MATH 501, Section 1 Solutions

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

(4) $(-i)^{35} = [(-1)(i)]^{35} = (-1)^{35}(i)^{35} = -(i)^{35} = -(i)^1(i)^{34} = -i(i^2)^{17} = -i(-1)^{17} = (-i)(-1) = i$

(6) $(8 + 2i)(3 - i) = 24 - 8i + 6i + 2 = 26 - 2i$

(8) $(i + 1)^3 = i^3 + 3i^2 + 3i + 1 = -i - 3 + 3i + 1 = 2i - 2$

(10) $|3 - 4i| = \sqrt{3^2 + 4^2} = \sqrt{25} = 5$

(12) From the previous problem, $|3 - 4i| = \sqrt{3^2 + 4^2} = 5$ Then $3 + 4i = 5\dfrac{3 - 4i}{5} = 5\left(\dfrac{3}{5} - \dfrac{4}{5}i\right)$

(20) The solutions of $z^6 = 1$ are the six sixth roots of 1. They include $z = 1$ and are evenly spaced around the unit circle. Thus, they are the numbers $\left\{1, \quad \dfrac{1}{2} + \dfrac{\sqrt{3}}{2}i, \quad -\dfrac{1}{2} + \dfrac{\sqrt{3}}{2}i, \quad -1, \quad -\dfrac{1}{2} - \dfrac{\sqrt{3}}{2}i, \quad \dfrac{1}{2} - \dfrac{\sqrt{3}}{2}i, \right\}$