

**Midterm 3 – Math 241**

**Friday, November 16, 2018**

This is a closed-book exam. No calculators allowed.

**Justify your answers** to obtain full credit (and partial credit, too).

You have 50 minutes.

This exam consists of 5 questions.

Please verify that you have all pages.

**Name:** \_\_\_\_\_

**ID#:** \_\_\_\_\_

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**1.** (25 points) Find the following integrals:

(a)  $\int_0^4 2(\sqrt{t} - t) dt$

(b)  $\int \frac{1 + 2t^3}{t^3} dt$

(c)  $\int \tan^4 x \sec^2 x dx$

(d)  $\int_0^\pi 2 \sin x \cos^2 x$

(e)  $\int \frac{x}{(x^2 + 2)^3}$

**2.** (*15 points*) Use mid-points to approximate the area above the  $x$ -axis and under  $x^2 + 6$  from  $x = 0$  to  $x = 6$  using 3 rectangles.

**3.** (20 points) Find the volume of the solid that lies between planes perpendicular to the  $x$ -axis at  $x = -1$  and  $x = 1$ . The cross-sections perpendicular to the  $x$ -axis are squares whose side runs from the curve  $y = \sqrt{1 - x^2}$  to  $y = -\sqrt{1 - x^2}$ . (see last page for picture if needed)

**4.** (15 points) A ball is thrown from a cliff that is 6 feet from the ground ( $s(0) = 6$ ) with initial velocity 100ft/sec ( $v(0) = 100$ ). If the acceleration due to gravity is  $-32$  ft/sec<sup>2</sup> ( $a(t) = -32$ ), find the equation  $s(t)$  for the position of the ball at time  $t$ .

**5.** (*25 points*) Set up but do not evaluate the integral(s) needed to find the area between the curves  $y = 2x^2$  and  $y = 6x$  from  $x = -2$  to  $x = 5$

# Final Score

	Score	Out of
Question 1		25
Question 2		15
Question 3		20
Question 4		15
Question 5		25
Total		100

