Mathematics Grade 9
Patterns (P)

Outcome	1 - Beginning The student is having difficulty demonstrating an understanding of the concept.	2 – Approaching The student is developing an understanding of the concept.	3 – Meeting The student consistently demonstrates an understanding of the concept or has achieved the concept.	4- Exemplary The student independently demonstrates an in-depth understanding of the concept, and consistently applies this knowledge to new situations.
P9.1 **I can demonstrate understanding of linear relations including:** ○ **graphing** ○ **analyzing** ○ **interpolating and extrapolating** ○ **solving situational questions.** **[C, CN, PS, R, T, V]**	• I can **identify graphs** which represent linear relations.	• I can sketch graphs for given **linear relations,** without the use of technology.	• I can **sketch graphs** for given linear relations, including horizontal **AND** vertical lines, **without the use of technology.**	• I can **formulate a problem** based on a given graph.
	• **With help**, I can interpolate **OR** extrapolate a value for either variable in a linear relation in a graph.	• I can interpolate **OR** extrapolate a value for either variable in a linear relation in a graph.	• I can interpolate **AND** extrapolate a value for either variable in a linear relation in a graph.	• I can **formulate situational questions** that would result in the need for interpolation **and/or** extrapolation.
	• **With help**, I can verify an interpolated **OR** extrapolated value from a graph by using substitution in the related linear relation.	• I can verify an interpolated **OR** extrapolated value from a graph by using substitution in the related linear relation.	• I can **verify** an interpolated **AND** extrapolated value from a graph by using substitution in the related linear relation.	• I can **verify** an interpolated **AND** extrapolated value from a graph by using substitution in a linear relation **that I created**.
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P9.2 **I can model and solve situational questions using linear equations of the form:** ○ **ax = b** ○ **x/a = b, a ≠ 0** ○ **ax + b = c** ○ **x/a + b = c, a ≠ 0** ○ **ax = b + cx** ○ **a(x + b) = c** ○ **ax + b = cx + d** ○ **a(bx + c) = d(ex + f)** ○ **a/x = b, x ≠ 0** **where a, b, c, d, e, and f are rational numbers. [C, CN, PS, V]**	• I can **model and solve problems** using linear equations of the form ○ ax=b ○ $\frac{x}{a} = b$ ○ $ax + b = c$ ○ $\frac{x}{a} + b = c$ ○ $a(x + b) = c$	• I can **model and solve problems** using linear equations of the form: ○ ax = b ○ x/a = b, a ≠ 0 ○ ax + b = c ○ x/a + b = c, a ≠ 0 ○ ax = b + cx ○ a(x + b) = c ○ ax + b = cx + d ○ a(bx + c) = d(ex + f) ○ a/x = b, x ≠ 0	• I can **model and solve situational questions** using linear equations of the form: ○ ax = b ○ x/a = b, a ≠ 0 ○ ax + b = c ○ x/a + b = c, a ≠ 0 ○ ax = b + cx ○ a(x + b) = c ○ ax + b = cx + d ○ a(bx + c) = d(ex + f) ○ a/x = b, x ≠ 0	• I can **create a model and solve a complex word problem** using linear equations**.**
	• **With help**, I can write a linear equation representing the pattern in a given table of values and verify the equation by substituting values from the table.	• I can **write a linear equation** representing the pattern in a given table of values **AND** verify the equation by substituting values from the table.	• I can **write a linear equation to represent a particular situation.**	• I can use **an equation to model and solve a complex problem**.
	• **With help**, I can verify, by substituting, whether or not a given rational number is a solution to a given linear equation.	• I can **verify**, by substituting, whether or not a given rational number is a solution to a given linear equation.	• I can **identify and explain the errors** of an incorrect solution to a linear equation.	• I can **identify and explain** the errors of an incorrect solution to a **complex linear equation.**
Comments :				

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P9.3 **I can demonstrate understanding of single variable linear inequalities with rational coefficients including:** ○ **solving inequalities** ○ **verifying** ○ **comparing** ○ **graphing.** **[C, CN, PS, R, V]**	• I can solve **one-step single-variable linear** inequalities and graph the solution. • I recognize the following symbols and know what they mean >,<,≥,≤	• I can solve **multi-step single-variable linear inequalities and graph the solution.** • I can **verify** whether or not a given rational number is part of the solution set for a linear inequality.	• I can **solve a situational question** involving a single variable linear **inequality** and graph the solution. • I can **explain why there is more than one solution to a linear inequality.**	• I can **create a situational question** involving a multi-step single variable linear inequality and graph the solution. • **I can analyze a given solution and explain any error.**
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P9.4 **I can demonstrate understanding of polynomials (limited to polynomials of degree less than or equal to 2) including:** ○ **modeling** ○ **generalizing strategies for addition, subtraction, multiplication, and division analyzing** ○ **relating to context** ○ **comparing for equivalency.** **[C, CN, R, V]**	**Modelling**	• I can represent polynomials concretely **OR** pictorially. • **With help,** I can identify the variables, degree, number of terms and coefficients, including the constant term, of a given simplified polynomial expression and explain the role or significance of each.	• I can represent polynomials concretely **OR** pictorially **AND** describe how the concrete or pictorial model reflects the symbolic form. • I can **identify the variables, degree, number of terms and coefficients**, including the constant term, of a given simplified polynomial expression and explain the role or significance of each.	• I can create a model (concretely **OR** pictorially) for a polynomial **AND** describe the relationship between x and x^2. • I can **write a polynomial** for a given concrete or pictorial representation.	• I can create a model (concretely or pictorially) for a polynomial that includes a **cubed variable.** • I can **write a polynomial for a given situation**.
	Generalizing and Comparing	• I can **recognize** equivalent forms of a polynomial expression.	• I can **write equivalent forms of a polynomial expression.**	• I can write **equivalent forms of a polynomial expression** and **justify the equivalence.**	• I can write **equivalent forms of a complex polynomial expression** and justify the equivalence.
	Operations	• I can **identify like terms** and I can explain why terms with different variable exponents cannot be added or subtracted.	• I can **simplify polynomial expressions.**	• I can **verify whether or not the simplification of the addition or subtraction and multiplication or division of two polynomials is correct and explain my reasoning.**	• I **can create and solve a problem with one or more operations involving polynomials.**

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Comments				