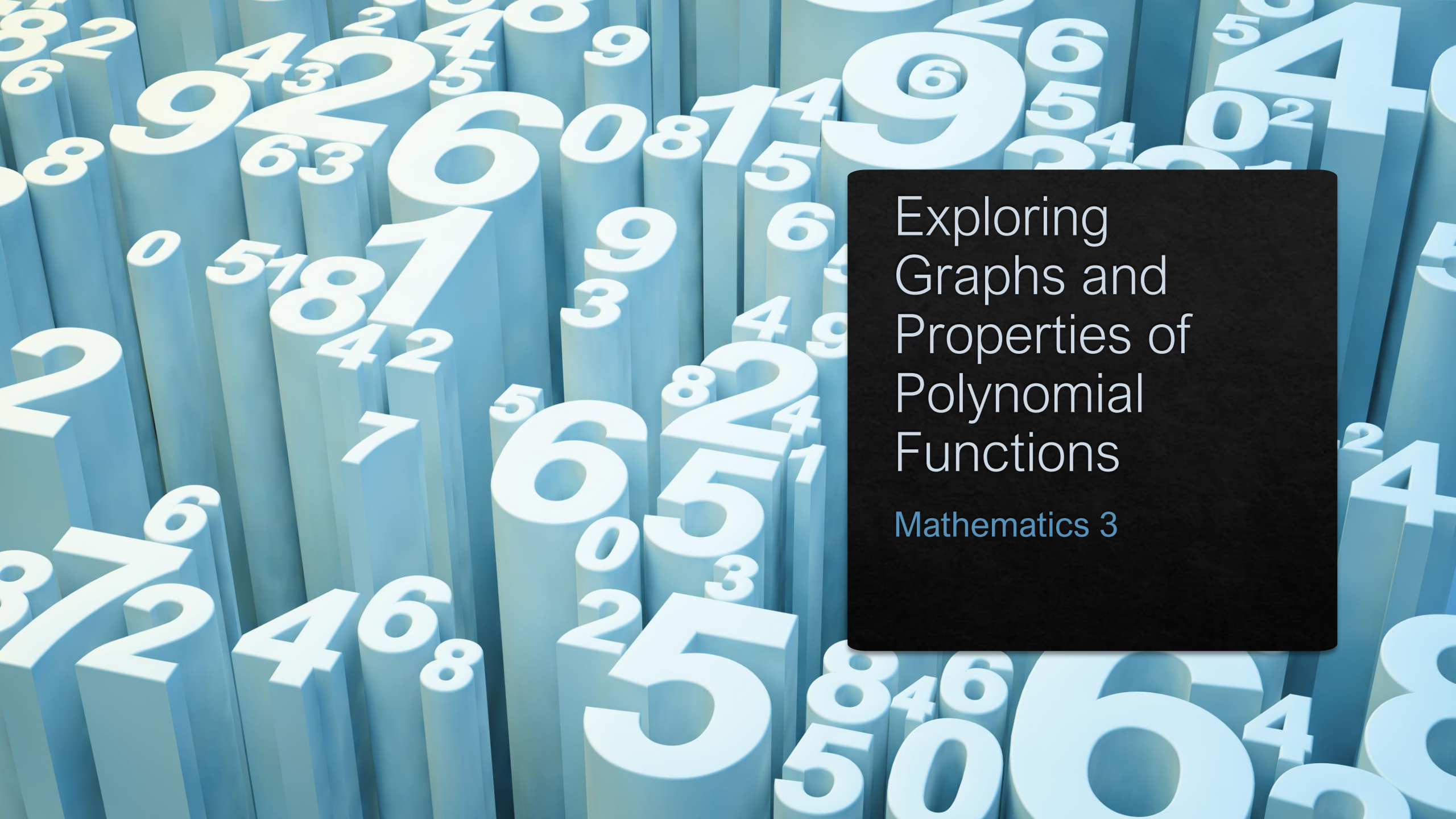
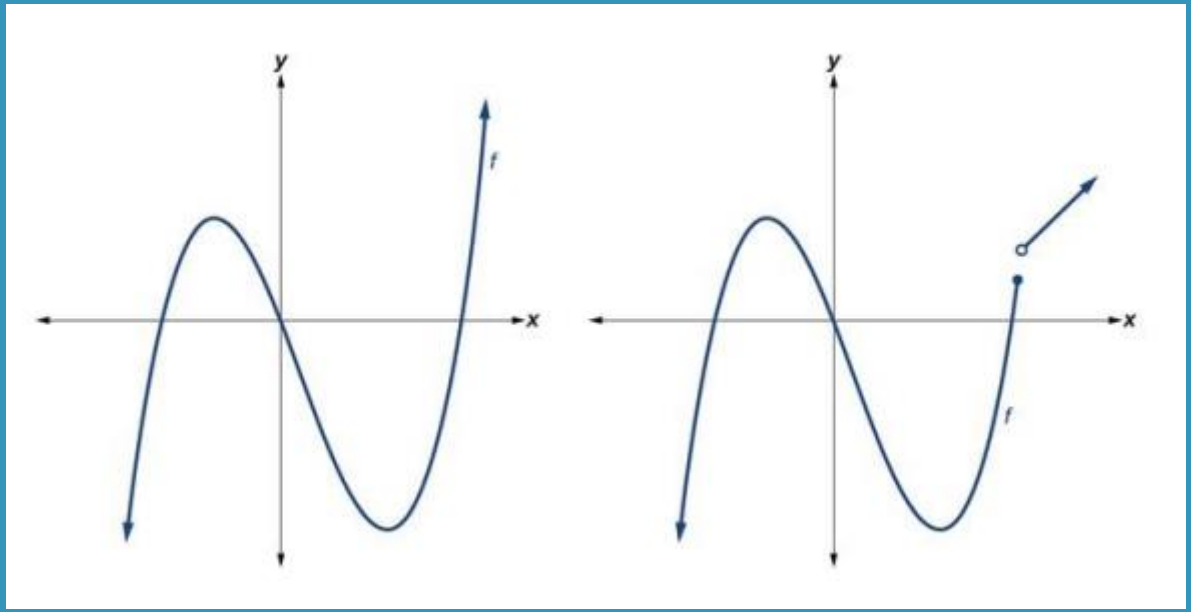


