

Put your name here: Key

9.2

AP Calculus AB: Area between two curves with y

1. Find the area between the curves $x = \frac{y^2-6}{2}$ and $x = y + 1$. (Ans: 18)

$$\frac{y^2-6}{2} = y+1$$
$$y^2-6 = 2y+2$$
$$y^2-2y-8=0$$
$$(y-4)(y+2)=0$$
$$\int_{-2}^4 (y+1) - \left(\frac{y^2-6}{2}\right) dy = \boxed{18}$$

2. Calculator: Find the area for the region R created by $x = y^2 - 2$ and $y = x^3$. (Ans: 4.215)

$$y^2-2 = \sqrt[3]{y}$$
$$y = -1, 1.79$$
$$\int_{-1}^{1.79} \sqrt[3]{y} - (y^2-2) dy = \boxed{4.215}$$

3. Find the area of the region enclosed by the graph of $y = x^3 + 8$ and the function $y = x + 8$. (Ans: ~~4~~)

$$x^3+8 = x+8$$
$$x^3 = x$$
$$x = -1, 0, 1$$
$$\int_{-1}^0 (x^3+8) - (x+8) dx + \int_0^1 (x+8) - (x^3+8) dx$$
$$\frac{1}{4} + \frac{1}{4} = \boxed{\frac{1}{2}}$$

4. Calculator: If some x-value, k, is in-between the interval $[0, \frac{\pi}{2}]$ and the area under the curve $y = \cos(x)$ from $x=k$ to $x=\frac{\pi}{2}$ is .1, then $k = \underline{\hspace{1cm}}$. (Ans: 1.120)

$$\int_k^{\pi/2} \cos(x) dx = .1$$
$$\boxed{k = 1.120}$$