UNIT 1

Transformations and Functions

General Outcome

Develop algebraic and graphical reasoning through the study of relations.

Specific Outcomes

RF2 Demonstrate an understanding of the effects of horizontal and vertical translations on the graphs of functions and their related equations.

RF3 Demonstrate an understanding of the effects of horizontal and vertical stretches on the graphs of functions and their related equations.

RF4 Apply translations and stretches to the graphs and equations of functions.

RF5 Demonstrate an understanding of the effects of reflections on the graphs of functions and their related equations, including reflections through the:

- x-axis
- y-axis
- line $y = x$.

RF6 Demonstrate an understanding of inverses of relations.

RF11 Demonstrate an understanding of factoring polynomials of degree greater than 2 (limited to polynomials of degree ≤ 5 with integral coefficients).

RF12 Graph and analyze polynomial functions (limited to polynomial functions of degree ≤ 5).

RF13 Graph and analyze radical functions (limited to functions involving one radical).

***Pre-Calculus 12*, pages 2–3**

Suggested Timing
30–45 min

Blackline Masters
Master 1 Holistic Project Rubric
Master 2 Ana-Holistic Project Rubric
BLM U1–1 Unit 1 Project Checklist

What's Ahead

In Unit 1, students explore polynomial and radical functions. They begin the unit looking at various transformation of functions, including translations, stretches, and reflections. They complete the chapter with a study of inverse functions. They then graph and analyze radical functions, and solve radical equations graphically. Students finish the unit looking at the characteristics of polynomial functions. They learn about the equations and graphs of these functions, and explore their transformations.

Planning Notes

Each chapter section begins with an investigation, which gives students a chance to develop their own strategies and understandings. Students can work on these individually or in pairs. The investigation is followed by several examples that explore the concepts. Consider leading the class through the examples, encouraging student involvement and input, including various strategies for approaching the questions. Students then work through a question related to the example in the Your Turn question. They practise their new skills in the Check Your Understanding section. Look over these questions before deciding which to assign. Alternatively, you could invite students to pick questions based on their level of understanding of the lesson.

Unit 1 Project

In this project, students explore mathematical functions in art, nature, and manufactured objects. More specifically, they will determine the equations of the functions or partial functions that they observe and then justify these findings. They will have an opportunity to create a display making the connection between the function and the image.

With the class, read and discuss the introductory notes for the Unit 1 project. You may wish to point out the Project Corners throughout Chapters 1, 2, and 3. These features are not mandatory but are recommended because they provide helpful information about the Unit 1 Project. You may wish to provide students with **BLM U1–1 Unit 1 Project Checklist**. Students can use the checklist as they prepare their project. Have students collect all their work for the Unit 1 project in a portfolio.

Students do best if they know exactly how they will be evaluated. One way to increase student motivation is to work with the class to create a specific rubric for the project. You may wish to use **Master 1 Holistic Project Rubric** as a template and review the general holistic points within the 1–5 scoring levels. Alternatively, you may wish to use **Master 2 Ana-Holistic Project Rubric** and decide whether you will score the work out of 5 or 20. See the Web Link below for a specific rubric in each style.

For additional information on the Unit 1 Project, see pages 3 and 157 in the student resource, and pages 7, 37 and 81 in this Teacher's Resource.

Web Link

For a holistic rubric and an ana-holistic rubric related to the Unit 1 Project, go to www.mcgrawhill.ca/school/learningcentres and follow the links.