

Name _____

Date _____

Year Group _____

Find the nth root of the following complex numbers

$$\sqrt[n]{z} = \sqrt[n]{r} * \left[\cos\left(\frac{\theta + 2\pi k}{n}\right) + i * \sin\left(\frac{\theta + 2\pi k}{n}\right) \right]$$

$$\sqrt[n]{z} = \sqrt[n]{r} * \left[\cos\left(\frac{\theta + 360^\circ k}{n}\right) + i * \sin\left(\frac{\theta + 360^\circ k}{n}\right) \right]$$

1. $x^4 = -256$; use degrees

$r =$ _____

$\theta =$ _____°

$n =$ _____

when $k = 0$

Steps => $\sqrt[n]{\text{_____}} * \left[\cos\left(\frac{\text{_____}^\circ + 360^\circ * \text{_____}}{\text{_____}}\right) + i * \sin\left(\frac{\text{_____}^\circ + 360^\circ * \text{_____}}{\text{_____}}\right) \right]$

Steps => $\text{_____} * \left[\cos\left(\frac{\text{_____}^\circ}{\text{_____}}\right) + i * \sin\left(\frac{\text{_____}^\circ}{\text{_____}}\right) \right]$

Steps => $\text{_____} * [\cos(\text{_____}^\circ) + i * \sin(\text{_____}^\circ)]$

Steps => $\text{_____} * \left[\frac{\sqrt{\text{_____}}}{\text{_____}} + i * \frac{\sqrt{\text{_____}}}{\text{_____}} \right]$

Answer => $\text{_____} * \sqrt{\text{_____}} \text{_____} i * \sqrt{\text{_____}}$

when $k = 1$ => Answer => $\text{_____} * \sqrt{\text{_____}} \text{_____} i * \sqrt{\text{_____}}$

when $k = 2$ => Answer => $\text{_____} * \sqrt{\text{_____}} \text{_____} i * \sqrt{\text{_____}}$

when $k = 3$ => Answer => $\text{_____} * \sqrt{\text{_____}} \text{_____} i * \sqrt{\text{_____}}$