

Quiz 2

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. (1 mark each) Integrate the following indefinite integrals:

a.

$$\int \frac{1}{x^{4/5}} dx = \int x^{-4/5} dx = \frac{x^{1/5}}{1/5} + C = 5x^{1/5} + C$$

b.

$$\int \sec x dx = \ln |\sec x + \tan x| + C$$

c.

$$\int \cot x dx = \ln |\sin x| + C$$

d.

$$\int \frac{1}{x\sqrt{x^2-3}} dx = \int \frac{1}{x\sqrt{x^2-(\sqrt{3})^2}} dx = \frac{1}{\sqrt{3}} \operatorname{arcsec}\left(\frac{x}{\sqrt{3}}\right) + C$$

e.

$$\int \frac{1}{x} dx = \ln|x| + C$$

f.

$$\int \sin x dx = -\cos x + C$$

Question 2. (4 marks) §4.7 #35 A particle is moving with the given data. Find the position of the particle.

$$a(t) = 10 \sin t + 3 \cos t \quad s(0) = 0, \quad s(2\pi) = 12$$

$$v(t) = \int a(t) dt = \int 10 \sin t + 3 \cos t dt = -10 \cos t + 3 \sin t + V_0$$

$$s(t) = \int v(t) dt = \int -10 \cos t + 3 \sin t + V_0 dt = -10 \sin t - 3 \cos t + V_0 t + S_0$$

Let's solve for S_0

$$0 = s(0)$$

$$0 = -10 \sin(0) - 3 \cos(0) + V_0(0) + S_0$$

$$0 = -3 + S_0$$

$$3 = S_0$$

Let's solve for V_0

$$12 = s(2\pi)$$

$$12 = -10 \sin(2\pi) - 3 \cos(2\pi) + V_0(2\pi) + 3$$

$$12 = -3 + 3 + 2\pi V_0$$

$$\frac{6}{\pi} = V_0$$

$$\therefore s(t) = -10 \sin t - 3 \cos t + \frac{6}{\pi} t + 3$$