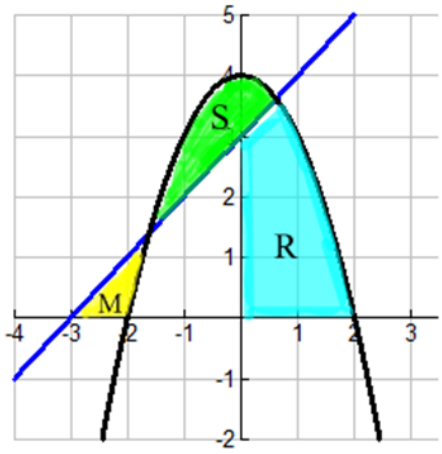
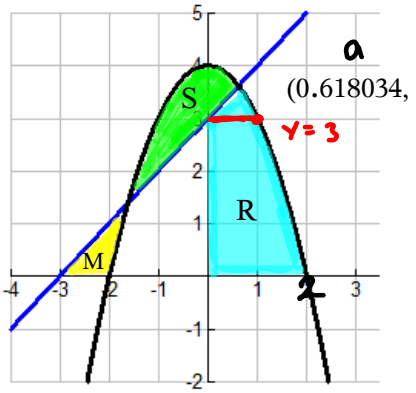


1. Let R be the region in the first quadrant bounded by the x-axis and the graphs of $f(x) = x + 3$ and $g(x) = -x^2 + 4$. Region S is bounded by the two curves and region M is bounded by the two curves and the x-axis in the second quadrant.
   a. Find the area of R.
   b. Find the area of M.
   c. Find the volume of a solid when area S is rotated about the line $y = 5$.
   d. Region S is the base of a solid. For the solid, each cross section perpendicular to the x-axis is an equilateral triangle. Write but do not solve an integral expression for the volume of this solid.

Feb 27-9:24 AM



a b

(0.618034, 3.61803)

$x = y - 3$

$x = \pm\sqrt{4 - y}$

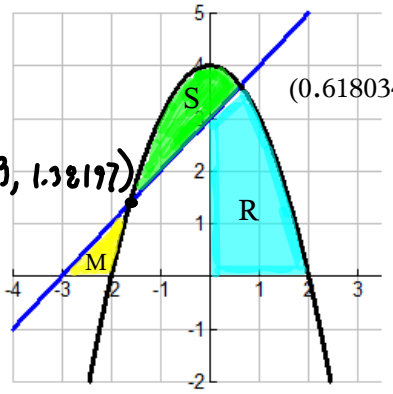
$= \sqrt{4 - y}$

a. $\int_0^a x + 3 \, dx + \int_a^2 -x^2 + 4 \, dx = 4.985$

OR

$\int_0^3 \sqrt{4 - y} \, dy + \int_3^b \left[\sqrt{4 - y} - (y - 3)\right] dy$

Feb 27-9:26 AM



$x = y - 3$

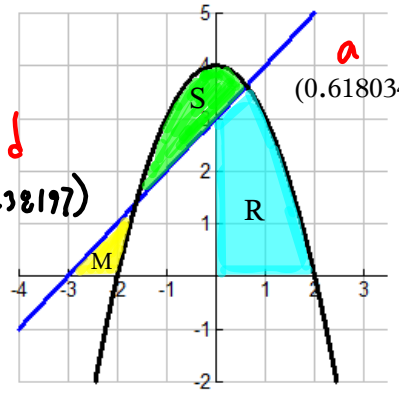
$x = -\sqrt{4-y}$

b. $\int_{-3}^{-2} (x+3)\,dx + \int_{-2}^{-1.6183} (x+3) - (-x^2+4)\,dx = 0.682$

or

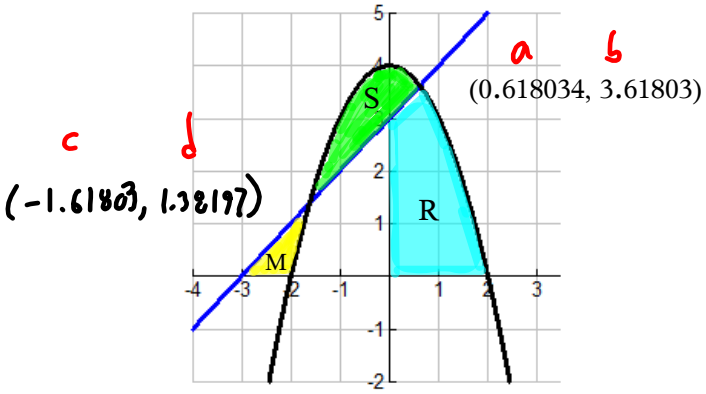
$\int_{0}^{1.38197} \left[-\sqrt{4-y} - (y-3)\right] dy = 0.682$

Feb 27-9:27 AM



c. $\pi \int_{c}^{a} \left[5 - (x+3)\right]^2 - \left[5 - (-x^2+4)\right]^2 dx = 7.454\pi$ or 23.416

Feb 27-9:27 AM



a b

(0.618034, 3.61803)

c d

(-1.61803, 1.38197)

0.807

d. $\frac{\sqrt{3}}{4}\int_{c}^{a}\left[(-x^2+4)-(x+3)\right]^2 dx$

Feb 27-10:50 AM