

CURRICULUM CONNECTIONS

PRESCRIBED LEARNING OUTCOMES

<p>A NUMBER</p> <p><i>Students demonstrate an understanding of and proficiency with calculations, including making decisions concerning which arithmetic operation or operations to use to solve a problem and then solve the problem.</i></p>	<p><i>It is expected that students will:</i></p> <p>A1 classify numbers as natural, whole, integer, rational, or irrational and describe contexts where they are used</p> <p>A2 describe how natural, whole, integer, rational, and irrational number sets are “nested” within the real number system</p> <p>A3 perform arithmetic operations on irrational numbers using appropriate decimal approximations</p> <p>A4 perform operations on irrational numbers of monomial and binomial form, using exact values</p> <p>A5 explain and apply the exponent laws for powers of numbers, including</p> <ul style="list-style-type: none">– $x^m \cdot x^n = x^{m+n}$– $x^m \div x^n = x^{m-n}$– $(x^m)^n = x^{mn}$– $(xy)^m = x^m y^m$– $\left(\frac{x}{y}\right)^m = \frac{x^m}{y^m}, y \neq 0$– $x^0 = 1, x \neq 0$– $x^{-m} = \frac{1}{x^m}, x \neq 0$ <p>A6 explain and apply the exponent laws for powers of numbers and for variables with rational exponents</p>
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<p>B PATTERNS AND RELATIONS (Patterns)</p> <p><i>Students use algebraic and graphical models to generalize patterns, make predictions, and solve problems.</i></p>	<p><i>It is expected that students will:</i></p> <p>Patterns</p> <p>B1 use expressions to represent general terms for arithmetic growth, and apply these expressions to solve problems</p> <p>B2 use expressions to represent sums for arithmetic growth, and apply these expressions to solve problems</p> <p>B3 relate arithmetic sequences to linear functions defined over the natural numbers</p> <p>Variables and Equations</p> <p>B4 factor polynomial expressions of the form</p> <ul style="list-style-type: none"> – $ax^2 + bx + c$ – $a^2x^2 - b^2y^2$ <p><i>Clarification: Factoring polynomials may include polynomials with degree greater than two</i></p> <p>B5 find the product of polynomials (i.e., monomials, binomials, trinomials)</p> <p><i>Clarification: Multiplying polynomials include:</i></p> <ul style="list-style-type: none"> – multiplying a monomial by a polynomial – multiplying a binomial by a binomial – multiplying a binomial by a trinomial – squaring a binomial – cubing a binomial <p>B6 divide a polynomial (P or $P(x)$) by a binomial (D or $D(x)$) and express the result in the forms</p> <ul style="list-style-type: none"> – $\frac{P}{D} = Q + \frac{R}{D}$ – $P(x) = D(x)Q(x) + R$, where Q and $Q(x)$ denote the quotient and R denotes the remainder <p><i>Clarification: Dividing polynomials may include binomial divisors of the form $(ax + c)$ or $(ax^2 + c)$</i></p> <p>B7 determine equivalent forms of simple rational expressions with polynomial numerators, and denominators that are factorable monomials, binomials, or trinomials</p> <p>B8 determine the non-permissible values for the variable in rational expressions with polynomial numerators, and denominators that are factorable monomials, binomials, or trinomials</p>
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- B9 perform the operations of addition, subtraction, multiplication, and division on rational expressions with polynomial numerators, and denominators that are monomials, binomials, or trinomials
- B10 find and verify the solutions of rational equations that reduce to linear form

Relations and Functions

- B11 describe a linear function in terms of
- ordered pairs
 - a rule, in word or equation form
 - a graph
- B12 use function notation to evaluate and represent linear functions
- B13 determine the following characteristics of the graph of a linear function, given its equation
- x - and y -intercepts
 - slope
 - domain
 - range

Clarification: The above characteristics may have to be determined given the graph of a linear equation.

- B14 sketch the graph of a linear function given its equation in the form
- $ax + by + c = 0$ (general form)
 - $y = mx + b$ (slope–intercept form)
- B15 represent linear data, using linear function models
- B16 solve problems involving partial variation and arithmetic sequences as applications of linear functions

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C SHAPE AND SPACE

Students describe and compare everyday phenomena, using either direct or indirect measurement and describe the characteristics of 3-D objects and 2-D shapes, and analyse the relationships among them.

It is expected that students will:

Measurement

- C1 solve 2-D and 3-D problems involving two right triangles
- C2 extend the concepts of sine and cosine for angles through to 180°
- C3 apply the sine and cosine laws to solve problems (excluding the ambiguous case)

3-D Objects and 2-D Shapes

- C4 solve problems involving distances between points in the coordinate plane
- C5 solve problems involving midpoints of line segments
- C6 solve problems involving rise, run, and slope of line segments
- C7 determine the equation of a line, given information that uniquely determines the line
- C8 solve problems using slopes of
 - parallel lines
 - perpendicular lines