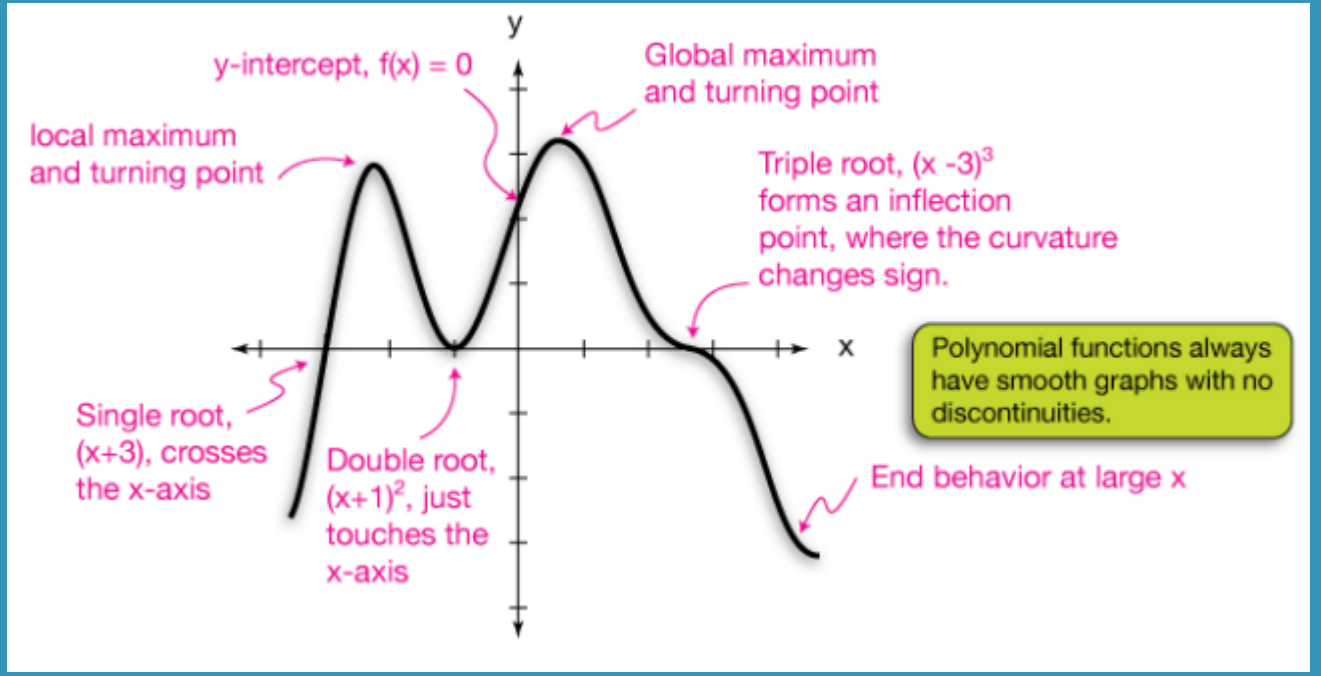
Exploring Graphs and Properties of Polynomial Functions

Mathematics 3

Function	Real Life Application of the Function
A. Insertion Sort Algorithm in Computers $y = 0.00339x^2 + 0.00143x - 5.95$	It is used to determine the numbers that a minicomputer can sort in less than 1 second.
B. Legendre Polynomial: $P(x) = \frac{1}{2}(5x^3 - 3x)$	It occurs in the solution of heat transfer problems in physics and engineering.
C. Chebyshev Polynomial: $f(x) = 8x^4 - 8x^2 + 1$	It is used in statistical studies.

Degree	Even		Odd	
Leading Coefficient	Positive, $a_n > 0$	Negative, $a_n < 0$	Positive, $a_n > 0$	Negative, $a_n < 0$
End Behavior	$x \to \infty$, $f(x) \to \infty$ $x \to -\infty$, $f(x) \to \infty$	$x \to \infty$, $f(x) \to -\infty$ $x \to -\infty$, $f(x) \to -\infty$	$x \to \infty$, $f(x) \to \infty$ $x \to -\infty$, $f(x) \to -\infty$	$x \to \infty$, $f(x) \to -\infty$ $x \to -\infty$, $f(x) \to \infty$
Arrow Notation	↑↑	↓↓	↑↓	↓↑


y
x
f
y
x
f


y
x
y-intercept, f(x) = 0
Global maximum
and turning point
local maximum
and turning point
Triple root, (x -3)³
forms an inflection
point, where the curvature
changes sign.
Polynomial functions always
have smooth graphs with no
discontinuities.
Single root,
(x+3), crosses
the x-axis
Double root,
(x+1)², just
touches the
x-axis
End behavior at large x