Worksheet for 26 November

① $\int_0^2 x \cdot 2^x \, dx$

② $\int x \cdot \sin(2x) \, dx$

③ $\int \ln x \, dx$

④ $\int x^2 e^{2x} \, dx$

The remaining problems require a combination of multiple techiques.

⑤ $\int_0^1 \arctan x\, dx$

⑥ $\int \cos(\sqrt{x})\, dx$

⑦ $\int (\ln x)^2\, dx$

⑧ $\int x^3 \cdot e^{-x^2/2}\, dx$

Part 2

① Find the area between the curves $y=x^3$ and $y=\sqrt{x}$:

$y=x^3$

$y=\sqrt{x}$
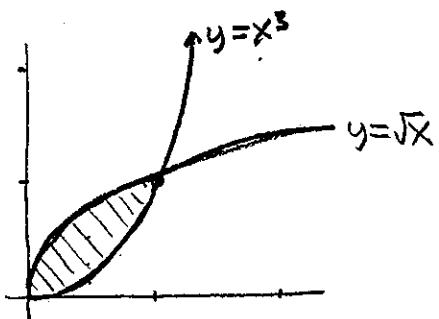
a) By slicing vertically

b) By slicing horizontally.

c) Write Riemann sum approximations (n rectangles) for both cases.

② a) Graph $y = 4x$, $y = \frac{1}{x}$, and $y = 1$ on the axes below.
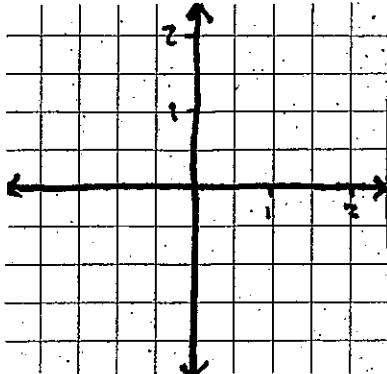
b) Compute the area of the region bounded by these three curves, by slicing vertically or horizontally.

③ a) Compute $\int_1^e \ln x \, dx$ using integration by parts.
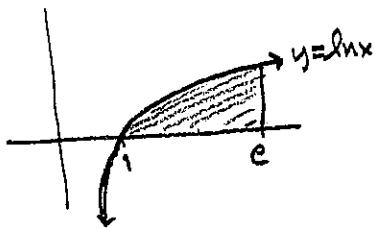
b) Compute the same area by slicing <u>horizontally</u>; make sure you get the same result!