

1. Factor the polynomial below completely, knowing that  $x - 3$  is a factor.  
*To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 4x^4 - 45x^2 + 81$$

2. Factor the polynomial below completely. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 9x^3 + 9x^2 - 46x + 24$$

3. Factor the polynomial below completely, knowing that  $x - 3$  is a factor.  
*To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 10x^4 - 59x^3 + 37x^2 + 174x - 72$$

4. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{12x^3 - 39x^2 + 29}{x - 3}$$

5. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{9x^3 - 24x^2 - 95x - 45}{x - 5}$$

6. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{8x^3 - 62x + 27}{x + 3}$$

7. What are the *possible Rational* roots of the polynomial below?

$$f(x) = 5x^2 + 7x + 2$$

8. What are the *possible Integer* roots of the polynomial below?

$$f(x) = 2x^2 + 6x + 3$$



9. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{12x^3 + 40x^2 - 92x + 45}{x + 5}$$

10. Factor the polynomial below completely. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 9x^3 - 27x^2 - 4x + 12$$

11. Factor the polynomial below completely, knowing that  $x - 3$  is a factor.  
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$$f(x) = 20x^4 - 133x^3 + 93x^2 + 333x + 135$$

12. Factor the polynomial below completely. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 4x^3 - 24x^2 + 5x + 75$$

13. Factor the polynomial below completely, knowing that  $x - 4$  is a factor.  
*To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 8x^4 + 30x^3 - 123x^2 - 425x - 300$$

14. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{6x^3 - 18x - 10}{x - 2}$$

15. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{25x^3 - 85x^2 - 184x - 82}{x - 5}$$

16. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{12x^3 - 65x^2 + 127}{x - 5}$$



17. What are the *possible Integer* roots of the polynomial below?

$$f(x) = 4x^4 + 6x^3 + 6x^2 + 7x + 6$$

18. What are the *possible Rational* roots of the polynomial below?

$$f(x) = 2x^2 + 2x + 3$$

19. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{15x^3 + 21x^2 - 24x - 16}{x + 2}$$

20. Factor the polynomial below completely. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 16x^3 + 40x^2 - 39x - 45$$

21. Factor the polynomial below completely, knowing that  $x - 5$  is a factor.  
*To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 10x^4 - 69x^3 + x^2 + 510x - 200$$

22. Factor the polynomial below completely. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 8x^3 - 38x^2 + 15x + 36$$

23. Factor the polynomial below completely, knowing that  $x - 5$  is a factor.  
*To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 25x^4 - 50x^3 - 379x^2 + 8x + 60$$

24. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{10x^3 + 35x^2 - 49}{x + 3}$$



25. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{6x^3 - 24x^2 + 30x - 8}{x - 2}$$

26. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{15x^3 - 35x^2 + 17}{x - 2}$$

27. What are the *possible Rational* roots of the polynomial below?

$$f(x) = 7x^3 + 7x^2 + 4x + 6$$

28. What are the *possible Rational* roots of the polynomial below?

$$f(x) = 2x^4 + 3x^3 + 3x^2 + 7x + 4$$

29. Perform the division below. Write the resulting quotient in the form  $ax^2 + bx + c$  and remainder as  $r$ .

$$\frac{12x^3 - 81x^2 + 114x - 43}{x - 5}$$

30. Factor the polynomial below completely. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 9x^3 - 33x^2 + 10x + 24$$