

1. Find the complete factorization and all four zeros of $P(x) = x^4 + 2x^3 - 2x^2 - 3x + 2$.

2. Find the complete factorization and all four zeros of $P(x) = 3x^4 - 2x^3 - x^2 - 12x - 4$. (Hint: $x - 2$ is a factor of P . After factoring out $x - 2$, use the Rational Zeros Theorem.)

3. Find a degree 3 polynomial with zeros -1 and $2i$.

Q: I can run but not walk. Wherever I go, thought follows close behind. What am I?

4. Find the complete factorization and all four zeros of $P(x) = x^4 + 6x^3 + 7x^2 - 6x - 8$.

5. Find the complete factorization and all four zeros of $P(x) = 2x^4 - 7x^3 + 3x^2 + 8x - 4$.

6. Find the complete factorization and all five zeros of $P(x) = x^5 - 4x^4 - x^3 + 10x^2 + 2x - 4$.

7. Find the complete factorization and all four zeros of $P(x) = 2x^4 + 15x^3 + 17x^2 + 3x - 1$.

8. Find the complete factorization and all three zeros of $P(x) = x^3 - 3x^2 + 3x - 2$.

9. Find the complete factorization and all three zeros of $P(x) = x^3 - x - 6$.

10. Find the complete factorization and all four zeros of $P(x) = 4x^4 + 4x^3 + 5x^2 + 4x + 1$.

11. Find the complete factorization and all four zeros of $P(x) = 4x^4 - 20x^3 + 37x^2 - 24x + 5$.

12. Find a degree 3 polynomial with real coefficients and zeros -3 and $1 - i$.

13. Find a degree 4 polynomial with real coefficients and zeros 1 (multiplicity 2) and $1 + 2i$.

Optional exercises from the Sullivan book if you'd like more practice:
4.5 (p.232) #11-19 odd, 33-55 odd
4.6 (p.240) #17-21 odd, 31-37 odd