Integrals III

May 9, 2022

Problem 1. Find the areas of the regions enclosed by the lines and curves

(1) $y = x^2 - 2$ and $y = 2$
(2) $y = 2x - x^2$ and $y = -3$
(3) $y = x^4$ and $y = 8x$
(4) $y = x^2 - 2x$ and $y = x$
(5) $y = x^2$ and $y = -x^2 + 4x$
(6) $y = 7 - 2x^2$ and $y = x^2 + 4$
(7) $y = x^4 - 4x^2 + 4$ and $y = x^2$
(8) $y = x\sqrt{a^2 - x^2}$, $a > 0$ and $y = 0$

Problem 2. Find the areas of the regions enclosed by the lines and curves

(1) $x = 2y^2$, $x = 0$ and $y = 3$
(2) $x = y^2$ and $x = y + 2$
(3) $y^2 - 4x = 4$ and $4x - y = 16$
(4) $x - y^2 = 0$ and $x + 2y^2 = 3$
(5) $x + y^2 = 0$ and $x + 3y^2 = 2$

Answers:

Problem 1. (1) $\frac{32}{3}$

(2) $\frac{32}{3}$

(3) $\frac{48}{5}$

(4) $\frac{9}{2}$

(5) $\frac{8}{3}$

(6) 4

(7) 8

(8) $\frac{2a^3}{3}$

Problem 2. (1) $\frac{16}{3}$

(2) $\frac{9}{2}$

(3) $\frac{243}{8}$

(4) 4

(5) $\frac{8}{3}$