

Answer the problems on separate paper. You do not need to rewrite the problem statements on your answer sheets. Do your own work. Show all relevant steps which lead to your solutions. Retain this question sheet for your records.

1. As $x \rightarrow \infty$, does f grow faster than g , at the same as g or slower than g ?

a) $f(x) = \sqrt{x+10}$, $g(x) = x^2$

b) $f(x) = \ln \sqrt{x+10}$, $g(x) = \ln x^2$

2. Evaluate $\sin(\sec^{-1} \frac{x}{4})$

3. Find y' . Simplify where appropriate.

$$y = x \sin^{-1} x - \sqrt{1-x^2}$$

4. Evaluate two (2) of the following three integrals.

a) $\int \frac{e^x}{1+e^{2x}} dx$ b) $\int \frac{dt}{9+2t^2}$ c) $\int \frac{dx}{1+6x+x^2}$

5. Find the area of the indicated regions.

a) The area enclosed in the first quadrant below the curves $y = x^2$ and $x + y = 2$ and above the x -axis.

b) The area bounded between the curves $y = x^2 - 4x$ and $y = -x^2 + 2x$ and between $x = -1$ and $x = 1$.

6. Find the volumes of the solids of revolution obtained by revolving the following regions about the indicated axes. In each case **do not** evaluate the representing integrals.

a) Region: Area enclosed by the curves $y = \sqrt{x}$ and $y = x$
i) Axis: line $y = -2$. ii) Axis: line $x = 2$.

b) Region: Area enclosed by the curves $y = \sqrt{x}$ and $y = \frac{x^2}{8}$
i) Axis: line $y = 2$. ii) Axis: line $x = 0$.