Let $z = e^{j\pi\theta} - e^{j3\pi\theta}$, then which of the following is true about $|z|$?

O None of the choices

O $|z| = 2\sin(\pi\theta)$

O $|z| = 2|\sin(\pi\theta)|$

O $|z| = 2|\cos(\pi\theta)|$

O $|z| = 2\cos(\pi\theta)$

O $|z| = 1$

Question 2/4

Find the real general solution to

$$y'' + y' + 4y = 0.$$

○ $y = C_1.e^{-\frac{x}{2}}\cos(\sqrt{3}\,x) + C_2.e^{-\frac{x}{2}}\sin(\sqrt{3}\,x)$

○ $y = C_1.e^{-x}\cos\left(\frac{\sqrt{11}\,x}{2}\right) + C_2.e^{-x}\sin\left(\frac{\sqrt{11}\,x}{2}\right)$

○ $y = C_1.e^{-\frac{x}{2}}\cos\left(\frac{\sqrt{11}\,x}{2}\right) + C_2.e^{-\frac{x}{2}}\sin\left(\frac{\sqrt{11}\,x}{2}\right)$

○ $y = C_1.e^{-\frac{x}{2}}\cos\left(\frac{\sqrt{15}\,x}{2}\right) + C_2.e^{-\frac{x}{2}}\sin\left(\frac{\sqrt{15}\,x}{2}\right)$

○ $y = C_1.e^{-x}\cos\left(\frac{\sqrt{15}\,x}{2}\right) + C_2.e^{-x}\sin\left(\frac{\sqrt{15}\,x}{2}\right)$

Let $z = \dfrac{1+j}{1-j}$, evaluate the principal value of $\ln(z)$.

- $\bigcirc$ $1 + j\frac{\pi}{2}$

- $\bullet$ $j\frac{\pi}{2}$

- $\bigcirc$ $1 + j\frac{\pi}{4}$

- $\bigcirc$ $1 - j\frac{\pi}{2}$

- $\bigcirc$ $-j\frac{\pi}{2}$

- $\bigcirc$ $1 - j\frac{\pi}{4}$

Find the general solution to

$$\frac{dy}{dx} + \frac{4}{x}y + 2 = 3x.$$

○ $y = \frac{1}{2}x^2 - \frac{2}{5}x + Cx^{-4}$

○ $y = \frac{1}{2}x^2 - \frac{2}{5}x + Cx^4$

○ $y = \frac{3}{5}x^2 - \frac{1}{2}x + Cx^{-3}$

○ $y = \frac{3}{5}x^2 - \frac{1}{2}x + Cx^3$

○ $y = \frac{3}{5}x^2 + \frac{1}{2}x + Cx^{-3}$

○ $y = \frac{1}{2}x^2 + \frac{2}{5}x + Cx^{-4}$