

## Dividing Polynomials Assignment

Divide the following polynomials by monomials.

1.  $24x^2 - 16x^3 + 8x - 16$  by 8

2.  $12a^4 - 30a^3 + 18a - 6$  by 6

3.  $50x^5 - 7x^4 + x^2$  by  $x$

4.  $24x^6 - 32x^4 + 8x^2$  by  $-8x^2$

5.  $9r^2s^2 + 3r^4s - 6rs^2$  by  $-3rs$

6.  $4x^4y - 8x^6y^2 + 12x^8y^6$  by  $4x^4y$

7.  $4x^4 + 8x^3 - 16x^2 + 10x$  by  $2x$

8.  $5b^4 - 10b^3 - 15b^2 + 10b$  by  $5b$

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## Dividing Polynomials Assignment

Divide the polynomials by binomials.

9.  $x^2 + 10x + 21$  by  $x + 7$

10.  $2a^2 - 3a - 6$  by  $a + 2$

11.  $2a^3 - 11a^2 - 6a - 5$  by  $a - 6$

12.  $a^3 - 6a^2 + 12a - 8$  by  $a - 2$

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## Dividing Polynomials Assignment

13.  $12x^3 - 11x^2 + 8x - 4$  by  $3x - 2$

14.  $2c^3 - 9c^2 - 7c - 1$  by  $2c - 3$

15.  $y^2 - y - 110$  by  $y + 10$

16.  $8d^2 + 3d + 4$  by  $d - 3$

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_

## Dividing Polynomials Assignment

Divide the following polynomials using synthetic division.

17.  $3x^3 - x^2 - 8x + 5$  by  $x + 2$

18.  $x^3 - x - 2$  by  $x - 3$

19.  $a^4 + 16$  by  $a + 2$

20.  $4x^5 - 3x + 122$  by  $x + 2$

# Dividing Polynomials Assignment

**Answer:**

Divide the following polynomials by monomials.

1.  $24x^2 - 16x^3 + 8x - 16$  by 8

**Solution:**

$$\begin{array}{r} -16x^3 + 24x^2 + 8x - 16 \\ \underline{\phantom{-16x^3 + 24x^2 + 8x - 16} 8} \\ = -2x^3 + 4x^2 + x - 2 \end{array}$$

3.  $50x^5 - 7x^4 + x^2$  by  $x$

**Solution:**

$$\begin{array}{r} 50x^5 - 7x^4 + x^2 \\ \underline{\phantom{50x^5 - 7x^4 + x^2} x} \\ = 50x^4 - 7x^3 + x \end{array}$$

5.  $9r^2s^2 + 3r^4s - 6rs^2$  by  $-3rs$

**Solution:**

$$\begin{array}{r} 9r^2s^2 + 3r^4s - 6rs^2 \\ \underline{\phantom{9r^2s^2 + 3r^4s - 6rs^2} -3rs} \\ = -3rs - r^3 + 2s \\ = -r^3 - 3rs + 2s \end{array}$$

7.  $4x^4 + 8x^3 - 16x^2 + 10x$  by  $2x$

**Solution:**

$$\begin{array}{r} 4x^4 + 8x^3 - 16x^2 + 10x \\ \underline{\phantom{4x^4 + 8x^3 - 16x^2 + 10x} 2x} \\ = 2x^3 + 4x^2 - 8x + 5 \end{array}$$

2.  $12a^4 - 30a^3 + 18a - 6$  by 6

**Solution:**

$$\begin{array}{r} 12a^4 - 30a^3 + 18a - 6 \\ \underline{\phantom{12a^4 - 30a^3 + 18a - 6} 6} \\ = 2a^4 - 5a^3 + 2a - 1 \end{array}$$

4.  $24x^6 - 32x^4 + 8x^2$  by  $-8x^2$

**Solution:**

$$\begin{array}{r} 24x^6 - 32x^4 + 8x^2 \\ \underline{\phantom{24x^6 - 32x^4 + 8x^2} -8x^2} \\ = -3x^4 + 4x^2 - 1 \end{array}$$

6.  $4x^4y - 8x^6y^2 + 12x^8y^6$  by  $4x^4y$

**Solution:**

$$\begin{array}{r} 4x^4y - 8x^6y^2 + 12x^8y^6 \\ \underline{\phantom{4x^4y - 8x^6y^2 + 12x^8y^6} 4x^4y} \\ = 1 - 2x^2y + 3x^4y^5 \\ = 3x^4y^5 - 2x^2y + 1 \end{array}$$

8.  $5b^4 - 10b^3 - 15b^2 + 10b$  by  $5b$

**Solution:**

$$\begin{array}{r} 5b^4 - 10b^3 - 15b^2 + 10b \\ \underline{\phantom{5b^4 - 10b^3 - 15b^2 + 10b} 5b} \\ = b^3 - 2b^2 - 3b + 2 \end{array}$$

Divide the polynomials by binomials.

