

Mathematics 9

Powers and Exponents				
	Emerging	Developing	Proficient	Extending
evaluate powers	relate powers to repeated multiplication	evaluate powers (whole number base)	evaluate powers (fractional or negative base) evaluate claims involving powers	express a number as a power of more than one base notice patterns in powers of a given base
apply exponent laws	apply exponent laws to products and quotients of powers	apply exponent laws to powers, products, and quotients raised to an exponent	apply more than one exponent law to expressions with powers	solve challenging or unfamiliar problems involving exponent laws
evaluate expressions with powers	evaluate powers with coefficients	evaluate expressions involving two operations with powers	evaluate expressions involving more than two operations with powers	write an expression that evaluates to a given value or characteristic
solve contextual problems involving powers	use repeated multiplication to solve contextual problems interpret expressions with powers and variables, in context	evaluate expressions with powers and variables	write expressions with powers to represent “real-world” scenarios	solve challenging or unfamiliar problems involving powers

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Operations with Rational Numbers				
	Emerging	Developing	Proficient	Extending
add and subtract rational numbers	add signed decimals add and subtract signed fractions with like denominators	subtract signed decimals add and subtract signed fractions with unlike denominators	add and subtract signed mixed numbers with unlike denominators	write an expression that evaluates to a given value or characteristic
multiply and divide rational numbers	multiply and divide signed decimals multiply signed fractions and integers	multiply and divide signed fractions	multiply and divide signed mixed numbers	write an expression that evaluates to a given value or characteristic
evaluate expressions involving two or more operations with rational numbers	evaluate expressions involving two operations with rational numbers (addition and subtraction or multiplication and division) state the order in which to perform two or more operations with rational numbers	evaluate expressions involving two operations with rational numbers (addition or subtraction and multiplication or division)	evaluate expressions involving more than two operations with rational numbers (addition or subtraction and multiplication or division)	write an expression that evaluates to a given value or characteristic group terms (i.e., use brackets) so that the expression evaluates to a given value or characteristic

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Operations with Polynomials				
	Emerging	Developing	Proficient	Extending
write and evaluate algebraic expressions	identify terms, coefficients, variables, and constants in algebraic expressions classify polynomials by number of terms and degree	evaluate algebraic expressions interpret algebraic expressions, in context	write algebraic expressions to represent “real-world” scenarios	solve challenging or unfamiliar problems involving algebraic expressions
add and subtract polynomials	combine like terms in an expression	add and subtract polynomials (degree 1)	add and subtract polynomials (degree 2) simplify expressions with three or more polynomials	write an expression that simplifies to a given polynomial or characteristic
multiply and divide by monomials	multiply and divide pairs of monomials multiply and divide polynomials by a constant	multiply and divide three or more monomials multiply and divide polynomials by a monomial	simplify expressions involving two or more expansions	write an expression that simplifies to a given polynomial or characteristic

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Linear Relations and Equations				
	Emerging	Developing	Proficient	Extending
graph linear relations	graph a linear relation from a table of values	make a table of values from an equation	graph a linear relation from an equation	generalize relationships involving linear relations (equation $\rightarrow$ graph)
write linear equations	write an equation from a table of values or graph (contains $x = 0$ and change in x -values of 1)	write an equation from a table of values or graph (change in x -values remains the same)	write an equation from a table of values or graph (change in x -values varies)	generalize relationships involving linear relations (graph $\rightarrow$ equation)

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Linear Relations and Equations (cont'd)				
	Emerging	Developing	Proficient	Extending
solve multi-step linear equations	solve linear equations involving brackets	solve linear equations involving like terms on one side or variables on both sides	solve linear equations involving brackets and like terms on one side or variables on both sides	solve challenging or unfamiliar problems involving linear equations
solve linear equations with rational coefficients	solve one- and two-step linear equations with rational coefficients	solve linear equations with rational coefficients involving the distributive property solve linear equations with rational coefficients involving like terms on one side or variables on both sides	solve linear equations with rational coefficients involving the distributive property and like terms on one side or variables on both sides	solve challenging or unfamiliar problems involving linear relations with rational coefficients
solve contextual problems involving linear relations and equations	determine an unknown value from a graph or equation (provided) interpret coefficients and constants, in context	graph a relation or write an equation to represent a “real-world” scenario	determine an unknown value from a graph or equation (created)	solve challenging or unfamiliar problems involving linear relations and equations

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Scale and Similarity				
	Emerging	Developing	Proficient	Extending
convert between SI units	state the most appropriate SI unit	convert between SI units (mm ↔ m, cm ↔ m, mm ↔ cm and m ↔ km)	convert between SI units (mm ↔ km and cm ↔ km)	convert between rates involving SI units (m/s ↔ km/h)
determine scale factors and unknown measurements	identify enlargements and reductions interpret scale factors as enlargements or reductions	draw enlargements and reductions to scale (grid) determine scale factors (same metric units) determine unknown measurements using scale (same metric units)	draw scale diagrams determine scale factors (different metric units) determine unknown measurements using scale (different metric units)	solve challenging or unfamiliar problems involving scale
determine unknown measurements in similar triangles	identify corresponding angles and sides in similar triangles	determine unknown measurements in similar triangles	determine unknown measurements in similar triangles (nested, transversals) determine whether two triangles are similar	determine unknown measurements in similar triangles (differences between corresponding sides in similar triangles)

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Statistics				
	Emerging	Developing	Proficient	Extending
identify and remove bias in data collection	identify factors that influence data collection identify populations and samples	identify bias in survey questions identify sampling methods identify sampling bias	remove bias from survey questions write survey questions free of bias remove sampling bias	design a research plan
identify and critique misrepresented data	identify ways in which graphs can be misleading	describe misleading impressions given by graphs	revise misleading graphs	create misleading graphs