MATH 104 TUTORIAL 1 ANSWERS

1. (a) $-x^{-2}$

(b) $-\frac{x^{-2}}{4} + \frac{x^3}{3}$

(c) $\frac{x^{-2}}{2} + \frac{x^2}{2} - x$

2. (a) $x^{4/3}$

(b) $\frac{1}{2}x^{2/3}$

(c) $\frac{3}{4}x^{4/3} + \frac{3}{2}x^{2/3}$

3. (a) $\sin(\pi x)$

(b) $\sin\left(\frac{\pi x}{2}\right)$

(c) $\left(\frac{2}{\pi}\right)\sin\left(\frac{\pi x}{2}\right) + \pi \sin x$

4.a $\frac{x}{5} + \frac{1}{x^2} + x^2 + C$

b. $\frac{1}{3}x^{3/2} + 4x^{1/2} + C$

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

d. $\int -5 \sin t \, dt = 5 \cos t + C$

e. $\int 3 \cos 5\theta \, d\theta = \frac{3}{5} \sin 5\theta + C$

f. $\int \frac{2}{5} \sec \theta \tan \theta \, d\theta = \frac{2}{5} \sec \theta + C$

g. $\int \frac{1}{2}(\csc^2 x - \csc x \cot x) \, dx = -\frac{1}{2}\cot x + \frac{1}{2}\csc x + C$

h. $\theta + \tan \theta + C$

l. $\colon \tan \theta + C$

5. a. $\frac{16}{15}$ b. $\frac{77}{60}$ c. $\colon \frac{8}{3}$ d. $\colon \frac{25}{12}$

6. a. $\displaystyle\sum_{k=1}^{3} \frac{k-1}{k} = \frac{1-1}{1} + \frac{2-1}{2} + \frac{3-1}{3} = 0 + \frac{1}{2} + \frac{2}{3} = \frac{7}{6}$

b. $\displaystyle\sum_{k=1}^{4} (-1)^k \cos k\pi = 4$

7. a. $1 + 2n^2$ b. c c. $\frac{n+1}{2n}$ d. 61

8. a. 1   b. ½

9. a. -1   b. 7/2