

**General Instructions:** Use black or blue pen only. Show neat, complete and organized solutions to earn full points. Box all final answers. The use of any electronic devices is not allowed during the exam. Cheating is punishable by a grade of **5.00** for the course.

I. Find the following antiderivatives.

1.  $\int \frac{2x^3}{\sqrt{x^2 + 1}} dx.$

2.  $\int \frac{\tan^2(\sqrt[3]{t})}{\sqrt[3]{t^2}} dt.$

II. Evaluate the following definite integrals.

1.  $\int_0^3 |x^2 - 4| dx.$

2.  $\int_0^{\sqrt[5]{\pi/4}} x^4 \cos(x^5) dx.$

III. Let  $F(x) = \int_0^{3 \cos x} \sqrt{9 - t^2} dt.$

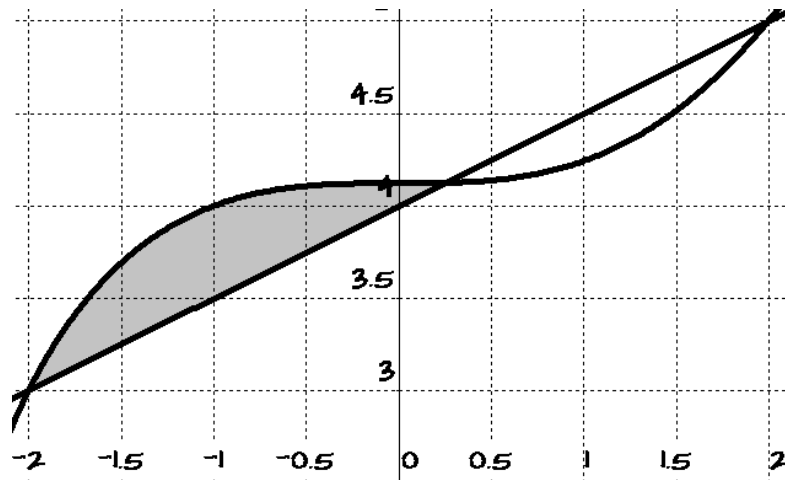
1. Evaluate  $F(0).$

2. Evaluate  $F' \left( \frac{\pi}{6} \right).$

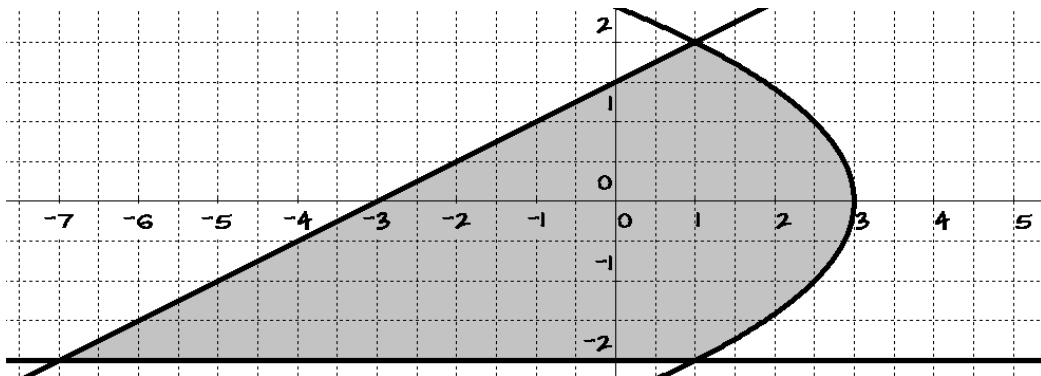
IV. Aaron throws his iPad upwards from the top of a tall structure in Uranus, whose gravity is approximately  $28\text{ft/s}^2$ . If the iPad reaches its maximum height of 2000 feet at  $t = 10$ , how high is the structure?

**MORE AT THE BACK**

- V. Let  $R$  be the region enclosed by  $x = -2$ ,  $x = \frac{1}{4}$ ,  $y = \sqrt{x^3 + 17}$  and  $x = 2y - 8$ . From left to right, the points of intersection are  $(-2, 3)$ ,  $(\frac{1}{4}, \frac{33}{8})$  and  $(2, 5)$ . Note that  $\sqrt{17} \approx 4.1231$  and  $\sqrt[3]{17} \approx 2.5713$ . Explain your answers briefly to get partial points.



1. Setup an integral to find the **area** of  $R$ .
  2. Setup an integral to find the **perimeter** of  $R$ .
- VI. Let  $R$  be the region enclosed by  $x = 2y - 3$ ,  $x = 3 - \frac{1}{2}y^2$  and  $y = -2$ , as shown in the figure. Note that the points of intersection are  $(-7, -2)$ ,  $(1, -2)$  and  $(1, 2)$ . Explain your answers briefly to get partial points.



1. Setup an integral to find the volume of the solid generated by revolving  $R$  about  $x = 5$  using **disks or washers**.
2. Setup an integral to find the volume of the solid generated by revolving  $R$  about  $x = 5$  using **cylindrical shells**.

END OF EXAM  
TOTAL: 12 POINTS

guissmo