

Math 142 Sample Problems for Exam 1

Question 1 Perform the required integrations:

a) $\int 6 \sec^2 5x \, dx.$

b) $\int \frac{\cos x}{\sqrt{1+2\sin x}} \, dx$

c) $\int \frac{\cos \sqrt{x}}{5\sqrt{x}} \, dx$

Question 2 A solid S is constructed with circular base of radius 6 meters. Parallel cross sections perpendicular to the base are squares. What is the volume of S ?

Question 3 Find the area bounded by the curves $x = y^2$ and $x = y + 2$.

Question 4 Find the area bounded by the curves $y = \cos \pi x$, $y = \sin \pi x$, $x = 0$.

Question 5 Find the volume of the solid of revolution obtained by rotating the region bounded by $y = x^3$, $x = 2$, $y = 0$ and $x = 0$ about the y -axis.

Question 6 Find the volume of the solid of revolution obtained by rotating the region bounded by $y = 2x^2$, and $y = 6$ about the line $y = 9$.

Question 7 Find the average value of the function $f(x) = x^5 \sqrt[7]{(x^3 + 1)}$ over the interval $[0, 2]$.

Question 8 Show that the function $f(x) = x^5 + 3x + 4$ is one-to-one. Then find the value of $(f^{-1})'(4)$.

Question 9 A work problem involving pumping fluid out of a tank.

Question 10 Stuff from Chapter 7: Especially, derivatives and integrals involving exponentials and logarithms.

You should consider this longer than the exam you will be given. The type and difficulty of these problems, however, will be indicative of the ones that will appear on the exam.

Sections covered will be 5.5, 6.1-6.5, 7.1-7.4