

# Polynomials

**Spoken Tutorial Project**

**<http://spoken-tutorial.org>**

**National Mission on Education through ICT**

**<http://sakshat.ac.in>**

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# Learning Objectives



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- **Polynomials of one variable**



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- **Slope of a linear polynomial**



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- Zeros of the polynomials



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- **Roots of the polynomials**
- **Remainder theorem**





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# System Requirement



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- **Ubuntu Linux OS v 16.04**



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- **GeoGebra v 5.0.438.0-d**



# Pre-requisites



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- **Learner should be familiar with GeoGebra interface**



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- Learner should be familiar with **GeoGebra** interface
- For the prerequisite **GeoGebra** tutorials, please visit [www.spoken-tutorial.org](http://www.spoken-tutorial.org)



# Polynomial





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- An algebraic expression containing one or more terms with non-zero coefficients is a polynomial



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- An algebraic expression containing one or more terms with non-zero coefficients is a polynomial
- $x^3 + 3x^2 + 2x - 5$  is a polynomial



# Degree of Polynomial



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- For example,  $p = x^5 - x^4 + 3$
- In this polynomial, degree is 5



# Assignment



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**Find the degree of the given polynomials**





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①  $x^5 - x^4 + 3$

②  $2 - y^2 - y^3 + 2y^8$

③  $5x^3 + 4x^2 + 7x$



# Zeros of Polynomial



# Zeros of Polynomial

- Zero of a polynomial  $p(x)$  is a number 'r' such that  $p(r)$  equal to zero  
 $p(r)=0$



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**Find the values of  $p(0)$ ,  $p(1)$  and  $p(2)$  for the polynomials**



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①  $p = 2 + t + t^2 - t^3$

②  $p = (x - 1)(x + 1)$

③  $p = x^3$



# Assignment



# Assignment

**Find the roots of the following polynomials**





# Assignment

**Find the roots of the following polynomials**

①  $f = x^2 - 2x + 1$

②  $g = 2x + 1$

③  $h = x^2 - 1$



# Remainder Theorem



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- 'a' be any real number
- If  $p(x)$  is divided by a linear polynomial  $x - a$ , then the remainder is  $p(a)$
- *$Dividend = (Divisor \times Quotient) + remainder$*



# Assignment



# Assignment

**Solve the exercises based on remainder theorem**





# Assignment

**Solve the exercises based on remainder theorem**

①  $p1 = x^4 + x^3 - 2x^2 + x$  ,  $p2 = x - 1$

②  $p1 = x^3 + 3x^2 + 3x + 1$  ,  $p2 = 2x + 5$

③  $p1 = 3x^3 + 7x$  ,  $p2 = 3x + 7$



# Assignment



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**Solve the exercises based on factorization**



# Assignment

**Solve the exercises based on factorization**

①  $p = x^3 - 2x^2 - x + 2$

②  $p = 12x^2 - 7x + 1$

③  $p = 2x^2 + 7x + 3$

④  $p = x^3 + 13x^2 + 32x + 20$



# Summary



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# About the Spoken Tutorial Project

- Watch the video available at [http://spoken-tutorial.org/What\\_is\\_a\\_Spoken\\_Tutorial](http://spoken-tutorial.org/What_is_a_Spoken_Tutorial)
- It summarises the Spoken Tutorial project
- If you do not have good bandwidth, you can download and watch it



# Spoken Tutorial Workshops

## The Spoken Tutorial Project Team

- Conducts workshops using spoken tutorials
- Gives certificates to those who pass an online test
- For more details, please write to [contact@spoken-tutorial.org](mailto:contact@spoken-tutorial.org)





# Forum for specific questions

- Do you have questions in THIS Spoken Tutorial?
- Please visit <http://forums.spoken-tutorial.org>
- Choose the minute and second where you have the question
- Explain your question briefly
- Someone from our team will answer them



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- It is supported by the National Mission on Education through ICT, MHRD, Government of India
- More information on this Mission is available at

<http://spoken-tutorial.org /NMEICT-Intro>

