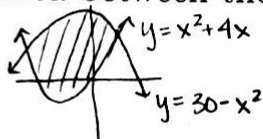


Quiz 3

January 25, 2017

Show all work and circle your final answer.

1. Set up, but **do not evaluate**, an integral that represents the area between the curves $y = x^2 + 4x$ and $30 - x^2$.



$$A = \int_{-5}^3 (30 - x^2) - (x^2 + 4x) dx$$

INTERSECT:

$$x^2 + 4x = 30 - x^2$$

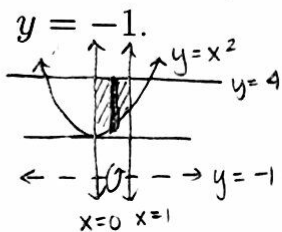
$$2x^2 + 4x - 30 = 0$$

$$x^2 + 2x - 15 = 0$$

$$(x+5)(x-3) = 0$$

$$x = -5, 3$$

2. Set up, but **do not evaluate**, an integral that represents the volume of the solid of revolution obtained by revolving the area bounded by $y = x^2$, $y = 4$, $x = 0$, and $x = 1$ about the line $y = -1$.

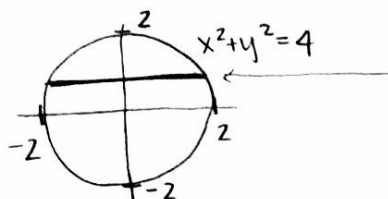


$$R = \text{distance from } y = 4 \text{ to } y = -1 \\ = 5$$

$$r = \text{distance from } y = x^2 \text{ to } y = -1 \\ = x^2 + 1$$

$$V = \pi \int_0^1 (5)^2 - (x^2 + 1)^2 dx$$

3. A solid S has a circular base in the xy -plane given by $x^2 + y^2 = 4$, and the cross-sections of S parallel to the x -axis are squares. Write an integral representing the volume of S . **Do not evaluate the integral.**



cross
section

$$A = (\text{side})^2$$

$$\text{side} = 2\sqrt{4-y^2} \quad (\text{since } x = \sqrt{4-y^2})$$

$$V = \int_{-2}^2 (2\sqrt{4-y^2})^2 dy$$