

Quiz #1

Name: Sohit

Q5: Find the ratio of the two numbers $z_1 = 3 + 4i$ and $z_2 = 5 + 2i$ (z_1/z_2):

$$\frac{z_1}{z_2} = \frac{(3+4i)(5-2i)}{(5+2i)(5-2i)} = \frac{(15+8) + \frac{14i}{21}}{29} = \frac{23}{29} + \frac{14i}{29}$$

$$= 0.793 + 0.483i$$

OR

$$\frac{z_1}{z_2} = \frac{|z_1| e^{i(\theta_1 - \theta_2)}}{|z_2|} = 0.9788 e^{i(0.547)}$$

Q5: Find the particular solution of the general solution given.

$$x'' + x = 0, \quad x = a \cos(t) + b \sin(t), \quad x(\pi/2) = 0 \text{ \& \ } x'(\pi/2) = 1$$

$$x' = -a \sin t + b \cos t$$

$$\therefore x(\pi/2) = a \cos(\pi/2) + b \sin(\pi/2) = 0 \rightsquigarrow \boxed{b=0}$$

$$x'(\pi/2) = -a \sin(\pi/2) = 1 \rightsquigarrow \boxed{a=-1}$$

$$\therefore \boxed{x(t) = -\cos(t)}$$

2 points = min

Quiz #2

Name: _____

Solution

/10: Solve the following equation:

$$y^3 y' + x^3 = 0, \quad y(0) = 1$$

$$y^3 \frac{dy}{dx} = -x^3 \quad \rightsquigarrow \int y^3 dy = \int -x^3 dx \quad] / 2$$

$$\int y^3 dy = \int -x^3 dx + c$$

$$\frac{y^4}{4} = -\frac{x^4}{4} + c \quad \rightsquigarrow y^4 = -x^4 + c_1 \quad] / 4$$

$$\text{if } x=0, y=1 \rightsquigarrow 1 = c_1$$

$$\boxed{y^4 + x^4 = 1} \quad] / 2$$

Min: $x/0$

• Other solution may exist.