121 §3.3 #s 15, 17, 19, 23, 31, 33, 39

#s 15-22 Find the product $i^2 = -1$

(15) $(x-3i)(x+3i) = x^2 - (3i)^2 = x^2 - 3^2 i^2$

$(a-b)(a+b) = a^2 - b^2$

$= \boxed{x^2 + 9}$

(17) $(x-(1+\sqrt{2}))(x-(1-\sqrt{2}))$

$= x^2 - (1-\sqrt{2})x - (1+\sqrt{2})x + (1+\sqrt{2})(1-\sqrt{2})$

$= x^2 - x + \sqrt{2}x - x - \sqrt{2}x + 1^2 - (\sqrt{2})^2$

$= x^2 - 2x + 1 - 2 = \boxed{x^2 - 2x - 1}$

(19) $(x-(3+2i))(x-(3-2i))$

M1 $= x^2 - (3-2i)x - (3+2i)x + (3+2i)(3-2i)$

$= x^2 - 3x + 2ix - 3x - 2ix + 3^2 - (2i)^2$

$= x^2 - 6x + 9 - 4i^2$

$= x^2 - 6x + 9 + 4$

$= \boxed{x^2 - 6x + 13}$

M2 $(x-3-2i)(x-3+2i)$

$= x^2 - 3x + 2ix - 3x + 9 - 6i - 2ix + 6i - 4i^2$

$= x^2 - 6x + 9 + 4$

$= \boxed{x^2 - 6x + 13}$

(121) S 3.3 #s 23, 31, 33, 39

#s 23-42 Find polynomial eq'n with real coefficients that has the given roots

(23) $-3, 5$: $(x+3)(x-5) = 0$

(31) $0, i\sqrt{3}$: $x(x - i\sqrt{3})(x - (-i\sqrt{3})) = 0$ CPT

(33) $3, 1-i$: $(x-3)(x-(1-i))(x-(1+i)) = 0$

(39) $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$: $(x-\frac{1}{2})(x-\frac{1}{3})(x-\frac{1}{4}) = 0$

Further Probs.

#s 43, 47, 51, 61, 65, 67, 69*, 70*

* Quadratic in Form