SM3 1.4 NH: Complex Factoring Techniques

Problems:

Factor each quadratic expression completely.

1) $12m^2 + 12$

$12(m + i)(m - i)$

2) $7x^2 + 2$

$(\sqrt{7}x - i\sqrt{2})(\sqrt{7}x + i\sqrt{2})$

3) $-4x^2 - 8$

$-4(x - i\sqrt{2})(x + i\sqrt{2})$

4) $4x^2 + 7$

$(2x + i\sqrt{7})(2x - i\sqrt{7})$

5) $11x^2 + 6$

$(\sqrt{11}x - i\sqrt{6})(\sqrt{11}x + i\sqrt{6})$

6) $2v^2 + 7$

$(\sqrt{2}v + i\sqrt{7})(\sqrt{2}v - i\sqrt{7})$

7) $x^2 + 4x + 5$

$(x + 2 - i)(x + 2 + i)$

8) $x^2 + 5x + 8$

$\left(x + \dfrac{5 - i\sqrt{7}}{2}\right)\left(x + \dfrac{5 + i\sqrt{7}}{2}\right)$

9) $n^2 - 5n + 12$

$\left(n - \dfrac{5 + i\sqrt{23}}{2}\right)\left(n - \dfrac{5 - i\sqrt{23}}{2}\right)$

10) $p^2 + 2p + 5$

$(p + 1 + 2i)(p + 1 - 2i)$

11) $n^2 - 7n + 11$

$\left(n - \dfrac{7 + i\sqrt{5}}{2}\right)\left(n - \dfrac{7 - i\sqrt{5}}{2}\right)$

12) $10a^2 + 3$

$(\sqrt{10}a + i\sqrt{3})(\sqrt{10}a - i\sqrt{3})$

13) $a^2 + 6a + 10$

$(a + 3 + i)(a + 3 - i)$

14) $n^2 - 2n + 12$

$(n - 1 + i\sqrt{11})(n - 1 - i\sqrt{11})$

15) $v^2 - 3v + 3$

$$\left(v - \frac{3 + i\sqrt{3}}{2}\right)\left(v - \frac{3 - i\sqrt{3}}{2}\right)$$

16) $2n^2 + 6$

$$2(n - i\sqrt{3})(n + i\sqrt{3})$$

17) $12a^2 + 7$

$$(2\sqrt{3}a + i\sqrt{7})(2\sqrt{3}a - i\sqrt{7})$$

18) $x^2 + 6x + 12$

$$(n + 3 + i\sqrt{3})(n + 3 - i\sqrt{3})$$

19) $x^2 - 4x + 7$

$$(x - 2 + i\sqrt{3})(x - 2 - i\sqrt{3})$$

20) $r^2 - 10r - 11$

$$(r - 11)(r + 1)$$