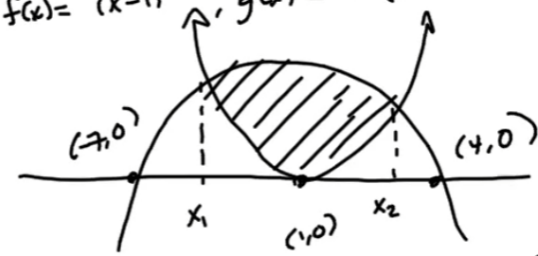
Find the area between

$f(x) = x^2 - 2x + 1$

and $g(x) = -x^2 - 3x + 28$

$f(x) = (x-1)^2$, $g(x) = -(x^2+3x-28) = -(x-4)(x+7)$

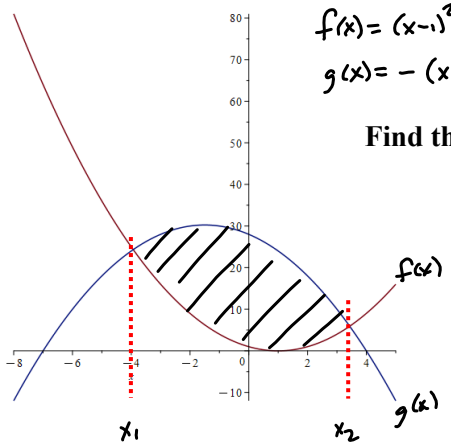


ND x_1, x_2

$$= \int_{x_1}^{x_2} g(x)\,dx - \int_{x_1}^{x_2} f(x)\,dx$$

$$= \int_{x_1}^{x_2} (g(x) - f(x))\,dx$$

... and THEN, I lost power to my desktop...



$f(x) = (x-1)^2$

$g(x) = -(x+7)(x-4)$

Find the area between them.

Find x1 and x2

Solve $f(x) = g(x)$

$x^2 - 2x + 1 = -(x^2 + 3x - 28)$

$= -x^2 - 3x + 28$

$\Rightarrow 2x^2 + x - 27 = 0$

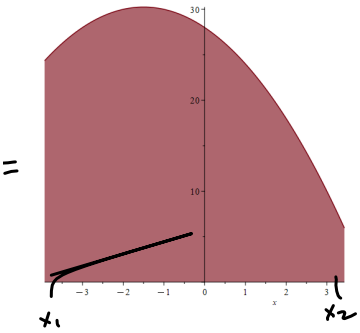
$\Rightarrow a = 2, b = 1, c = -27$

$\Rightarrow b^2 - 4ac = 1^2 - 4(2)(-27)$

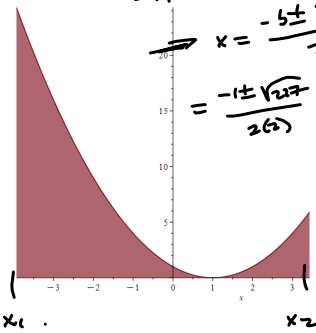
$= 1 + 216 = 217$

$\Rightarrow x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$= \frac{-1 \pm \sqrt{217}}{2(2)} = \boxed{\frac{-1 \pm \sqrt{217}}{4} = x}$



$=$ —



$= \int_{x_1}^{x_2} g(x)\,dx - \int_{x_1}^{x_2} f(x)\,dx$

$= \int_{x_1}^{x_2} (g(x) - f(x))\,dx$

$= \int_{x_1}^{x_2} (-2x^2 - x + 27)\,dx = \frac{-2x^3}{3} - \frac{x^2}{2} + 27x \Big|_{x_1}^{x_2}$

$x_1 = \frac{-1 - \sqrt{217}}{4} \approx -3.932729965 \approx x_1$

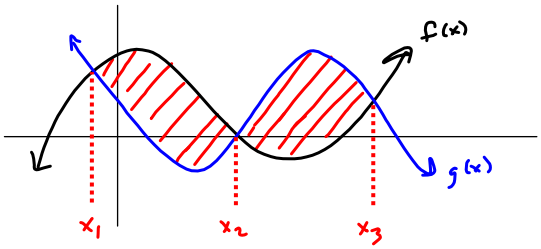
$x_2 = \frac{-1 + \sqrt{217}}{4} \approx 3.432729965 \approx x_2$

$\times$ 133.1920671 ≈ Area

FINAL ANS.

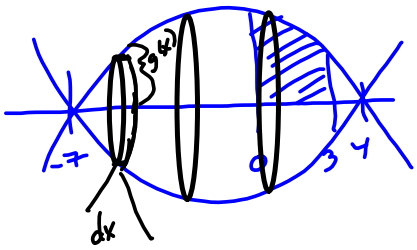
$$evalf\left(\int_{-3.932729965}^{3.432729965} (g(x) - f(x))\,dx\right) \approx 133.1920671$$

$\int_{x_1}^{x_2} (\text{UPPER} - \text{LOWER})\,dx$ = Area between Upper & Lower function.



$$\text{Area} = \int_{x_1}^{x_3} |f(x) - g(x)|\,dx = \int_{x_1}^{x_2} (f(x) - g(x))\,dx + \int_{x_2}^{x_3} (g(x) - f(x))\,dx$$

Find the volume of the solid of revolution of the region bounded by $x = 0$, $x = 3$, $y = 0$ (the x-axis), and the graph of $g(x)$, when $g(x)$ is revolved about the x-axis.



Volume! → Area of representative disk.

(Area)(thickness) = volume.

$= (\pi r^2)\,dx$

$= \pi (g(x))^2\,dx$

ADD ALL These ("N") disks

$$\pi \sum_{k=1}^{n} g(x_k)^2 \Delta x \xrightarrow{n \to \infty} \pi \int_{x_1}^{x_2} g(x)^2\,dx = \pi \int_{-7}^{4} -(x^2 - 3x + 27)^2\,dx$$

$$= \frac{16505\,\pi}{30} \approx 16865.22129$$