

8
(830)

$$0 = (x^3 - a)^2 x^2$$

$x^3 = a$
 $x = \sqrt[3]{a}$

$$\int_0^{\sqrt[3]{a}} (x^3 - a)^2 x^2 dx = \frac{1}{9}$$

$\frac{2}{9} = \frac{1}{9}$

הצבה

$$u = x^3 - a$$

$$du = 3x^2 dx$$

$$\frac{du}{3x^2} = dx$$

הצבה

$$\frac{1}{9} = \int_0^{\sqrt[3]{a}} \frac{u^2 \cdot x^2 \cdot du}{3x^2} = \int_0^{\sqrt[3]{a}} \frac{u^2}{3} du = \frac{u^3}{9} \Big|_0^{\sqrt[3]{a}}$$

$$= \frac{(x^3 - a)^3}{9} \Big|_0^{\sqrt[3]{a}} = \frac{(a - a)^3}{9} - \frac{(-a)^3}{9} = \frac{a^3 - 2a^3 + a^3}{9} = \frac{1}{9} = \frac{a^3 - 2a^3}{9}$$

$a = 1$

13
(831)

הצבה

$$u = \cos x + a$$

$$du = -\sin x dx$$

$$\frac{du}{-\sin x} = dx$$

$$\frac{1}{6} = \int_0^{\frac{\pi}{3}} \frac{\cos x}{(\cos x + a)^2} dx = \int_0^{\frac{\pi}{3}} \frac{\cos x \cdot du}{u^2 (-\sin x)} = \int_0^{\frac{\pi}{3}} \frac{-du}{u^2} = \frac{1}{u} \Big|_0^{\frac{\pi}{3}} = \frac{1}{\cos x + a} \Big|_0^{\frac{\pi}{3}} = \frac{1}{0.5 + a} - \frac{1}{1 + a}$$

$$\frac{1}{6} = \frac{1}{0.5 + a} - \frac{1}{1 + a} \rightarrow (0.5 + a)(1 + a) = (1 + a) - 0.5(1 + a)$$

$$0.5a^2 + 0.9a + 0.5 = 0 \quad a^2 + 1.8a - 2 = 0$$

$$a = 1 \quad a = -2$$

6
(832)

$$y = \frac{x}{6} + \frac{1}{6} \leftarrow x - 6y + 1 = 0$$

$$y' = \frac{1}{6} = \frac{1}{2\sqrt{x}} \Rightarrow x = 9$$

(9, 3)

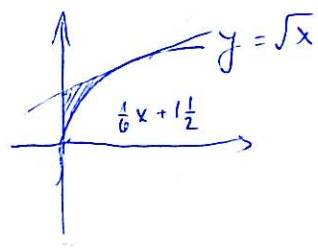
נקודת ההשקה

$$y - 3 = \frac{1}{6}(x - 9)$$

$$y = \frac{1}{6}x + \frac{1}{2}$$

משוואת הישר

נתן ונמצא בין הישן והעקום



$$\int_0^9 (\sqrt{x} - \frac{1}{6}x - \frac{1}{2}) dx = \left| \frac{2}{3}x^{3/2} - \frac{x^2}{12} - \frac{1}{2}x \right|_0^9 = 2.25$$

התשובה ארוכה יותר (אוהבתי אותה) כי הוסיף את הערך הפתוח (כאן 3) ולא רכזו על ה-1/2.