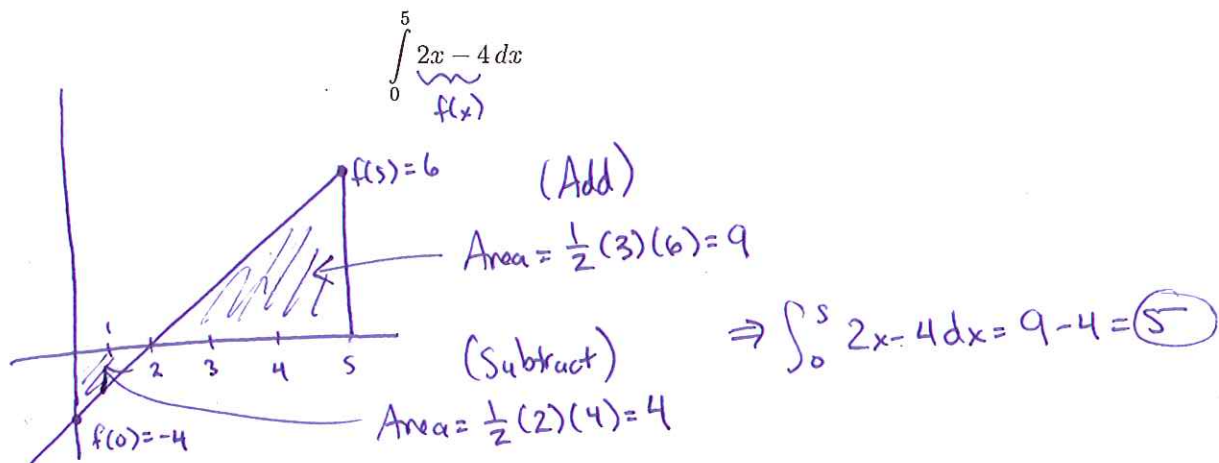


# Solutions

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Math 2 — Quiz 2

1. Use geometry (*not* calculus) to calculate



2. (a) Find an antiderivative  $F(x)$  of  $f(x) = \cos(3x)$ .

Notice that  $\frac{d}{dx}(\sin(3x)) = 3\cos(3x)$  by the Chain Rule. If we divide both sides by 3, we get  $\frac{d}{dx}\left[\frac{1}{3}\sin(3x)\right] = \cos(3x)$ , therefore

$$F(x) = \frac{1}{3}\sin(3x)$$

(b) Use the above answer to calculate

$$\int_0^{\pi/6} \cos(3x) dx$$

$$F\left(\frac{\pi}{6}\right) = \frac{1}{3}\sin\left(3 \cdot \frac{\pi}{6}\right) = \frac{1}{3}\sin\left(\frac{\pi}{2}\right) = \frac{1}{3}(1) = \frac{1}{3}$$

$$F(0) = \frac{1}{3}\sin(3 \cdot 0) = \frac{1}{3}\sin(0) = 0$$

$$\begin{aligned} \Rightarrow \text{FTC2 says } \int_0^{\pi/6} \cos(3x) dx &= F\left(\frac{\pi}{6}\right) - F(0) \\ &= \frac{1}{3} - 0 = \boxed{\frac{1}{3}} \end{aligned}$$