

Lesson 15 Practice Problems

1. For the polynomial function $f(x) = x^3 - 2x^2 - 5x + 6$, we have $f(0) = 6$, $f(2) = -4$, $f(-2) = 0$, $f(3) = 0$, $f(-1) = 8$, $f(1) = 0$. Rewrite $f(x)$ as a product of linear factors.

2. Select **all** the polynomials that have $(x - 4)$ as a factor.

- A. $x^3 - 13x - 12$
- B. $x^3 + 8x^2 + 19x + 12$
- C. $x^3 + 6x + 5x - 12$
- D. $x^3 - x^2 - 10x - 8$
- E. $x^2 - 4$

3. Write a polynomial function, $p(x)$, with degree 3 that has $p(7) = 0$.

4. Long division was used here to divide the polynomial function

$p(x) = x^3 + 7x^2 - 20x - 110$ by $(x - 5)$ and to divide it by $(x + 5)$.

$$\begin{array}{r}
 + 7x^2 - 20x - 110 \\
 + 12x + 40 \\
 \hline
 x-5 x^3 + 7x^2 - 20x - 110 \\
 - x^3 + 5x^2 \\
 \hline
 + 12x^2 - 20x \\
 - 12x^2 + 60x \\
 \hline
 - 40x - 110 \\
 - 40x + 200 \\
 \hline
 + 90
 \end{array}$$

$$\begin{array}{r}
 + 7x^2 - 20x - 110 \\
 + 2x - 30 \\
 \hline
 x+5 x^3 + 7x^2 - 20x - 110 \\
 - x^3 - 5x^2 \\
 \hline
 + 2x^2 - 20x \\
 - 2x^2 - 10x \\
 \hline
 - 30x - 110 \\
 30x + 150 \\
 \hline
 + 40
 \end{array}$$

a. What is $p(-5)$?

b. What is $p(5)$?

5. Which polynomial function has zeros when $x = 5, \frac{2}{3}, -7$?

A. $f(x) = (x + 5)(2x + 3)(x - 7)$

B. $f(x) = (x + 5)(3x + 2)(x - 7)$

C. $f(x) = (x - 5)(2x - 3)(x + 7)$

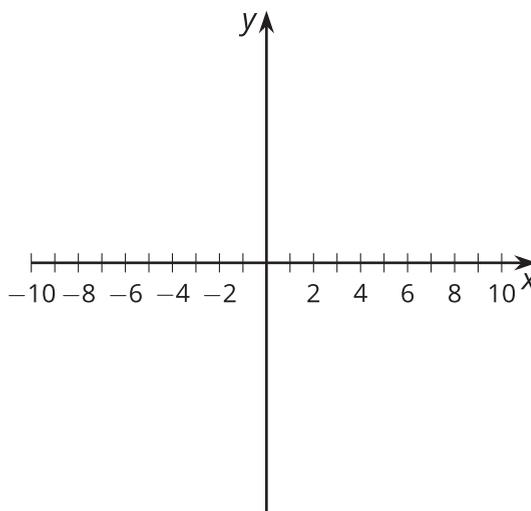
D. $f(x) = (x - 5)(3x - 2)(x + 7)$

(From Unit 2, Lesson 5.)

6. The polynomial function $q(x) = 3x^4 + 8x^3 - 13x^2 - 22x + 24$ has known factors $(x + 3)$ and $(x + 2)$. Rewrite $q(x)$ as the product of linear factors.

(From Unit 2, Lesson 12.)

7. We know these things about a polynomial function $f(x)$: it has degree 3, the leading coefficient is negative, and it has zeros at $x = -5, -1, 3$. Sketch a graph of $f(x)$ given this information.



(From Unit 2, Lesson 14.)