1(a) Calculate the indefinite integral

$$\int \frac{1}{x(\ln x)^2}\, dx.$$

Final answer

(b) Calculate the indefinite integral

$$\int \frac{1+e^x}{x+e^x}\, dx.$$

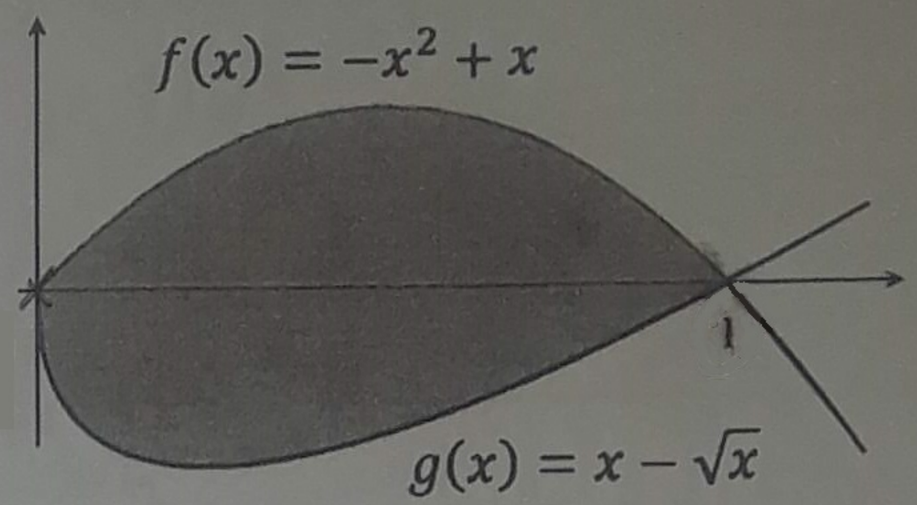
Final answer

2. (a) Calculate the definite integral

$$\int_0^{\pi} (3 - \cos x) \sin x \, dx.$$

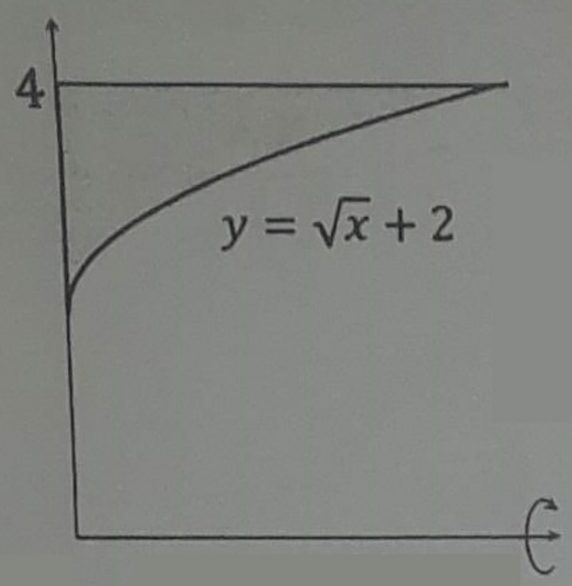
Final answer

(b) Find the area of the region enclosed by the graphs of $f(x) = -x^2 + x$ and $g(x) = x - \sqrt{x}$ for



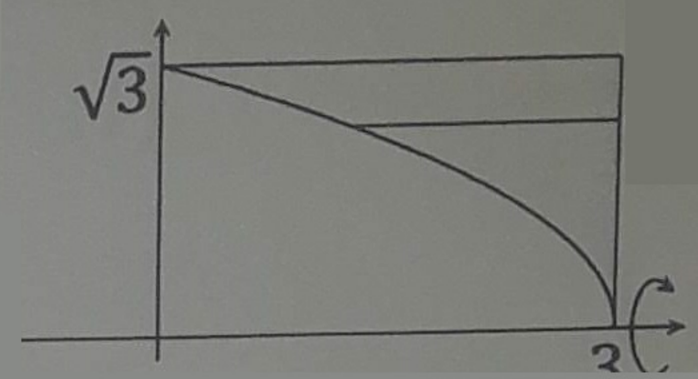
Final answer

3.(a) Find the volume of the solid generated by revolving the region bounded by $y = \sqrt{x} + 2$, $x = 0, y = 4$ about the x-axis.



Final answer

(b) Using the shell method, find the volume of solid of revolution generated by revolving the region bounded by $y = \sqrt{3}$, $x = 3$, and $x = 3 - y^2$ around the x-axis.



Final answer

4. $y = \frac{x^2}{2} - \frac{\ln x}{4}$.

(a)(3pt) Calculate $\frac{dy}{dx}$.

Final answer

(b)(3pt) Calculate $\sqrt{1 + \left(\frac{dy}{dx}\right)^2}$.

Final answer

(c)(14pt) Calculate the arc length of the graph of $y = \frac{x^2}{2} - \frac{\ln x}{4}$ for $1 \leq x \leq 3$.

Final answer

5. $y = \sqrt{2x}$.

(a)(3pt) Calculate $\frac{dy}{dx}$.

Final answer

(b)(3pt) Calculate $\sqrt{1 + \left(\frac{dy}{dx}\right)^2}$.

Final answer

(c)(14pt) Find the surface area generated by revolving the graph of $y = \sqrt{2x}$ for $1 \leq x \leq 5$ around x-axis.

Final answer