

10. i^{100}

Soln
 $\frac{100}{4} = 25 \text{ rem } 0$

$= i^4 = (i^2)(i^2) = 1$

$i^{100} = \underline{\underline{1}}$

b. i^{200}

Soln
 $\frac{200}{4} = 50 \text{ rem } 0$

$= i^4 = (i^2)(i^2) = 1$

$i^{200} = \underline{\underline{1}}$

c. i^{300}

Soln
 $\frac{300}{4} = 75 \text{ rem } 0$

$= i^4 = (i^2)(i^2) = 1$

$i^{300} = \underline{\underline{1}}$

d. i^{19}

Soln
 $\frac{19}{4} = 4 \text{ rem } 3$

$i^3 = i \cdot (i^2)$
 $= i(-1) = -i$

$i^{19} = \underline{\underline{-i}}$

2.0

$$2x^2 + x + 4 = 0$$

Soln

$$2x^2 + x + 4 = 0$$

$$a = 2$$

$$b = 1$$

$$c = 4$$

Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(2)(4)}}{2(2)}$$

$$= \frac{-1 \pm \sqrt{1 - 32}}{4}$$

$$\sqrt{1 - 32} = \sqrt{-31}$$

$$\sqrt{-1} = i$$

$$\sqrt{31} \times \sqrt{-1} = \sqrt{31}i$$

Therefore

$$x = \frac{-1 \pm \sqrt{31}i}{4}$$

~~$$\text{and } x = \frac{-1 \pm i}{4}$$~~

$$= x = \frac{-1 + \sqrt{31}i}{4}$$

$$\text{or } x = \frac{-1 - \sqrt{31}i}{4}$$

$$b. \quad x^2 + x + 1 = 0$$

Soln

$$a = 1$$

$$b = 1$$

$$c = 1$$

Fm

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-1 \pm \sqrt{1^2 - 4(1)(1)}}{2+1}$$

$$\frac{-1 \pm \sqrt{1-4}}{2}$$

$$= \frac{-1 \pm \sqrt{-3}}{2}$$

$$= \frac{\sqrt{-3}}{\sqrt{-1} + \sqrt{3}}$$

$$i + \sqrt{3} = \sqrt{3}i$$

$$= \frac{-1 \pm \sqrt{3}i}{2}$$

$$= \frac{-1 + \sqrt{3}i}{2}$$

$$= \frac{-1 - \sqrt{3}i}{2}$$

$$c. \quad x^2 + 1 = 0$$

Soln

$$x^2 + 1 = 0$$

$$x^2 = -1$$

$$\sqrt{x^2} = \sqrt{-1}$$

$$\text{or } x = \sqrt{-1}$$

$$x = \sqrt{-1}$$

$$\sqrt{-1} = i$$

$$x = i$$

$$x = \pm i$$

$$x = i$$

$$x = -i$$