Unit 2: Quadratic Functions Lesson 2.1

Game On!

(4) 1. Evidence of quadratic functions can be found in real-life situations. Describe a sporting situation that has quadratic characteristics. Use key terms such as maximum or minimum, starting or ending points (ordered pairs), shape, vertex, etc. to explain why the situation could be considered to have quadratic characteristics. A complete response must have a minimum of 3 sentences and must address all of the above key terms.

2. Which of the following functions are quadratic? Explain.

(1) a. $y = x^2 + 3x$

(1) b. $f(x) = x(4 - x) - 2$

(1) c. $g(x) = 3x^2 - 2 + 4x^2$

(2) 3. Determine $f(3)$, given the function $f(x) = 2x^2 + 2x + 3$.

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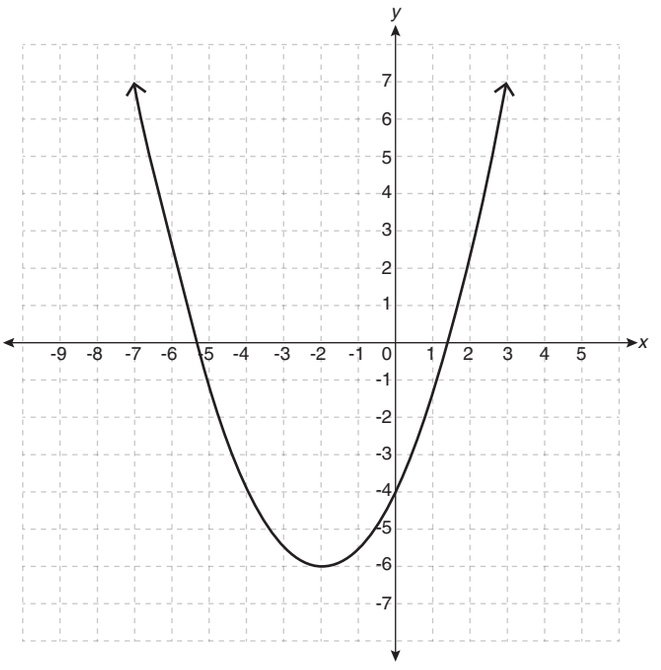
4. The graph of a function is given below.



Determine

- the coordinates of the vertex

_____

- the equation of the axis of symmetry

_____

- whether the function has a maximum or a minimum value

_____

- the maximum or minimum value

_____

- the domain

_____

- the range

_____

- the x-intercepts

- the y-intercept

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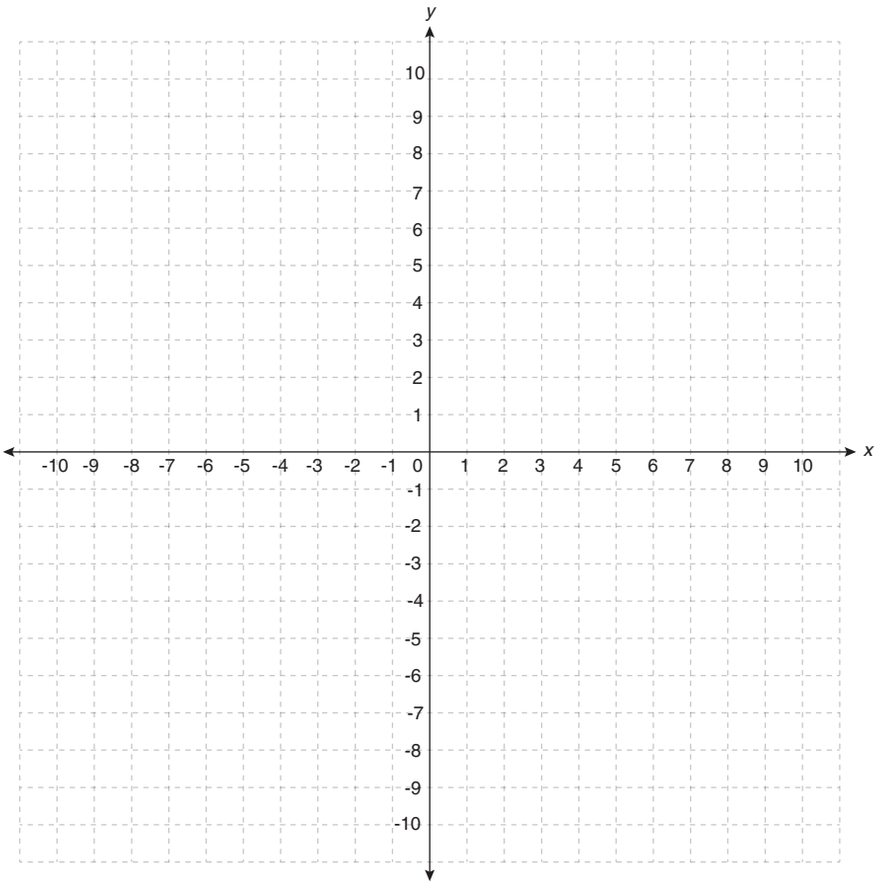
(4) 5. The function $f(x) = -3x^2 + 12x - 9$ has a zero at $x = 1$ and an axis of symmetry at $x = 2$. Use characteristics of the graphs of quadratic functions to sketch the graph of the function $f(x) = -3x^2 + 12x - 9$ without using a table of values.



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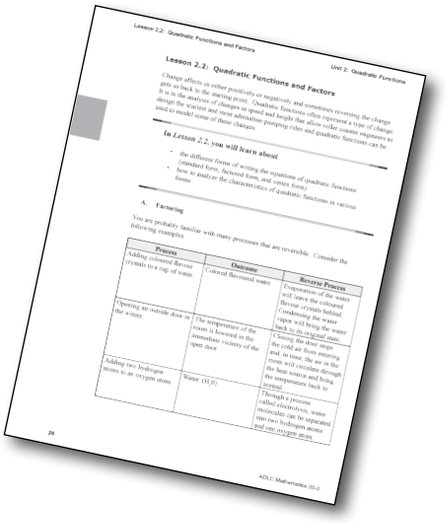
You have completed *Lesson 2.1* Assignment *Game On!*. Please return to the *Module* and continue your training with *Lesson 2.2*.



Lesson 2.2: Quadratic Functions and Factors

Unit 2: Quadratic Functions

Lesson 2.2: Quadratic Functions and Factors

Change affects in either positively or negatively, and sometimes reversing the change gets us back to the starting point. Quadratic functions often represent a type of change. It is in the analysis of changes in speed and height that allow roller coaster engineers to design the scariest and most adrenaline pumping rides and quadratic functions can be used to model some of these changes.

In *Lesson 2.2*, you will learn about

- the different forms of writing the equations of quadratic functions (standard form, factored form and vertex form)
- how to analyze the characteristics of quadratic functions in various forms

A. Factoring

You are probably familiar with many processes that are reversible. Consider the following examples.

Process	Outcome	Reverse Process
Adding coloured flavour crystals to a cup of water	Coloured flavoured water	Evaporation of the water will leave the coloured flavour crystals behind. Condensing the water vapor will bring the water back to its original state.
Opening an outside door in the winter	The temperature of the room is lowered in the immediate vicinity of the open door	Closing the door stops the cold air from entering and, in time, the air in the room will circulate through the heat source and bring the temperature back to normal.
Adding two hydrogen atoms to an oxygen atom.	Water (H_2O)	Through a process called electrolysis, water molecules can be separated into two hydrogen atoms and one oxygen atom.

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