MATH 104 TUTORIAL 7 ANSWERS

1.a. $\int x^2 \sin x \, dx = -x^2 \cos x + 2x \sin x + 2 \cos x + C$

b. $\int x^2 e^{-x} \, dx = -x^2 e^{-x} - 2x e^{-x} - 2 e^{-x} + C$

c. $: y \tan^{-1} y - \ln \sqrt{1 + y^2} + C$

d. $\int (r^2 + r + 1) e^r \, dr = (r^2 + r + 1) e^r - (2r + 1) e^r + 2e^r + C$

e. $\frac{1}{2} (e^{-y} \sin y - e^{-y} \cos y) + C,$

f. $\frac{z^2}{4} [2(\ln z)^2 - 2 \ln z + 1] + C$

g. $\frac{1}{3}x^3 e^{x^3} - \frac{1}{3}e^{x^3} + C$

h. $\frac{1}{3}\sin 2x \sin 4x + \frac{1}{6}\cos 2x \cos 4x + C$

2.a. $-\cos x + \frac{1}{3}\cos^3 x + C$

b. $\frac{1}{4}\sin^4 x - \frac{1}{6}\sin^6 x + C$

c. $\frac{1}{2}\tan^2 x + C$

d. $\frac{\pi}{4}$