

DEGREE OF POLYNOMIAL

NAME: _____ Div: _____ DATE: _____

★ The degree of a monomial is the sum of the exponents of its variables.

Monomial	Degree
$4x^3$	3
$5a^2b^3c$	$2 + 3 + 1 = 6$

$$3 + 2 + 4 = 9$$

★ The degree of a polynomial in one variable is the highest power of the variable in any one term.

Polynomials	Degree
$6x^2 + 3x$	2
$x^5 + 7x^2 - 3$	5

★ The degree of a polynomial in two variables or more is the largest sum of the exponents in any one term.

Polynomials	Degree
$x^2y^3 + xy^4 + xy^5$	6
$3x^3y^4 + 7xy^3 - 2xy$	7

$$2x^3y^2z^4$$

Example 2

Classify each polynomial and state its degree.

- a) $3abc$ b) $2x^2 + x$ c) $3xy + 5x^2y^2 - 3$

Solution

a) $3abc$ is a monomial. The sum of the exponents is $1 + 1 + 1 = 3$. It is a third-degree polynomial.

b) $2x^2 + x$ is a binomial. The highest power, 2, is contained in the term $2x^2$. It is a second-degree polynomial.

c) $3xy + 5x^2y^2 - 3$ is a trinomial. The largest exponent sum is contained in the term $5x^2y^2$. It is a fourth-degree polynomial.

The terms of a polynomial are usually arranged so that the powers of one variable are in either ascending order or descending order.

Descending Order

$$x^3 + 2x^2 - 5x + 7$$

$$(\text{in } x) 5x^2 + 7xy + 3y^2$$

Ascending Order

$$7 - 5x + 2x^2 + x^3$$

$$(\text{in } x) 3y^2 + 7xy + 5x^2$$

Do Q# 1-31 (ODD)

Practice

Identify as a monomial, binomial, or trinomial.

1. $5xyz$
2. $x + 2y$
3. $a - 2b + 3c$
4. $x^2 + y^2$
5. 23
6. $x - y + 2$

State the degree of each monomial.

7. $25x$
8. $25x^2y^2$
9. 17
10. $2x^2y^3$
11. $-5x^3y^4$
12. $-6xy^4z$

State the degree of each polynomial.

13. $5x^2y^2 + 3xy^3$
14. $3x + 2y - 5z$
15. $x^4 + 2x^3 + 3x^2 + 4$
16. $4x^4y^2 + 2x^3y^5 - 23$
17. $3x - 2y + z^2$
18. $25m^3n + 36m^3n^3$
19. $-5x^4y^2z + 2x^2y^2z^2$

Arrange the terms in each polynomial in descending powers of x .

20. $1 + x^3 + x^2 + x^5$
21. $5 - 3x^3 + 2x$
22. $5y^2 + 2xy - x^2$
23. $25xy^2 - 5x^2y + 3x^3y^3 - 4x^4$
24. $5ax + 7b^2x^4 - 3x^3 + 4abx^2$

Arrange the terms in each polynomial in ascending powers of x .

25. $3x^2 - 2x^3 + 5x^5 + x - 2$
26. $4x^4 + x^2 - 3x^3 + 5 - x$
27. $4xy^2 - 2x^2y^2 - 3x^4 + 2x^3y$
28. $5x^2yz^2 + 2xy^4z + 3x^3y^4z^2 - 3$
29. $z - xy + x^2$
30. $x^2 - 2xy - 3x^3 + 16$
31. $2x^3y + 3xy - x^5$
32. $3x^3y^2 + x^4y + xy - 1$

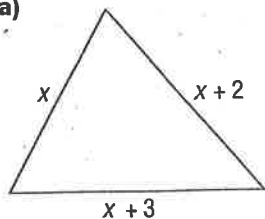
Problems and Applications

33. Identify each type of polynomial.

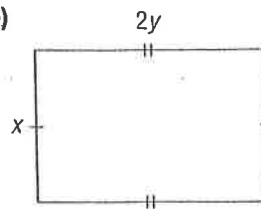
- a) $\frac{4\pi r^3}{3}$
- b) $\pi r^2 + 2\pi rh$
- c) $4\pi r$

34. What type of polynomial is represented by the perimeter of each of these figures?

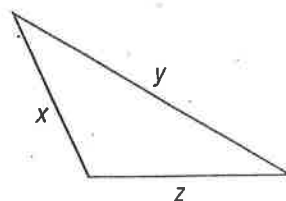
a)



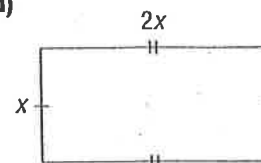
b)



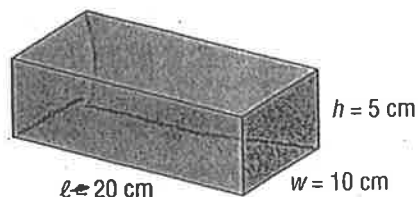
c)



d)



35. a) Calculate the area of each face of this box.



b) What is the total area of the box?

c) Write a polynomial that can be used to calculate the answer you gave in part b).

36. The formula for the volume of a rectangular jewellery box is lwh . Its dimensions are $25 \text{ cm} \times 18 \text{ cm} \times 17 \text{ cm}$. It has 2 cm thick walls. What is the volume of the box's interior to the nearest cubic centimetre?



37. Write a problem that can be solved with a polynomial. Have a classmate solve your problem.