A2 Solving Polynomial Equations by Factoring

I. Solve by factoring.

1. $x(x-1)^2(x+1)^3=0$
2. $x^3-2x^2+x=0$
3. $12x^3+4x^2+3x+1=0$
4. $x^5+2x^4+3x^2-12=x^5+x^4+2x^2$
5. $(2x-1)(x^2+3)(2x^2-5)=0$
6. $y^4-1=0$
7. $5x^6=9x^4-4x^2$
8. $15x^5-72x^3-108x=0$
9. $x^6-4x^4-9x^2+36=0$
10. $4x^4+4x^2=-1$
11. $x^7-x^4=0$
12. $27x^3+54x^3=x+2$
13. $18x^3=50x$
14. $(2x+1)^2(2x^2+5x-1)=0$
15. $x^6-64=0$

II. Write a polynomial equation in standard form with integral coefficients given the roots.

16. 1, 3, -1/2
17. 0, 2 (multiplicity of 2)
18. $\sqrt{2}$, $-\sqrt{2}$, 4

ANSWERS

1. x = 0, 1 mult. 2, -1 mult. 3

2. x = 0, 1 mult. 2

3. x = $-\frac{1}{3}, \pm\frac{1}{2}i$

4. x = $\pm\sqrt{3}, \pm 2i$

5. x = $\frac{1}{2}, \pm i\sqrt{3}, \pm\frac{\sqrt{10}}{2}$

6. x = $\pm 1, \pm i$

7. x = 0 mult 2, $\pm 1, \pm\frac{2\sqrt{5}}{5}$

8. x = $0, \pm\sqrt{6}, \pm\frac{i\sqrt{30}}{5}$

9. x = $\pm i\sqrt{3}, \pm\sqrt{3}, \pm 2$

10. x = $\frac{i\sqrt{2}}{2}$ mult. 2, $-\frac{i\sqrt{2}}{2}$ mult. 2

11. x = 0 mult. 4, 1, $\frac{-1\pm i\sqrt{3}}{2}$

12. x = $-2, -\frac{1}{3}, \frac{1}{6}\pm\frac{\sqrt{3}}{6}i$

13. x = 0, $\pm\frac{5}{3}$

14. x = $-\frac{1}{2}$ mult 2, $\frac{-5\pm\sqrt{33}}{4}$

15. x = $\pm 2, -1\pm i\sqrt{3}, 1\pm i\sqrt{3}$

16. $2x^3 - 7x^2 + 2x + 3 = 0$

17. $x^3 - 4x^2 + 4x = 0$

18. $x^3 - 4x^2 - 2x + 8 = 0$