Polynomial and Rational Functions

AP Precalculus · Vocabulary in context

Word	Example
function /ˈfʌŋkʃn/	A **function** returns a value.
domain /dəˈmeɪn/	Leave zero out of the **domain** when x is on the bottom of a fraction. $\frac{}{x}$
range /reɪndʒ/	The **range** of $f(x) = x^2$ is all values greater than or equal to zero. $f(x) = x^2$
independent variable /ˌɪndɪˈpendənt ˈveərɪəbl/	The **independent variable** is the one you change.
dependent variable /dɪˈpendənt ˈveərɪəbl/	The **dependent variable** is the one you measure.
increasing /ɪnˈkriːsɪŋ/	A sequence is **increasing** if each term is bigger than the last.
decreasing /ˈdiːkriːsɪŋ/	A sequence is **decreasing** if each term is smaller than the last.
average rate of change /ˈævrɪdʒ reɪt ɒv tʃeɪndʒ/	The **average rate of change** is the change in y divided by the change in x. $\frac{y}{x}$
concave up /kɒnˈkeɪv ʌp/	The graph is **concave up** when it bends like a cup.
concave down /kɒnˈkeɪv daʊn/	The graph is **concave down** when it bends like a hill.
secant line /ˈsiːkənt laɪn/	A **secant line** cuts a curve at two points.
linear /ˈlɪnɪə/	The relationship looks **linear**.

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quadratic /kwɒˈdrætɪk/	$x^2 + 5x + 6 = 0$ is a **quadratic** equation. $x^2 + 5x + 6 = 0$
polynomial /ˌpɒlɪˈnəʊmɪəl/	$3x^2 + 2x - 1$ is a **polynomial**. $3x^2 + 2x - 1$
degree /dɪˈgriː/	A higher **degree** gives a better approximation.
leading term /ˈliːdɪŋ tɜːm/	In $3x^4 - x + 2$, the **leading term** is $3x^4$. $3x^4 - x + 2$ $3x^4$
leading coefficient /ˈliːdɪŋ ˌkəʊɪˈfɪʃənt/	In $3x^4 - x + 2$, the **leading coefficient** is 3. $3x^4 - x + 2$ 3
local (relative) extremum /ˈləʊkl ekˈstreməm/	A **local (relative) extremum** is a peak or valley in a small area.
global (absolute) maximum /ˈgləʊbl ˈmæksɪməm/	The **global (absolute) maximum** is the highest point of the whole graph.
point of inflection /pɔɪnt ɒv ɪnˈflekʃn/	At a **point of inflection**, the curve changes from bending one way to the other.
even function /ˈiːvən ˈfʌŋkʃən/	x^2 is an **even function**: $f(-x) = f(x)$. x^2 $f(-x) = f(x)$
odd function /ɒd ˈfʌŋkʃən/	x^3 is an **odd function**: $f(-x) = -f(x)$. x^3 $f(-x) = -f(x)$
zero /ˈzɪərəʊ/	A **zero** of a function is where its graph crosses the x-axis. x
root /ruːt/	The number 3 is a **root** of $x^2 = 9$. 3 $x^2 = 9$
multiplicity /ˌmʌltɪˈplɪsɪti/	In $(x - 2)^2$, the root 2 has **multiplicity** two. $(x - 2)^2$ 2
complex /ˈkɒmpleks/	$x^2 + 1 = 0$ has **complex** roots. $x^2 + 1 = 0$

Word	Example
conjugate /ˈkɒndʒuːgeɪt/	The **conjugate** of $2 + \sqrt{3}$ is $2 - \sqrt{3}$. $2 + \sqrt{3}$ $2 - \sqrt{3}$
End behavior /end bɪˈheɪvjə/	**End behavior** describes the graph as x gets very large. x
rational function /ˈræʃənl ˈfʌŋkʃn/	A **rational function** is one polynomial divided by another.
slant asymptote /slænt ˈæsɪmptəʊt/	A **slant asymptote** is a sloping line the graph gets close to.
horizontal asymptote /ˌhɒrɪˈzɒntl ˈæsɪmptəʊt/	$y = 2$ is a **horizontal asymptote**: the graph gets close to it for large x. $y = 2$ x
vertical asymptote /ˈvɜːtɪkl ˈæsɪmptəʊt/	The line $x = 0$ is a **vertical asymptote** of $y = 1/x$. $x = 0$ $y = 1/x$
hole /həʊl/	The graph has a **hole** at $x = 2$ because $f(2)$ is undefined. $x = 2$ $f(2)$
Polynomial long division /ˌpɒlɪˈnəʊmɪəl lɒŋ dɪˈvɪʒn/	Use **polynomial long division** to divide $x^3 + 1$ by $x + 1$. $x^3 + 1$ $x + 1$
quotient /ˈkwəʊʃənt/	When you divide 12 by 3, the **quotient** is 4. 12 3 4
remainder /rɪˈmeɪndə/	14 divided by 5 leaves a **remainder** of 4. 14 5 4
binomial theorem /baɪˈnəʊmɪəl ˈθɪərəm/	The **binomial theorem** expands $(a + b)^n$ quickly. $(a + b)^n$
Pascal's triangle	Each number in **Pascal's triangle** is the sum of the two above it.
transformation /trænsfɔːˈmeɪʃn/	This **transformation** moves the graph three units up.

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Word	Example
Translations /trænˈsleɪʃnz/	**Translations** slide the graph without turning it.
Dilations /daɪˈleɪʃnz/	**Dilations** stretch or shrink the graph.
Reflections /rɪˈflekʃnz/	**Reflections** flip the graph over a line.
model /ˈmɒdl/	A **model** uses a function to describe real data.
assumptions /əˈsʌmpʃnz/	Check the **assumptions** behind the forecast before expanding.
piecewise-defined function /ˈpiːswaɪz dɪˈfaɪnd ˈfʌŋkʃn/	A **piecewise-defined function** uses different rules for different x values. x