

Dividing Polynomials by Monomials

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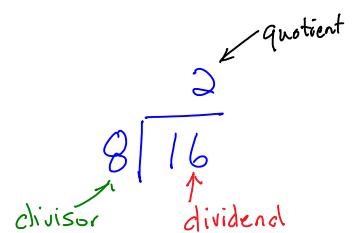
Mathematics 9 Polynomials Dividing Polynomials by Monomials

A. Definitions

1. **dividend:** the expression that is being divided.

2. **divisor:** the term that is being used to divide by.

3. **quotient:** the answer to a division question.



B. Dividing Polynomials Algebraically

When you divide a polynomial by a monomial, each term in the polynomial must be divided by the monomial.

dividend $\frac{6x^2 - 8x}{2x}$ divisor = $3x - 4x^0$ = $3x - 4$

1. Divide each expression.

a) $\frac{12x^2 + 27x}{3}$

$(12x^2)$ $+ 27x$
 $\underline{3}$ $\underline{3}$

$4x^2 + 9x$

b) $\frac{15m^3 + 27m^2}{3m}$

$(15m^3)$ $+ 27m^2$
 $\underline{3m}$ $\underline{3m}$

$5m^2 + 9m$

c) $\frac{12x^2 - 16x}{4x}$

$(12x^2)$ $- 16x$
 $\underline{4x}$ $\underline{4x}$

$3x - 4x^0$
 $3x - 4$

d) $\frac{4x^3 + 18x^2 - 10x}{2x}$

$(4x^3)$ $+ 18x^2$ $- 10x$
 $\underline{2x}$ $\underline{2x}$ $\underline{2x}$

$2x^2 + 9x - 5x^0$
 $2x^2 + 9x - 5$

$$e) \frac{12a^2b - 18ab}{6b}$$

$$\begin{array}{r} 12a^2b \\ 6b \\ \hline -18ab \\ 6b \end{array}$$

$$2a^2b - 3ab$$

$$\boxed{2a^2 - 3a}$$

$$f) \frac{10x^3y^3 + 14x^3y^2}{-2xy}$$

$$\begin{array}{r} 10x^3y^3 \\ -2xy \\ \hline -14x^3y^2 \\ -2xy \end{array}$$

$$\boxed{-5x^2y^2 - 7x^2y}$$

$$g) \frac{15a^2b - 18ab^2}{3ab}$$

$$\begin{array}{r} 15a^2b \\ 3ab \\ \hline -18ab^2 \\ 3ab \end{array}$$

$$5ab - 6a^2b$$

$$\boxed{5a - 6b}$$

$$h) \frac{24x^3y^3 + 18x^3y^2 - 36x^2y^2}{-6x^2y}$$

$$\begin{array}{r} 24x^3y^3 \\ -6x^2y \\ \hline +18x^3y^2 \\ -6x^2y \\ \hline -36x^2y^2 \\ -6x^2y \end{array}$$

$$-4xy^2 - 3xy + 6x^2y$$

$$\boxed{-4xy^2 - 3xy + 6y}$$

2. A rug has an area of $15x^3 - 10x^2$. If the width of the rug is $5x^2$, determine the length of the rug.

$$5x^2 \quad \boxed{15x^3 - 10x^2}$$

$$A = l w$$

$$\frac{15x^3 - 10x^2}{5x^2} = \underline{\underline{l(5x^2)}}$$

$$\frac{15x^3 - 10x^2}{5x^2} = l$$

$$\begin{array}{r} 15x^3 \\ 5x^2 \\ \hline -10x^2 \\ 5x^2 \end{array}$$

$$3x - 2x^2$$

$$\boxed{3x - 2}$$

Assignment: Dividing Polynomials by Monomials Assignment

Name: _____

Dividing Polynomials by Monomials Assignment

Divide the following.

$$1) \frac{6x - 18}{3}$$

$$2) \frac{10m^2 + 15m}{5}$$

$$3) \frac{12x^2 - 18x}{-6}$$

$$4) \frac{4x^2 - 6x}{2x}$$

$$5) \frac{-8a^2 + 12a}{-4a}$$

$$6) \frac{7x^3 - 21x^2 - 14x}{7x}$$

$$7) \frac{5y^5 + 20y^3}{5y^2}$$

$$8) \frac{-8n^4 - 6n^3 - 10n^2}{-2n^2}$$

$$9) \frac{-2a^3 + 2a^2 + 8a}{2a}$$

$$10) \frac{-10y^6 - 15y^4 + 25y^2}{-5y^2}$$

$$11) \frac{6x^2y + 12xy}{3xy}$$

$$12) \frac{-16m^3n^2 + 12m^2n^2}{-4m^2n^2}$$

$$13) \frac{20x^5y^7 - 36x^4y^6 + 12x^2y^2}{4x^2y^2}$$

$$14) \frac{4m^8n^6 + 8m^4n^5 - 6m^3n^2}{2m^3n^2}$$

$$15) \frac{24a^4b^5 - 18a^3b^4 + 12a^2b^3}{6a^2b^2}$$

$$16) \frac{-27x^5y + 18x^4y - 9x^3y}{-9x^3y}$$

Answers

1) $2x - 6$

2) $2m^2 + 3m$

3) $-2x^2 + 3x$

4) $2x - 3$

5) $2a - 3$

6) $x^2 - 3x - 2$

7) $y^3 + 4y$

8) $4n^2 + 3n + 5$

9) $-a^2 + a + 4$

10) $2y^4 + 3y^2 - 5$

11) $2x + 4$

12) $4m - 3$

13) $5x^3y^5 - 9x^2y^4 + 3$

14) $2m^5n^4 + 4mn^3 - 3$

15) $4a^2b^3 - 3ab^2 + 2b$

16) $3x^2 - 2x + 1$