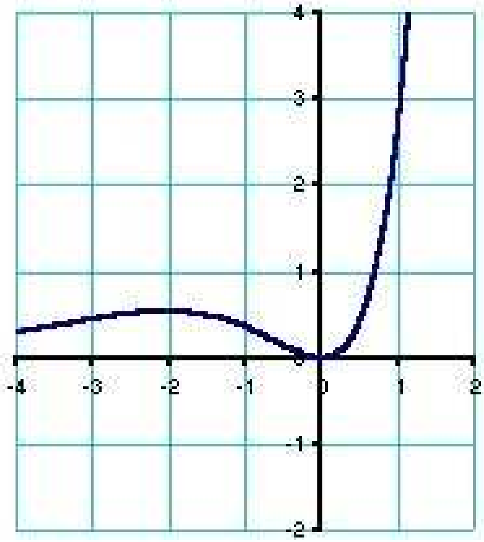
Antw. 1.



$f(x) = x^2 \cdot e^x \rightarrow f'(x) = 2x \cdot e^x + x^2 \cdot e^x$

$f'(x) = 0 \Leftrightarrow 2x \cdot e^x + x^2 \cdot e^x = 0$

$(2x + x^2)e^x = 0 \Leftrightarrow 2x + x^2 = 0$

$x(2 + x) = 0 \Leftrightarrow x = 0 \vee x = -2$

$f(0) = 0$ minimum

$f(-2) = 4 \cdot e^{-2} \approx 0{,}54$ maximum

Antw. 2.

$f'(x) = 2x \cdot e^x + x^2 \cdot e^x \rightarrow f''(x) = 2e^x + 2x \cdot e^x + 2x \cdot e^x + x^2 \cdot e^x$

$f''(x) = (2 + 4x + x^2) \cdot e^x$

$f''(x) = 0 \Leftrightarrow 2 + 4x + x^2 = 0$

abc – formule : $x \approx -3{,}41 \vee x \approx -0{,}59$

buigpunten $(-3{,}41; 0{,}38)$ en $(-0{,}59; 0{,}19)$

Antw. 3.

$f(x) = 2 \cdot \sin(3x) \rightarrow F(x) = 2 \cdot \cos(3x) \cdot \frac{-1}{3} + c = \frac{-2}{3}\cos(3x) + c$

$g(x) = 5 \cdot e^{\frac{1}{2}x} \rightarrow G(x) = 5 \cdot e^{\frac{1}{2}x} \cdot \frac{1}{\frac{1}{2}} + c = 10 \cdot e^{\frac{1}{2}x} + c$

$h(x) = 2^{5x} \rightarrow H(x) = 2^{5x} \cdot \frac{1}{\ln(2)} \cdot \frac{1}{5} + c = \frac{1}{5\ln(2)} \cdot 2^{5x} + c$

Antw. 4.

$(x-2)^2 = -x^2 + 4 \Leftrightarrow x^2 - 4x + 4 = -x^2 + 4$

$2x^2 - 4x = 0 \Leftrightarrow x = 0 \vee x = 2$

$$\text{Opp} = \int_0^2 \left((-x^2+4) - (x-2)^2\right) \cdot dx = \int_0^2 \left(-2x^2 + 4x\right) \cdot dx =$$

$$\left[-\tfrac{2}{3}x^3 + 2x^2\right]_0^2 = \left(-\tfrac{16}{3} + 8\right) - (0) = 2\tfrac{2}{3}$$

Antw. 5.

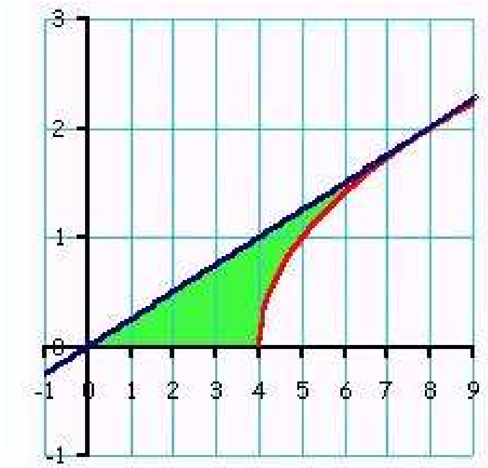
$f(x) = \sqrt{x-4} \rightarrow f'(x) = \dfrac{1}{2\sqrt{x-4}}$

$f'(8) = \frac{1}{4} \rightarrow$ raaklijn : $y = \frac{1}{4}(x-8) + 2 = \frac{1}{4}x$

De gekleurde oppervlakte is een driehoek

met basis 8 en hoogte 2, minus $\int_4^8 \sqrt{x-4} \cdot dx$.

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



Antw. 6.

De oppervlakte van het gekleurde gebied is:

$$\text{Opp} = \int_p^{2p} \frac{1}{x} \cdot dx = \left[\ln(x)\right]_p^{2p} =$$

$$\ln(2p) - \ln(p) = \ln\left(\frac{2p}{p}\right) = \ln(2)$$

Dat antwoord is onafhankelijk van p.