of the cone. 5

3. Find the total area between the curve $y = 4 - x^2$ and the x-axis over the interval [0, 4]. 5

4. Sketch the region whose area is represented by the definite integral, and evaluate the integral using (i) geometrical formula (ii) by integration.

(a) $\int_{-1}^{2} (2x+3)\,dx$ (b) $2\int_{-3}^{3} \sqrt{9-x^2}\,dx$. 5

5. Suppose that a particle moves on a coordinate line so that its velocity at time t is $v(t) = t^2 - 3t$ m/s. Find the (i) displacement and (ii) distance traveled by the particle during the time interval $0 \le t \le 6$. 5

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