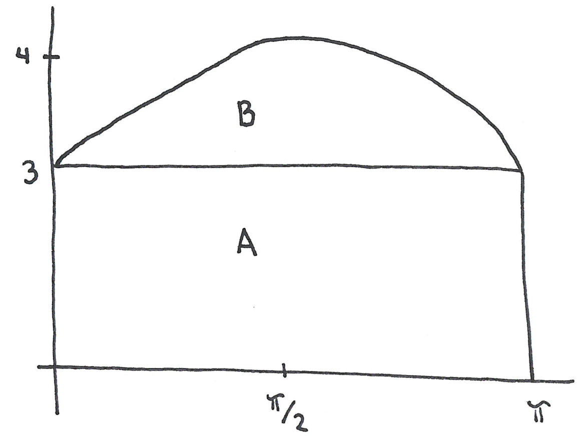
Quiz 3

1. Given that $\int_0^\pi \sin x\,dx = 2$, find $\int_0^\pi (\sin x + 3)\,dx$

$$\underbrace{\int_0^\pi \sin x + 3\,dx}_{A+B} = \underbrace{\int_0^\pi \sin x\,dx}_{B} + \underbrace{\int_0^\pi 3\,dx}_{A}$$



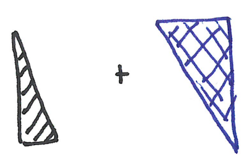
$$\int_0^\pi 3\,dx = \underset{\text{height}}{3}\,\underset{\text{base}}{\pi} \qquad \int_0^\pi \sin x\,dx = 2$$

So that $\int_0^\pi \sin x + 3\,dx = \int_0^\pi \sin x\,dx + \int_0^\pi 3\,dx = 2 + 3\pi$

2. Compute $\int_0^3 (4-4x)\,dx$ by directly calculating area.

There are two triangles:

Area =

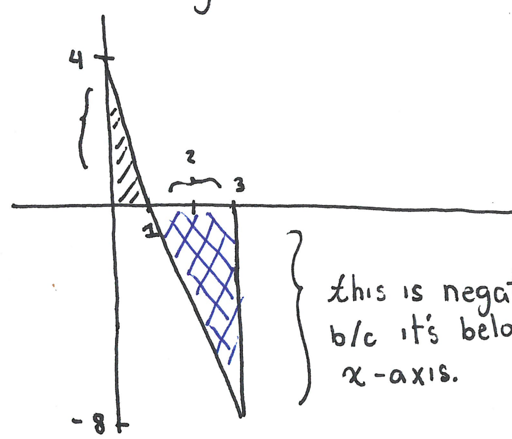


$= \frac{1}{2}(1)(4) - \frac{1}{2}(2)(8)$

b = 1
h = 4

b = 2
h = 8
NEGATIVE

$= 2 - 8 = -6$



this is negative b/c it's below x-axis.

3. Find the antiderivatives.

a) e^{9x}. $\qquad F(x) = \frac{1}{9}e^{9x} + C$

b) $x^3 + 7x - 2$ $\qquad F(x) = \frac{1}{4}x^4 + \frac{7}{2}x^2 - 2x + C$

c) $-2\cos(2x) + 2x^2$ $\qquad F(x) = -\sin(2x) + \frac{2}{3}x^3 + C$

NOTE:
$\frac{d}{dx}\sin(2x) = 2\cos(2x)$