LESSON 11.7

NAME _____ DATE _____

Challenge: Skills and Applications

For use with pages 684–689

1. Divide $x^3 - 5x^2 + 4x - 7$ by $x - 3$.
2. Divide $x^4 + 9x^2 - 5$ by $x + 2$.
3. Divide $3x^3 - 3x + 8$ by $3x - 6$.
4. By letting $x = 10$, the number 32 can be written as $3x + 2$. In a similar fashion, write 6759 as a fourth degree polynomial.
5. Use long division to divide the expression from Exercise 4 by $3x + 2$. Show your work.
6. Show the relationship between long division and polynomial long division by dividing 6759 in expanded form $(6000 + 700 + 50 + 9)$ by 32 in expanded form $(30 + 2)$ and then comparing your work to that in Exercise 5.

In Exercises 7–11, use the following information.

A company currently has 12 franchises. The predicted total profit from the franchises is given by $720{,}000 + 54{,}000x - 500x^2$ dollars, where x is the number of new franchises added.

7. Write a model for the average profit per franchise in terms of x.
8. Simplify the model from Exercise 7.
9. Find the average profit per franchise if $x = 2$.
10. Find the average profit per franchise if $x = 5$.
11. As the number of franchises increases does the average profit per franchise increase or decrease?