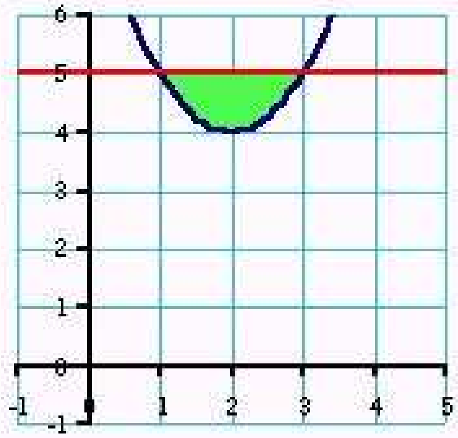
Antw. 1.

a. $x^2 - 4x + 8 = 5 \Leftrightarrow x^2 - 4x + 3 = 0$

$\Leftrightarrow (x-1)(x-3) = 0$

$x = 1$ en $x = 3$; snijpunten (1,5) en (3,5)



b. plaatje

c. De oppervlakte is:

$$\int_1^3 \left(5 - (x^2 - 4x + 8)\right) \cdot dx =$$

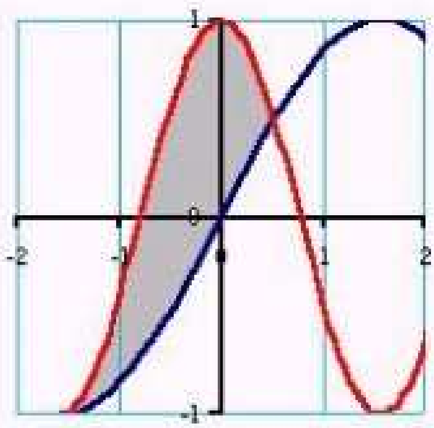
$$\int_1^3 \left(-3 - x^2 + 4x\right) \cdot dx =$$

$$\left[-3x - \tfrac{1}{3}x^3 + 2x^2\right]_1^3 = (0) - (1\tfrac{1}{3}) = 1\tfrac{1}{3}$$

Antw. 2.

a. Met de rekenmachine:

$x = -\frac{1}{2}\pi$ en $x = \frac{1}{6}\pi$



b. plaatje

c. De oppervlakte is:

$$\int_{-\frac{1}{2}\pi}^{\frac{1}{6}\pi} (\cos(2x) - \sin(x)) \cdot dx =$$

$$\left[\tfrac{1}{2}\sin(2x) + \cos(x)\right]_{-\frac{1}{2}\pi}^{\frac{1}{6}\pi} =$$

$$\left(\tfrac{1}{2} \cdot \tfrac{1}{2} \cdot \sqrt{3} + \tfrac{1}{2} \cdot \sqrt{3}\right) - (0 - 0) = \tfrac{3}{4} \cdot \sqrt{3}$$

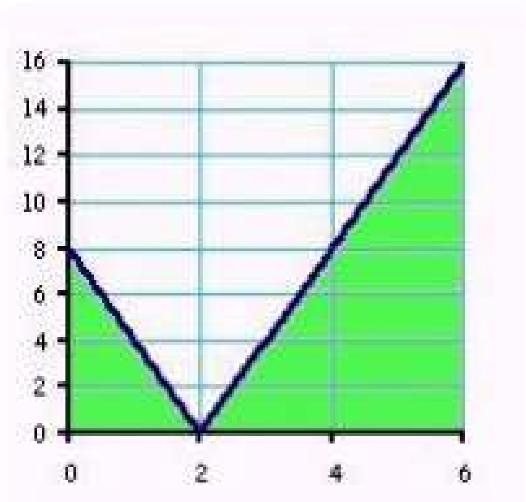
Antw. 3.

$$\int_0^6 |4x-8| \cdot dx =$$

$$\int_0^2 (-4x+8) \cdot dx + \int_2^6 (4x-8) \cdot dx =$$

$$= \left[-2x^2+8x\right]_0^2 + \left[2x^2-8x\right]_2^6 =$$

$$(8)-(0)+(24)-(-8) = 40$$



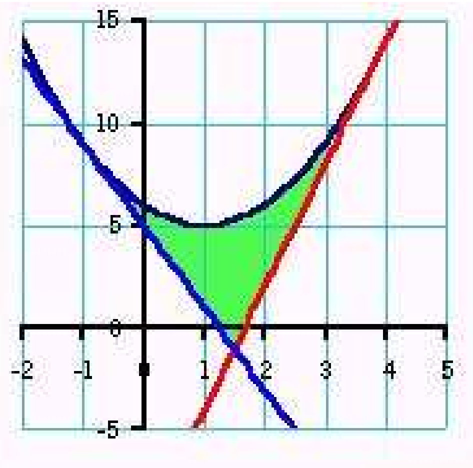
Antw. 4.

$$\int_2^{18} \frac{4}{\sqrt{2x}} \cdot dx = \int_2^{18} 4 \cdot \frac{1}{\sqrt{2x}} \cdot dx = \left[4 \cdot \sqrt{2x}\right]_2^{18} = 24-8 = 16$$

Antw. 5.

$$\frac{dy}{dx} = 2x-2;$$

De helling van de raaklijn in (4,14) is 6 en de helling van de raaklijn in (-1,9) is -4.
De vergelijkingen van de raaklijnen zijn:
$y = 6x-10$ en $y = -4x+5$.
Het snijpunt van de lijnen is $(1\frac{1}{2}, -1)$.



