

1. Divide.

a. $\frac{12x^4+3x^2}{x}$

$12x^3 + 3x$

b. $\frac{14m^2-27m^3}{7m}$

$\frac{14m^2}{7m} - \frac{27m^3}{7m} =$

$2m - \frac{27}{7}m^2$

c. $\frac{-9x^5+3x^4-12}{3x^3}$

$-\frac{9x^5}{3x^3} + \frac{3x^4}{3x^3} - \frac{12}{3x^3} = -3x^2 + x - \frac{4}{x^3}$

d. $\frac{-12a^3+36a-15}{3a}$

$-\frac{12a^3}{3a} + \frac{36a}{3a} - \frac{15}{3a}$

$= -4a^2 + 12 - \frac{5}{a}$

2. Use long division to find the quotient. Write any remainder as $\frac{\text{Remainder}}{\text{Divisor}}$. Show your work on a separate paper.

a. $\frac{x^2+4x+3}{x+3}$

$x+1$

b. $\frac{x^2-36}{x-6}$

$x+6$

c. $\frac{3x^2-x-4}{x-1}$

$3x+2 - \frac{2}{x-1}$

d. $\frac{4x^3+11x^2-8x-10}{x+3}$

$4x^2 - x - 5 + \frac{5}{x+3}$

e. $\frac{x^5+x^2}{x^2+x}$

$x^3 - x^2 + x$

f. $\frac{2x^2+13x+15}{x+5}$

$2x+3$

g. $\frac{x^3+64}{x+4}$

$x^2 - 4x + 16$

h. $\frac{9a^3-3a^2-3a+4}{3a+2}$

$3a^2 - 3a + 1 + \frac{2}{3a+2}$

i. $\frac{-3y+2y^2-15}{2y+5}$

$y - 4 + \frac{5}{2y+5}$

j. $\frac{x^6-x^4}{x^3+1}$

$x^3 - x - 1 + \frac{x+1}{x^3+1}$

$$\begin{array}{r}
 2a. \quad X+3 \overline{) \begin{array}{r} X+1 \\ X^2+4X+3 \\ -(X^2+3X) \\ \hline X+3 \\ -(X+3) \\ \hline 0 \end{array}} \\
 \end{array}$$

$$\frac{X^2}{X} = X$$

$$\frac{X}{X} = 1$$

$$\begin{array}{r}
 b. \quad X+5 \overline{) \begin{array}{r} 2X+3 \\ 2X^2+13X+15 \\ -(2X^2+10X) \\ \hline 3X+15 \\ -(3X+15) \\ \hline 0 \end{array}} \\
 \end{array}$$

$$\frac{2X^2}{X} = 2X$$

$$\frac{3X}{X} = 3$$

$$\begin{array}{r}
 b. \quad X-6 \overline{) \begin{array}{r} X+6 \\ X^2+0X-36 \\ -(X^2-6X) \\ \hline 6X-36 \\ -(6X-36) \\ \hline 0 \end{array}} \\
 \end{array}$$

$$\frac{X^2}{X} = X$$

$$\frac{6X}{X} = 6$$

$$\begin{array}{r}
 g. \quad X+4 \overline{) \begin{array}{r} X^2-4X+16 \\ X^3+0X^2+0X+64 \\ -(X^3+4X^2) \\ \hline -4X^2+0X \\ -(-4X^2-16X) \\ \hline 16X+64 \\ -(16X+64) \\ \hline 0 \end{array}} \\
 \end{array}$$

$$\frac{X^3}{X} = X^2$$

$$\frac{-4X^2}{X} = -4X$$

$$\frac{16X}{X} = 16$$

$$\begin{array}{r}
 c. \quad X-1 \overline{) \begin{array}{r} 3X+2 \\ 3X^2-X-4 \\ -(3X^2-3X) \\ \hline 2X-4 \\ -(2X-2) \\ \hline -2 \end{array}} \\
 \end{array}$$

$$\frac{3X^2}{X} = 3X$$

$$\frac{2X}{X} = 2$$

h.

$$\begin{array}{r}
 3a^2 - 3a + 1 \\
 3a+2 \overline{) 9a^3 - 3a^2 - 3a + 4} \\
 \underline{-(3a^3 + 6a^2)} \\
 -9a^2 - 3a \\
 \underline{-(-9a^2 - 6a)} \\
 3a + 4 \\
 \underline{-(3a + 2)} \\
 2
 \end{array}$$

$$\begin{aligned}
 \frac{9a^3}{3a} &= 3a^2 \\
 -\frac{9a^2}{3a} &= -3a \\
 \frac{3a}{3a} &= 1
 \end{aligned}$$

d.

$$\begin{array}{r}
 4x^2 - x - 5 \\
 x+3 \overline{) 4x^3 + 11x^2 - 8x - 10} \\
 \underline{-(4x^3 + 12x^2)} \\
 -x^2 - 8x \\
 \underline{-(-x^2 - 3x)} \\
 -5x - 10 \\
 \underline{-(-5x - 15)} \\
 5
 \end{array}$$

$$\begin{aligned}
 \frac{4x^3}{x} &= 4x^2 \\
 -\frac{x^2}{x} &= -x \\
 -\frac{5x}{x} &= -5
 \end{aligned}$$

i.

$$\begin{array}{r}
 y - 4 \\
 2y+5 \overline{) 2y^2 - 3y - 15} \\
 \underline{-(2y^2 + 5y)} \\
 -8y - 15 \\
 \underline{-(-8y - 20)} \\
 5
 \end{array}$$

$$\begin{aligned}
 \frac{2y^2}{2y} &= y \\
 -\frac{8y}{2y} &= -4
 \end{aligned}$$

e.

$$\begin{array}{r}
 x^3 - x^2 + x \\
 x^2+x \overline{) x^5 + 0x^4 + 0x^3 + x^2} \\
 \underline{-(x^5 + x^4)} \\
 -x^4 + 0x^3 \\
 \underline{-(-x^4 - x^3)} \\
 x^3 + x^2 \\
 \underline{-(x^3 + x^2)} \\
 0
 \end{array}$$

$$\begin{aligned}
 \frac{x^5}{x^2} &= x^3 \\
 -\frac{x^4}{x^2} &= -x^2 \\
 \frac{x^3}{x^2} &= x
 \end{aligned}$$

$$\int \cdot X^3+1 \overline{) X^6 + 0X^5 - X^4 + 0X^3 + 0X^2 + 0X + 0} \quad \frac{X^6}{X^3} = X^3$$

$$\underline{-(X^6 \qquad \qquad + X^3)}$$

$$\qquad \qquad -X^4 - X^3$$

$$\underline{-(-X^4 \qquad \qquad -X)}$$

$$\frac{-X^4}{X^3} = -X$$

$$\qquad \qquad \qquad -X^3 \qquad \qquad +X$$

$$\underline{-(-X^3 \qquad \qquad -1)}$$

$$\frac{-X^3}{X^3} = -1$$

X+1