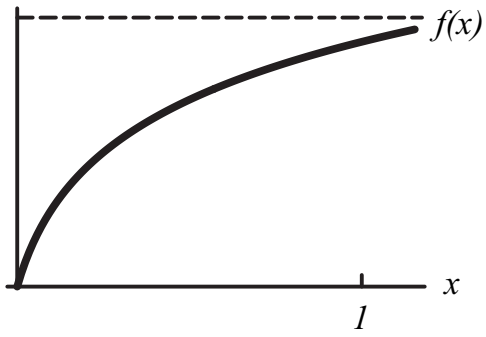
Math 30: Unit 2 Exam

Fall Semester 2006

Instructions. Read each problem carefully and follow all of its instructions. For each of the problems below, write a clear and concise solution in your blue book. For any short answer questions, write clearly your answer and any additional explanation that is needed.

1. (5 points) Consider the function $f(x)$ graphed below.



   Suppose we have computed the LEFT, RIGHT, MIDPT and TRAP approximations to $\int_0^1 f(x)\mathrm{d}x$ and get the following four values (each using the same number of subdivisions).

   I) 0.36735 II) 0.39896 III) 0.36814 IV) 0.33575

   Unfortunately, we forgot which values corresponded to which approximations! Determine which number corresponds to which approximation and explain how you know this. You must provide an explanation to receive full-credit.

2. (5 points) Does $\int_1^\infty \frac{2+e^{-z}}{z}\mathrm{d}z$ converge? Explain clearly how you know.

3. (5 points) A circular cone has base radius 10 cm and height 5 cm. Use the method of slicing to find the volume of this cone.

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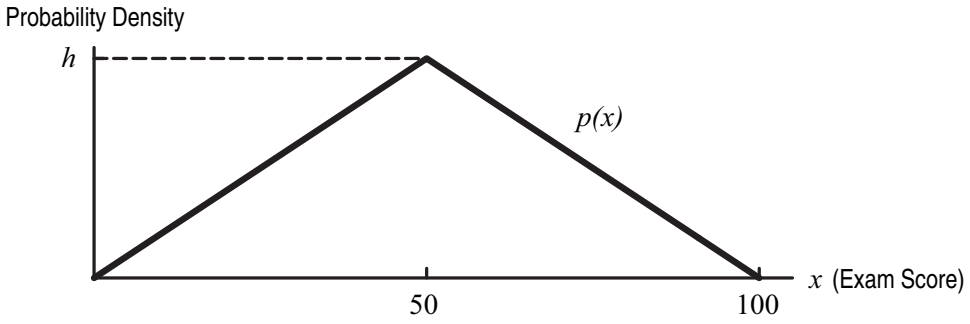
4. (5 points) Find the arc length of the curve $y(x) = \frac{2}{3}x^{3/2}$ from $x = 0$ to $x = 4$.

5. A professor gives the same 100-point final exam year after year and finds that students' scores tend to follow the triangular probability density function $p(x)$ pictured below.



   (a) (3 points) Find the value of the height h.

   (b) (2 points) What fraction of the students would you expect to score below 25 points on the exam?