State if the given binomial is a factor of the given polynomial.

1. (18x3 – 21x2 – 4) ÷ (6x – 7)

1. (100x3 + 20x2 – 35x – 9) ÷ (10x + 5)

1. (48x3 – 68x2 – 56x + 60) ÷ (8x – 6)

1. (72x3 + 3x2 – 27x + 10) ÷ (9x – 3)

Find the value of a for the given polynomials.

1. Find the value of a if the remainder of (x3 – ax2 + 3x – 3) ÷ (x – 4) is 5.
2. Find the value of a if the remainder of (-x3 +9) ÷ (x – 2) is 1.
3. Find the value of a if the remainder of (2x3 + 8x2 + ax – 1) ÷ (x + 3) is 2.
4. Find the value of a if f(-2) is -3 for f(x) = x3 + ax2 – 3.
5. Find the value of a if f(4) is -1 for f(x) = -2x3 + 9x2 – ax + 7.
6. Find the value of a if f(-1) is 5 for f(x) = ax4 – 5x2 +7.

Sketch the following polynomial functions. Answer the questions.

|  |  |
| --- | --- |
| 1. End behavior is  Degree is 4   as x + ∞, f(x) - ∞  as x - ∞, f(x) - ∞  All zeros are real | 1. End behavior  Degree is 6   as x - ∞, f(x) + ∞  as x + ∞, f(x) + ∞  Four zeros are real, two zeros are imaginary |
| 1. End behavior is  Degree is 3   as x - ∞, f(x) - ∞  as x + ∞, f(x) + ∞  All zeros are real | 1. End behavior is   Degree is 5   as x + ∞, f(x) - ∞  as x - ∞, f(x) + ∞  Three zeros are real, two zeros are imaginary |
| 1. Positive Leading Coefficient Degree is odd All zeros are real | 1. Negative Leading Coefficient   Degree is even Half the zeros are real, half the zeros are imaginary |