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(41) $G(x) = \int_0^{x^3} \sqrt{t+1}\, dt$

$f'(2)$

$G'(x) = \sqrt{x^3+1} \cdot 3x^2$

$f'(2) = 3 \cdot 3 \cdot 4 = 36$

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(39) $r(t) = 100 + 72t - 3t^2$ $\frac{\text{Hrs}}{t}$

$$\int_0^{24} r(t)\,dt =$$

$$\int_{12}^{24} r(t)\,dt =$$

(30) $\int_{-2}^{-1} \frac{12x\,dx}{(x^2+2)^3}$

$u = x^2 + 2$

$du = 2x\,dx$

$6\,du = 12x\,dx$

$\int_{-4}^{-1} 6 \frac{du}{u^3}$

$6\int u^{-3}\,du = 6 \cdot \frac{u^{-2}}{-2} = \frac{-3}{u^2}\Big|_{6}^{18}$

$= -3\left(\frac{1}{6^2} - \frac{1}{18^2}\right)$

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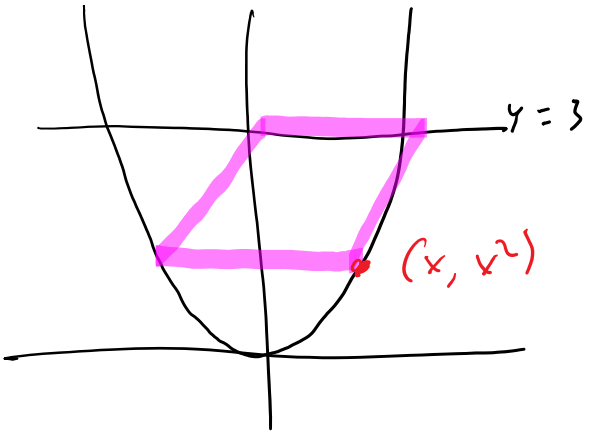
(14) The base of a solid is region enclosed by $y = x^2$ and $y = 3$. The cross-sections $\perp$ to y-axis are squares. Find volume



$y = x^2 \rightarrow x = \pm\sqrt{y}$

side length $= 2\sqrt{y}$

area of $\square = 4y$

$$\int_0^3 4y\,dy = 2y^2 \Big|_0^3$$

$= 18$.