Math 141 Final Worksheet 3

1. Evaluate the following definite integrals by interpreting them as (signed) areas.

i) $\int_0^2 \sqrt{4-x^2}\,dx$, ii) $\int_1^4 (-3+2x)\,dx$

2. If $\int_5^1 f(x)\,dx = 4$ and $\int_1^2 2f(x)\,dx = 3$, find $\int_2^5 f(x)\,dx$.

3. Calculate (without doing any calculation!)

i) $\int_{-10\pi}^{10\pi} \sin(x^7)\,dx$

ii) $\int_{100}^{100} e^{\sqrt{1+x^{27}}}\,dx$

iii) $\int_0^3 (\cos^2 x + \sin^2 x)\,dx$.

4. Find the following indefinite integrals

i) $\int \sin(3x)\,dx$

ii) $\int \frac{(1+y)^2}{y}\,dy$

iii) $\int \left(t\sqrt{t} - \frac{1}{t\sqrt{t}}\right)dt$

5. Use the Fundamental Theorem of Calculus (first part) to calculate

i) $\int_0^2 (5x^4 - x^2 - 2x)\,dx$

ii) $\int_0^{\frac{\pi}{3}} (\cos x + \sin(2x))\,dx$

iii) $\int_1^4 \left(e^{6x} + \frac{1}{x}\right)dx.$