9.  $x^2 + 10x + 21$  by  $x + 7$

**Solution:**

$$\begin{array}{r} \phantom{x+7} \overline{) x^2 + 10x + 21} \\ \phantom{x+7} \underline{x+7} \phantom{+21} \\ \phantom{x+7} 3x+21 \\ \phantom{x+7} \underline{-(3x+21)} \\ \phantom{x+7} 0 \end{array}$$

$$= x + 3$$

10.  $2a^2 - 3a - 6$  by  $a + 2$

**Solution:**

$$\begin{array}{r} \phantom{a+2} \overline{) 2a^2 - 3a - 6} \\ \phantom{a+2} \underline{2a+7} \phantom{-6} \\ \phantom{a+2} -7a-6 \\ \phantom{a+2} \underline{-(-7a-14)} \\ \phantom{a+2} 8 \end{array}$$

$$= 2a - 7 + \frac{8}{a+2}$$

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11.  $2a^3 - 11a^2 - 6a - 5$  by  $a - 6$

**Solution:**

$$\begin{array}{r} 2a^2 + a \\ a - 6 \overline{) 2a^3 - 11a^2 - 6a - 5} \\ \underline{-(2a^3 - 12a^2)} \\ a^2 - 6a \\ \underline{-(a^2 - 6a)} \\ 0 - 5 \end{array}$$

$$= 2a^2 + a - \frac{5}{a - 6}$$

12.  $a^3 - 6a^2 + 12a - 8$  by  $a - 2$

**Solution:**

$$\begin{array}{r} a^2 - 4a + 4 \\ a - 2 \overline{) a^3 - 6a^2 + 12a - 8} \\ \underline{-(a^3 - 2a^2)} \\ -4a^2 + 12a \\ \underline{-(-4a^2 + 8a)} \\ 4a - 8 \\ \underline{-(4a - 8)} \\ 0 \end{array}$$

$$= a^2 - 4a + 4$$

13.  $12x^3 - 11x^2 + 8x - 4$  by  $3x - 2$

**Solution:**

$$\begin{array}{r} 4x^2 - x + 2 \\ 3x - 2 \overline{) 12x^3 - 11x^2 + 8x - 4} \\ \underline{-(12x^3 - 8x^2)} \\ -3x^2 + 8x \\ \underline{-(-3x^2 + 2x)} \\ 6x - 4 \\ \underline{-(6x - 4)} \\ 0 \end{array}$$

$$= 4x^2 - x + 2$$

14.  $2c^3 - 9c^2 - 7c - 1$  by  $2c - 3$

**Solution:**

$$\begin{array}{r} c^2 - 3c - 8 \\ 2c - 3 \overline{) 2c^3 - 9c^2 - 7c - 1} \\ \underline{-(2c^3 - 3c^2)} \\ -6c^2 - 7c \\ \underline{-(-6c^2 + 9c)} \\ -16c - 1 \\ \underline{-(-16c + 24)} \\ -25 \end{array}$$

$$= c^2 - 3c - 8 - \frac{25}{2c - 3}$$

15.  $y^2 - y - 110$  by  $y + 10$

**Solution:**

$$\begin{array}{r} y - 11 \\ y + 10 \overline{) y^2 - y - 110} \\ \underline{-(y^2 + 10y)} \\ -11y - 110 \\ \underline{-(-11y - 110)} \\ 0 \end{array}$$

$$= y - 11$$

16.  $8d^2 + 3d + 4$  by  $d - 3$

**Solution:**

$$\begin{array}{r} 8d + 27 \\ d - 3 \overline{) 8d^2 + 3d + 4} \\ \underline{-(8d^2 - 24d)} \\ 27d + 4 \\ \underline{-(27d - 81)} \\ 85 \end{array}$$

$$= 8d + 27 + \frac{85}{d - 3}$$

# Dividing Polynomials Assignment

Divide the following polynomials using synthetic division.

17.  $3x^3 - x^2 - 8x + 5$  by  $x + 2$

**Solution:**

$$\begin{array}{r|rrrr} x^3 & x^2 & x & c \\ 3 & -1 & -8 & 5 & \underline{-2} \\ \downarrow & -6 & 14 & -12 & \\ 3 & -7 & 6 & -7 & \end{array}$$

$$= 3x^2 - 7x + 6 - \frac{7}{x+2}$$

19.  $a^4 + 16$  by  $a + 2$

**Solution:**

$$\begin{array}{r|rrrrr} a^4 & a^3 & a^2 & a & c \\ 1 & 0 & 0 & 0 & 16 & \underline{-2} \\ \downarrow & -2 & 4 & -8 & 16 & \\ 1 & -2 & 4 & -8 & 32 & \end{array}$$

$$= a^3 - 2a^2 + 4a - 8 + \frac{32}{a+2}$$

18.  $x^3 - x - 2$  by  $x - 3$

**Solution:**

$$\begin{array}{r|rrrr} x^3 & x^2 & x & c \\ 1 & 0 & -1 & -2 & \underline{3} \\ \downarrow & 3 & 9 & 24 & \\ 1 & 3 & 8 & 22 & \end{array}$$

$$= x^2 + 3x + 8 + \frac{22}{x-3}$$

20.  $4x^5 - 3x + 122$  by  $x + 2$

**Solution:**

$$\begin{array}{r|rrrrrr} x^5 & x^4 & x^3 & x^2 & x & c \\ 4 & 0 & 0 & 0 & -3 & 122 & \underline{-2} \\ \downarrow & -8 & 16 & -32 & 64 & -122 & \\ 4 & -8 & 16 & -32 & 61 & 0 & \end{array}$$

$$= 4x^4 - 8x^3 + 16x^2 - 32x + 61$$