

1. Find each quotient.

a) $\frac{64x^3 - 72x^2 + 12x}{8x^3}$

b) $(7x^3y^4 - 21x^2y^3 + 28xy^2) \div (-7xy)$

c) $(y^2 - 10y - 25) \div (y - 5)$

d) $\frac{4y^3 + 6y^2 + 14}{2y + 4}$

e) $(2x^4 - x^3 - 5x^2 + x - 6)(x^2 + 2)$

f) $(x^3 - 2x^2 + 8) \div (x + 2)$

g) $(x^3 + 125) \div (y + 5)$

h) $\frac{-2x^2 - 15x + 5 + 2x^3}{3 - x}$

i) $(-2x^4 + 3x^2 - 5) \div (x - 2)$

j) $(-2x^3 + x^2 - 3) \div (2x + 1)$

k) $(8m^3 - 18m^2 + 37m - 13) \div (2m^2 - 3m + 6)$

2. Let $P(x) = 4x^3 - 8x^2 + 13x - 2$ and $D(x) = 2x - 1$. Use long division to find polynomials $Q(x)$ and $R(x)$ such that $P(x) = Q(x) \cdot D(x) + R(x)$.

3. For each pair of functions, find the quotient $\left(\frac{f}{g}\right)(x)$ and give any x -values that are not in the domain of the quotient function.

a) $f(x) = 8x^3 - 27$, $g(x) = 2x - 3$

b) $f(x) = 27x^3 + 64$, $g(x) = 3x + 4$

4. Let $f(x) = x^2 - 16$, $g(x) = 3x + 1$, and $h(x) = x - 4$. Find the following, if possible.

a) $\left(\frac{f}{g}\right)(x)$

b) $\left(\frac{f}{g}\right)(1)$

c) $\left(\frac{f}{h}\right)(x)$

d) $\left(\frac{f}{h}\right)(4)$

e) $\left(\frac{h}{g}\right)(x)$

f) $\left(\frac{h}{g}\right)\left(\frac{1}{2}\right)$

g) $\left(\frac{h}{f}\right)(x)$

h) $\left(\frac{h}{f}\right)(-4)$

5. A company gives its employees an annual salary increase of p percent. An employee is offered a starting salary of \$30,000. His cumulative earnings after 3 years is given by the expression $\frac{30,000(1-r^3)}{1-r}$, where r represents $(100 + p)$ percent expressed in decimal form.

a) Use long division to simplify this expression.

b) Use the expression from part a) to determine the cumulative amount the employee will earn over 3 years if the annual increase is 4%.