

## Publisher Questions to the Western and Northern Canadian Protocol (WNCP) Mathematics Team

### Pre-calculus 11 and 12

1. What technologies are expected? Should publishers create resources that anticipate an evolution in which CAS become increasingly accessible during the life of this curriculum?

**WNCP Response:** Students are expected to have access to technology, including calculators and computers. Publishers should develop resources that address the use of technology as specified in the WNCP Common Curriculum Framework and in the Call for Proposals (CFP-0804) criteria. Please refer to page 4 of the Publisher Questions Posted November 23, 2007 for further information regarding the inclusion of technology.

### Pre-calculus 11

#### Relations and Functions

1. AI 3.1 refers to a quadratic function. What is the WNCP accepted definition of a quadratic function?

**WNCP Response:** A quadratic function is any function of the form  $y = ax^2 + bx + c$ ,  $a \neq 0$ , as expressed in SO 4. The AIs for SO 3 and 4 make specific reference to quadratic functions when the equation is expressed in an alternate form such as  $y = a(x - p)^2 + q$ .

2. For SO 10, can the formulas for compound interest and/or annuities be developed and used?

**WNCP Response:** Compound interest and annuities are not appropriate for this outcome.

### Pre-calculus 12

#### Relations and Functions

1. In SO 1–5, which of the functions students encounter in grades 11 and 12 are students expected to work with?

**WNCP Response:** The intent of SO 1–5 is that students will learn about compositions and transformations of functions using functions they are already familiar with. So, that could include linear, quadratic and absolute value functions as well as graphs that don't have a particular function associated with them. This builds on the work done with quadratic functions in Grade 11. Once these concepts have been covered, students should then be able to apply them to new functions as they are introduced; that is, trigonometric functions, exponential functions, logarithmic functions, polynomial functions and rational functions.

2. In the AIs for SO 2, 3, and 5, students are required to generalize using inductive reasoning, which suggests that students have to graph many examples. Technology is not listed as a process with these outcomes, so are students expected to generate large numbers of graphs by hand or, may students use technology to produce graphs?  
**WNCP Response: Students are expected to sketch a number of graphs and draw general conclusions for the various transformations. Technology may be used to do some of this; however, when it comes to assessing the outcomes, students should be able to apply the transformations without using technology.**

### **Trigonometry**

3. In SO 6, what is meant by reciprocal identities – the relationships of cosecant, secant, cotangent to sine, cosine and tangent? Are students expected to work with Pythagorean identities that include these reciprocal identities?  
**WNCP Response: Reciprocal identities refer to the relationship between sine and cosecant, cosine and secant and tangent and cotangent. There are three identities that are commonly referred to as the Pythagorean identities, including the relationship between sine and cosine, sine and cotangent and cosine and secant. Students are expected to be familiar with all three.**
4. In AI 6.5, what is meant by non-permissible values of an identity?  
**WNCP Response: When asked to prove an identity, students should be able to identify the replacements for the variable for which the original expressions (left-hand side and right-hand side) are undefined. These are the non-permissible values of an identity.**