

The following example illustrates polynomial division by a quadratic divisor.

**EXAMPLE 9** Divide  $\frac{z^4 - 3z^3 + 2z^2 - 3z + 1}{z^2 + 2z - 1}$ .

**Solution**

$$\begin{array}{r} z^2 - 5z + 13 \\ z^2 + 2z - 1 \overline{) z^4 - 3z^3 + 2z^2 - 3z + 1} \\ \underline{-(z^4 + 2z^3 - z^2)} \phantom{+ 1} \\ -5z^3 + 3z^2 - 3z \phantom{+ 1} \\ \underline{-(-5z^3 - 10z^2 + 5z)} \phantom{+ 1} \\ 13z^2 - 8z + 1 \\ \underline{-(13z^2 + 26z - 13)} \\ -34z + 14 \end{array}$$

Hence,

$$\frac{z^4 - 3z^3 + 2z^2 - 3z + 1}{z^2 + 2z - 1} = z^2 - 5z + 13 + \frac{-34z + 14}{z^2 + 2z - 1}$$

## EXERCISE 2.2

### A

■ Write each product as a single fraction in lowest terms. See Example 1.

1.  $\frac{24}{3} \cdot \frac{20}{36} \cdot \frac{3}{4}$
2.  $\frac{3}{10} \cdot \frac{16}{27} \cdot \frac{30}{36}$
3.  $\frac{15n^2}{3p} \cdot \frac{5p^2}{n^3}$
4.  $\frac{21t^2}{5s} \cdot \frac{15s^3}{7st}$
5.  $\frac{-4}{3np} \cdot \frac{6n^2p^3}{16}$
6.  $\frac{14a^3b}{3b} \cdot \frac{-6}{7a^2}$
7.  $\frac{1}{3}x^2 \cdot \frac{6}{7}x^3$
8.  $\frac{2}{3}y \cdot \frac{9}{10}y^2$
9.  $\frac{3}{4}x^2y \cdot \frac{2}{3}xy^2$
10.  $\frac{1}{4}x^3y \cdot \frac{2}{5}xy$
11.  $-\frac{1}{2}xyz^2 \cdot \frac{2}{3}x^2y$
12.  $-\frac{3}{5}x^2y \cdot \frac{5}{6}xy^2z$
13.  $\frac{-12a^2b}{5c} \cdot \frac{10b^2c}{24a^3b}$
14.  $\frac{a^2}{xy} \cdot \frac{3x^3y}{4a}$
15.  $\frac{-2ab}{7c} \cdot \frac{3c^2}{4a^3} \cdot \frac{-6a}{15b^2}$
16.  $\frac{10x}{12y} \cdot \frac{3x^2z}{5x^3z} \cdot \frac{6y^2x}{3yz}$
17.  $5a^2b^2 \cdot \frac{1}{a^3b^3}$
18.  $15x^2y \cdot \frac{3}{45xy^2}$