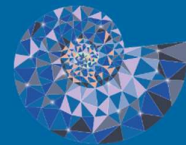


Areas between curves and lines



Gold

Given that:

$$f(x) = -3x^2 + ax + b, \quad \int_0^3 f(x) dx = 22.5$$

and that $f(x) \geq 3 - x$ for $0 \leq x < 4$, find the area in the region bounded by $f(x)$, $y = 3 - x$, $x = 3$ and $x = 0$.

Silver

Find the area of the region between the curve:

$$f(x) = -x^2 + 4x + 5$$

and the line $y = 5 - x$ between the points where the line intersects the y -axis and x -axis.

Bronze

Find the area under the curve:

$$f(x) = x^3 - 2x + 5$$

and between the lines $x = -1$ and $x = 2$.

(It may help to know that $f(x)$ is positive between $x = -1$ and $x = 2$.)