

Key

Rewrite the polynomial in standard form. Then, identify the leading coefficient, degree, and number of terms. Name the polynomial.

1) $6x - 4x^4 + 5^7 \rightarrow$ Quartic trinomial

$-4x^4 + 6x + 78125$

LC: -4 Deg: 4 #Term: 3

2) $3x^2 + 2x^6 - 4x^4 - 1 \rightarrow$ 6th degree polynomial w/ 4 terms
(Sextic polynomial)

$2x^6 - 4x^4 + 3x^2 - 1$

LC: 2 Deg: 6 #Term: 4

3) $a^4b^6c^3 \rightarrow$ 13th degree monomial

LC: 1 Deg: 13 #Terms: 1

Add or subtract. Write your answer in standard form.

4) $(x^2 - 3x + 4) - (3x + x^3 - 4)$

$-x^3 + x^2 - 6x + 8$

5) $(2y^2 - 5y + 3) + (y^2 - 2y - 5)$

$3y^2 - 7y - 2$

6) A triangle has a perimeter of $10a + 3b + 12$ and has sides of length $3a + 8$ and $5a + b$, what is the length of the third side?

$2a + 2b - 4$



7) For a rectangle with length of $3x + 4$ and perimeter of $10x + 18$, what is the width of the rectangle?

$2x + 5$

Find each product.

8) $-4c^2d^3(5cd^2 + 3c^2d)$

$-20c^3d^5 - 12c^4d^4$

10) $2xy(3x^2 - xy + 7)$

$6x^3y - 2x^2y^2 + 14xy$

12) $(x^3 + 3x^2 + 1)(3x^2 + 6x - 2)$

$3x^5 + 15x^4 + 16x^3 - 3x^2 + 6x - 2$

9) $3x^2(2y + 5x)$

$6x^2y + 15x^3$

11) $(x - y)(x^2 + 2xy - y^2)$

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

13) $(x - 3y)^3$

$x^3 - 9x^2y + 27y^2x - 27y^3$

Divide using long division.

14) $(6x^3 - 14x^2 + 10x - 4) \div (x - 1)$

$6x^2 - 8x + 2 - \frac{2}{x-1}$

15) $(60 - 16y^2 + y^4) \div (10 - y^2)$

$y^2 + 6$

Divide using synthetic division.

16) $(3x^3 - 11x^2 - 56x - 48) \div (3x + 4)$

$3x^2 - 15x - 36$

17) $(x^4 - 7x^3 + 9x^2 - 22x + 25) \div (x - 6)$

$x^3 - x^2 + 3x - 4 + \frac{1}{x-6}$

$$-6x+8$$

$$3y^2-7y-2$$

$$\textcircled{6} P=10a+3b+12$$

$$\text{Side 1 + Side 2} = (3a+8) + (5a+b) \\ = 8a+b+8$$

$$(10a+3b+12) - (8a+b+8)$$

$$10a+3b+12-8a-b-8 =$$

$$\boxed{2a+2b+4}$$

$$\textcircled{7} P=2l+2w$$

$$10x+18 = 2(3x+4) + 2w$$

$$10x+18 = 6x+8+2w$$

$$\frac{4x+10}{2} = \frac{2w}{2}$$

$$\boxed{2x+5} = w$$

$$\textcircled{8} -4c^2d^3(5cd^2+3c^2d)$$

$$-20c^3d^5 - 12c^4d^4$$

$$\textcircled{9} 3x^2(2y+5x)$$

$$6x^2y + 15x^3$$

$$\textcircled{10} 2xy(3x^2-xy+7)$$

$$6x^3y - 2x^2y^2 + 14xy$$

$$\textcircled{11} (x-y)(x^2+2xy-y^2)$$

$$\cancel{x^3} + 2\cancel{x^2y} - \cancel{xy^2} - \cancel{x^2y} - 2\cancel{xy^2} + \cancel{y^3}$$

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

$$\textcircled{12} (x^3+3x^2+1)(3x^2+6x-2)$$

$$\cancel{3x^5} + \cancel{6x^4} - \cancel{2x^3} + \cancel{6x^4} + \cancel{18x^3} - \cancel{6x^2} + 3x^2 + 6x - 2$$

$$3x^5 + 15x^4 + 16x^3 - 3x^2 + 6x - 2$$

13) $(x-3y)^3$

$[(x-3y)(x-3y)](x-3y)$

$(x^2 - 3xy - 3xy + 9y^2)(x-3y)$

$(x^2 - 6xy + 9y^2)(x-3y)$

$x^3 - 3x^2y - 6x^2y + 18xy^2 + 9y^2x - 27y^3$

$x^3 - 9x^2y + 27y^2x - 27y^3$

14) $x-1 \overline{) 6x^3 - 14x^2 + 10x - 4}$
 $\begin{array}{r} 6x^2 - 8x + 2 \\ \underline{-(6x^3 - 6x^2)} \\ -8x^2 + 10x - 4 \\ \underline{-(-8x^2 + 8x)} \\ 2x - 4 \\ \underline{-(2x - 2)} \\ -2 \end{array}$

$6x^2 - 8x + 18 + \frac{14}{x-1}$

16) $3x+4=0$
 $x=a = -\frac{4}{3}$

$-\frac{4}{3} \overline{) 3 \quad -11 \quad -56 \quad -48}$
 $\begin{array}{r} \phantom{-\frac{4}{3}} \downarrow \\ \phantom{-\frac{4}{3}} -4 \quad 20 \quad 48 \\ \hline 3 \quad -15 \quad -36 \quad 0 \end{array}$

$3x^2 - 15x - 36$

17) $x-6=0$
 $x=a=6$

$6 \overline{) 1 \quad -7 \quad 9 \quad -22 \quad 25}$
 $\begin{array}{r} \downarrow \\ 6 \quad -6 \quad 18 \quad -24 \\ \hline 1 \quad -1 \quad 3 \quad -4 \quad 1 \end{array}$

$x^3 - x^2 + 3x - 4 + \frac{1}{x-6}$

$(y^4 + 0y^3 + 16y^2 + 0y + 60) \div (-y^2 + 0y + 10)$
 $\begin{array}{r} -y^2 \\ \underline{-(y^4 - 0y^3 - 10y^2)} \\ -6y^2 + 0y + 60 \\ \underline{-(-6y^2 + 0y + 60)} \\ 0 \end{array}$

$y^2 + 6$

Perfect Cubes
 $(5+2)(5^2-5)$
 $= (5+2)(5-5)$