

## Unit 8.6 Given Zeros Find Polynomial PRACTICE

**Find the factors of the polynomial. Find the polynomial equation.**

1) Zeros:  $\left\{\frac{\sqrt{5}}{5}, -\frac{\sqrt{5}}{5}, \sqrt{2}, -\sqrt{2}, i\sqrt{2}, -i\sqrt{2}\right\}$

Factors:  $(25x^2 - 5)(x^2 - 2)(x^2 + 2) = 0$

Polynomial:  
Equation  $25x^6 - 5x^4 - 100x^2 + 20 = 0$

2) Zeros:  $\left\{1, -1, \frac{i\sqrt{2}}{2}, -\frac{i\sqrt{2}}{2}\right\}$

Factors:  $(x - 1)(x + 1)(4x^2 + 2) = 0$

Polynomial:  
Equation  $4x^4 - 2x^2 - 2 = 0$

3) Zeros:  $\left\{5, \sqrt{7}, -\sqrt{7}, \frac{\sqrt{5}}{5}, -\frac{\sqrt{5}}{5}\right\}$

Factors:  $(25x^2 - 5)(x^2 - 7)(x - 5) = 0$

Polynomial:  
Equation  $25x^5 - 125x^4 - 180x^3 + 900x^2 + 35x - 175 = 0$

4) Zeros:  $\left\{i, -i, \frac{\sqrt{14}}{2}, -\frac{\sqrt{14}}{2}\right\}$

Factors:  $(x^2 + 1)(4x^2 - 14) = 0$

Polynomial:  
Equation  $4x^4 - 10x^2 - 14 = 0$

5) Zeros:  $\left\{\frac{1}{2}, -\frac{1}{2}, \frac{-1+i\sqrt{3}}{4}, \frac{-1-i\sqrt{3}}{4}, \frac{1+i\sqrt{3}}{4}, \frac{1-i\sqrt{3}}{4}\right\}$

Factors:  $(16x^2 + 8x + 4)(16x^2 - 8x + 4)(2x - 1)(2x + 1) = 0$

Polynomial:  
Equation  $1024x^6 - 16 = 0$

6) Zeros:  $\left\{2\sqrt{2}, -2\sqrt{2}, \frac{\sqrt{10}}{5}, -\frac{\sqrt{10}}{5}\right\}$

Factors:  $(x^2 - 8)(25x^2 - 10) = 0$

Polynomial:  
Equation  $25x^4 - 210x^2 + 80 = 0$

7) Zeros:  $\left\{\frac{i\sqrt{10}}{5}, -\frac{i\sqrt{10}}{5}, 2i, -2i\right\}$

Factors:  $(25x^2 + 10)(x^2 + 4) = 0$

Polynomial:  
Equation  $25x^4 + 110x^2 + 40 = 0$

8) Zeros:  $\left\{\frac{2\sqrt{10}}{5}, -\frac{2\sqrt{10}}{5}, i\sqrt{2}, -i\sqrt{2}\right\}$

Factors:  $(25x^2 - 40)(x^2 + 2) = 0$

Polynomial:  
Equation  $25x^4 + 10x^2 - 80 = 0$

9) Zeros:  $\left\{2, -2, \frac{i\sqrt{6}}{3}, -\frac{i\sqrt{6}}{3}\right\}$

Factors:  $(9x^2 + 6)(x - 2)(x + 2) = 0$

Polynomial:  
Equation  $9x^4 - 30x^2 - 24 = 0$

10) Zeros:  $\left\{1, \frac{i}{2}, -\frac{i}{2}, -3\right\}$

Factors:  $(4x^2 + 1)(x - 1)(x + 3) = 0$

Polynomial:  
Equation  $4x^4 + 8x^3 - 11x^2 + 2x - 3 = 0$

11) Zeros:  $\{2, -1 + i\sqrt{3}, -1 - i\sqrt{3}, -2 \text{ mult. } 2, 1 + i\sqrt{3}, 1 - i\sqrt{3}\}$

Factors:  $(x^2 - 2x + 4)(x^2 + 2x + 4)(x - 2)(x + 2)^2 = 0$

Polynomial:  
Equation  $x^7 + 2x^6 - 64x - 128 = 0$

12) Zeros:  $\left\{\frac{1}{2} \text{ mult. } 2, \frac{-1+i\sqrt{3}}{4}, \frac{-1-i\sqrt{3}}{4}, -\frac{1}{2}, \frac{1+i\sqrt{3}}{4}, \frac{1-i\sqrt{3}}{4}\right\}$

Factors:  $(16x^2 + 8x + 4)(16x^2 - 8x + 4)(2x + 1)(2x - 1)^2 = 0$

Polynomial:  
Equation  $2048x^7 - 1040x^6 - 32x + 16 = 0$

13) Zeros:  $\left\{\frac{i\sqrt{6}}{3}, -\frac{i\sqrt{6}}{3}, 3, -3 \text{ mult. } 2\right\}$

Factors:  $(9x^2 + 6)(x - 3)(x + 3)^2 = 0$

Polynomial:  
Equation  $9x^5 + 27x^4 - 75x^3 - 225x^2 - 54x - 162 = 0$

14) Zeros:  $\left\{\sqrt{3}, -\sqrt{3}, \frac{\sqrt{5}}{5}, -\frac{\sqrt{5}}{5}, -\frac{1}{2}\right\}$

Factors:  $(x^2 - 3)(25x^2 - 5)(2x + 1) = 0$

Polynomial:  
Equation  $50x^5 + 25x^4 - 160x^3 - 80x^2 + 30x + 15 = 0$