Student: Cole Lamers **Date:** 10/03/19	**Instructor:** Viktoriya Shcherban **Course:** Calc 1 11:30 AM / Internet (81749&81750) Shcherban	**Assignment:** 5.4 The Fundamental Theorem of Calculus

1. Evaluate the following integral.

$$\int_0^2 3x(x-5)\,dx$$

$\int_0^2 3x(x-5)\,dx =$ -22 (Simplify your answer.)

2. Evaluate the given definite integral.

$$\int_2^4 \left(4x^3 - \frac{x^3}{5}\right) dx$$

$\int_2^4 \left(4x^3 - \frac{x^3}{5}\right) dx =$ 228 (Simplify your answer.)

3. Evaluate the integral.

$$\int_0^1 \left(4x^2 + \sqrt{x}\right) dx$$

$\int_0^1 \left(4x^2 + \sqrt{x}\right) dx =$ 2 (Simplify your answer.)

4. Evaluate the integral.

$$\int_0^{\pi/3} 10\sec^2 x\,dx$$

$\int_0^{\pi/3} 10\sec^2 x\,dx =$ $10\sqrt{3}$ (Type an exact answer, using radicals as needed.)

5. Evaluate the integral.

$$\int_{\pi/6}^{5\pi/6} 4\csc\theta\cot\theta\,d\theta$$

$\int_{\pi/6}^{5\pi/6} 4\csc\theta\cot\theta\,d\theta =$ 0

(Type an exact answer, using radicals as needed.)

6. Evaluate the following integral.

$$\int_0^{\pi/4} \tan^2 x \, dx$$

$\int_0^{\pi/4} \tan^2 x \, dx =$ $1 - \frac{\pi}{4}$ (Type an exact answer in terms of π.)

7. Evaluate the integral.

$$\int_{\sqrt{2}}^{1} \left(\frac{u^5}{2} - \frac{1}{u^3} \right) du$$

$\int_{\sqrt{2}}^{1} \left(\frac{u^5}{2} - \frac{1}{u^3} \right) du =$ $-\frac{1}{3}$ (Simplify your answer.)

8. Find the derivative

a. by evaluating the integral and differentiating the result.
b. by differentiating the integral directly.

$$\frac{d}{dx} \int_{\pi/6}^{\sqrt{x}} \cos t \, dt$$

a. Evaluate the integral and differentiate the result to find the derivative.

$\frac{d}{dx} \int_{\pi/6}^{\sqrt{x}} \cos t \, dt =$ $\frac{1}{2\sqrt{x}} \cos \sqrt{x}$

b. Differentiate the integral directly to find the derivative.

$\frac{d}{dx} \int_{\pi/6}^{\sqrt{x}} \cos t \, dt =$ $\frac{1}{2\sqrt{x}} \cos \sqrt{x}$

9. Find the derivative

a. by evaluating the integral and differentiating the result.
b. by differentiating the integral directly.

$$\frac{d}{dt}\int_0^{t^3} \sqrt[3]{u}\,du$$

a. Evaluate the integral and differentiate the result to find the derivative.

$$\frac{d}{dt}\int_0^{t^3} \sqrt[3]{u}\,du = 3t^3$$

b. Differentiate the integral directly to find the derivative.

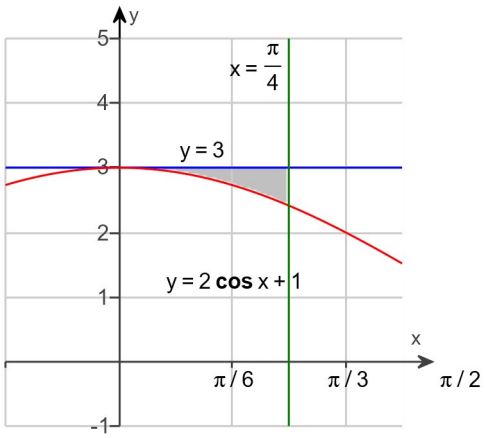
$$\frac{d}{dt}\int_0^{t^3} \sqrt[3]{u}\,du = 3t^3$$

10. Find the total area of the region between the x-axis and the graph.

$$y = x^3 + 3x^2 + 2x, \quad -2 \le x \le 0$$

Total area = $\frac{1}{2}$ (Simplify your answer.)

11. Find the shaded region in the graph.



What is the area of the shaded region?

$\frac{\pi}{2} - \sqrt{2}$

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression. Type an exact answer in terms of π.)