De oppervlakte van het groene stuk is:

$$\int_{-1}^{1,5} \left((x^2-2x+6)-(-4x+5)\right) \cdot dx + \int_{1,5}^{4} \left((x^2-2x+6)-(6x-10)\right) \cdot dx =$$

$$\int_{-1}^{1,5} \left((x^2+2x+1)\right) \cdot dx + \int_{1,5}^{4} \left((x^2-8x+16)\right) \cdot dx =$$

$$\left[\tfrac{1}{3}x^3+x^2+x\right]_{-1}^{1,5} + \left[\tfrac{1}{3}x^3-4x^2+16x\right]_{1,5}^{4} = \left(4\tfrac{7}{8}\right)-\left(-\tfrac{1}{3}\right)+\left(21\tfrac{1}{3}\right)-\left(16\tfrac{1}{8}\right) = 10\tfrac{5}{12}$$

Antw. 6.

a. $\int \frac{1}{x^3} \cdot dx = \int x^{-3} \cdot dx = -\frac{1}{2}x^{-2} = -\frac{1}{2x^2}$

b. $\int 4 \cdot \sin(3x) \cdot dx = \frac{-4}{3} \cdot \cos(3x)$

c. $\int \frac{5}{x\sqrt{x}} \cdot dx = \int 5 \cdot x^{-1\frac{1}{2}} \cdot dx = 10 \cdot x^{-\frac{1}{2}} = \frac{10}{\sqrt{x}}$

d. $\int x^2\sqrt{x} \cdot dx = \int x^{2\frac{1}{2}} \cdot dx = \frac{2}{7} \cdot x^{3\frac{1}{2}} = \frac{2}{7} \cdot x^3\sqrt{x}$

e. $\int (3x+5)^4 \cdot dx = \frac{1}{5} \cdot \frac{1}{3} \cdot (3x+5)^5 = \frac{1}{15} \cdot (3x+5)^5$

Antw. 7.

a. f(4)=1 en f(12)=3

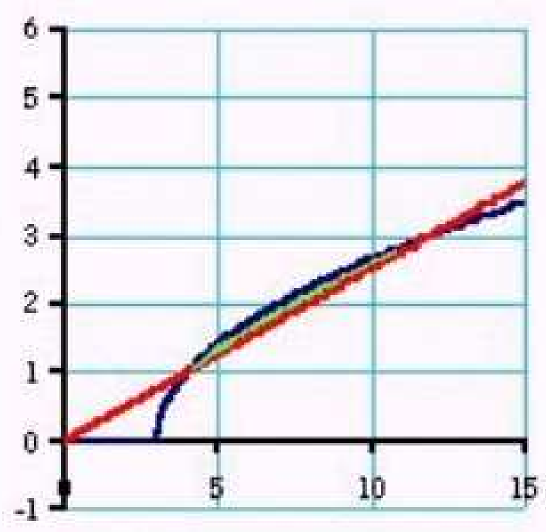
b. $y = \frac{1}{4}(x-4)+1 = \frac{1}{4}x$

c. plaatje.

d. De oppervlakte is:

$$\int_4^{12} \left(\sqrt{x-3} - \frac{1}{4}x\right) \cdot dx = \left[\frac{2}{3}(x-3)^{1\frac{1}{2}} - \frac{1}{8}x^2\right]_4^{12} =$$

$$(18-18) - \left(\frac{2}{3} - 2\right) = 1\frac{1}{3}$$



Antw. 8.

a. $9 - x^2 \geq 0 \Leftrightarrow x^2 \leq 9 \Leftrightarrow -3 \leq x \leq 3$ $f(x) = x \cdot \sqrt{9 - x^2}$

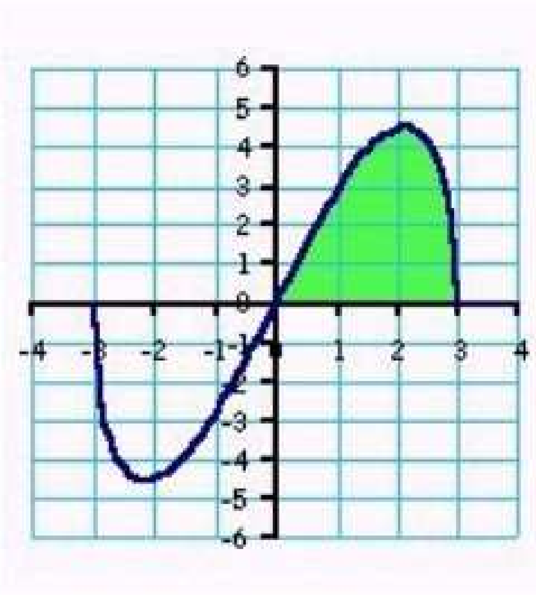
b. $f'(x) = 1 \cdot \sqrt{9 - x^2} + x \cdot \dfrac{1}{2\sqrt{9 - x^2}} \cdot -2x =$

$\sqrt{9 - x^2} + \dfrac{-x^2}{\sqrt{9 - x^2}} = \dfrac{9 - 2x^2}{\sqrt{9 - x^2}}$.

$f'(x) = 0 \Leftrightarrow x = \pm\sqrt{4\frac{1}{2}}$

max: $f(-3)=0$, min: $f(-\sqrt{4\frac{1}{2}})=-4\frac{1}{2}$,

max: $f(\sqrt{4\frac{1}{2}})=4\frac{1}{2}$ min: $f(3)=0$



c. $F'(x) = k \cdot 1\frac{1}{2}(9 - x^2)^{\frac{1}{2}} \cdot (-2x) = -3k \cdot x \cdot \sqrt{9 - x^2}$

Als $k = -\frac{1}{3}$ dan is $F'(x) = f(x)$,

dan is $F(x)$ een primitieve van f.

d. De rechter oppervlakte is:

$$\int_0^3 f(x) \cdot dx = \left[-\tfrac{1}{3} \cdot \left(9 - x^2\right)^{1\frac{1}{2}} \right]_0^3 = (0) - (-9) = 9$$