Lesson 12 Practice Problems

1. The polynomial function $p(x) = x^3 - 3x^2 - 10x + 24$ has a known factor of $(x - 4)$.

   a. Rewrite $p(x)$ as the product of linear factors.

   b. Draw a rough sketch of the graph of the function.

2. Tyler thinks he knows one of the linear factors of $P(x) = x^3 - 9x^2 + 23x - 15$. After finding that $P(1) = 0$, he suspects that $x - 1$ is a factor of $P(x)$. Here is the diagram he made to check if he's right, but he set it up incorrectly. What went wrong?

	x^2	$-8x$	**-15**
x	x^3	$-8x^2$	$-15x$
1	x^2	$-8x$	-15

3. The polynomial function $q(x) = 2x^4 - 9x^3 - 12x^2 + 29x + 30$ has known factors $(x - 2)$ and $(x + 1)$. Which expression represents $q(x)$ as the product of linear factors?

    A. $(2x - 5)(x + 3)(x - 2)(x + 1)$

    B. $(2x + 3)(x - 5)(x - 2)(x + 1)$

    C. $(2x + 15)(x - 1)(x - 2)(x + 1)$

    D. $(2x - 15)(x + 1)(x - 2)(x + 1)$

4. Each year a certain amount of money is deposited in an account which pays an annual interest rate of r so that at the end of each year the balance in the account is multiplied by a growth factor of $x = 1 + r$. $1,000 is deposited at the start of the first year, an additional $300 is deposited at the start of the next year, and $500 at the start of the following year.

    a. Write an expression for the value of the account at the end of three years in terms of the growth factor x.

    b. Determine (to the nearest cent) the amount in the account at the end of three years if the interest rate is 4%.

(From Unit 2, Lesson 2.)

5. State the degree and end behavior of $f(x) = 5 + 7x - 9x^2 + 4x^3$. Explain or show your reasoning.

(From Unit 2, Lesson 8.)

6. Describe the end behavior of $f(x) = 1 + 7x + 9x^3 + 6x^4 - 2x^5$.

7. What are the points of intersection between the graphs of the functions $f(x) = (x + 3)(x - 1)$ and $g(x) = (x + 1)(x - 3)$?