The purpose of this activity is to see if you have a solid but basic algebraic skills to deal with linear and quadratic relations.

1 Getting Started

SKILLS AND CONCEPTS You Need

Study Aid

For help, see the Essential Skills Appendix.

Question	Appendix
1	A-8
2	A-7
4	A-5
5	A-15
6	A-12
7	A-14
8	A-9, A-10

1. Simplify each expression.

a) $3(x + y) - 5(x - y)$

b) $(4x - y)(4x + y)$

c) $\frac{1}{2}(x^2 + 1) - \frac{3}{2}(x^2 - 1)$

d) $4x(x + 2) - 2x(x - 4)$

2. Evaluate each expression in question 1 when $x = 3$ and $y = -5$.

3. Solve each linear equation.

a) $5x - 8 = 7$

b) $-2(x - 3) = 2(1 - 2x)$

c) $\frac{5}{6}y - \frac{3}{4}y = -3$

d) $\frac{x - 2}{4} = \frac{2x + 1}{3}$

4. Graph each **linear relation**.

a) $y = 2x - 3$

b) $3x + 4y = 12$

5. Graph each circle.

a) $x^2 + y^2 = 9$

b) $3x^2 + 3y^2 = 12$

6. Graph each **parabola**, labelling the **vertex** and the **axis of symmetry**.

a) $y = x^2 - 6$

b) $y = (x - 2)^2 - 1$

c) $y = -3(x + 4)^2 + 2$

d) $y = -x^2 + 6x$

7. For each **quadratic relation**, list the **transformations** you need to apply to $y = x^2$ to graph the relation. Then sketch the graph.

a) $y = x^2 - 2$

b) $y = -4x^2 + 3$

c) $y = \frac{1}{2}(x - 1)^2 - 4$

d) $y = -2(x + 3)^2 + 5$

8. Solve each quadratic equation.

a) $x^2 - 5x + 6 = 0$

b) $3x^2 - 5 = 70$

9. Compare the properties of linear relations, circles, and quadratic relations. Begin by completing a table like the one shown. Then list similarities and differences among the three types of relations.

Property	Linear Relations	Circles	Quadratic Relations
Equation(s)			
Shape of graph			
Number of quadrants graph enters			
Descriptive features of graph			
Types of problems modelled by the relation			

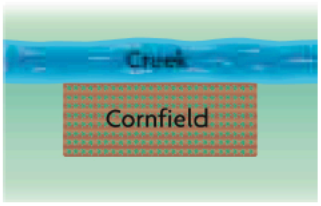
APPLYING What You Know

Fencing a Cornfield

YOU WILL NEED

- graph paper

Rebecca has 600 m of fencing for her cornfield. The creek that goes through her farmland will form one side of the rectangular boundary. Rebecca considers different widths to maximize the area enclosed.



? How are the length and area of the field related to its width?

A. What are the minimum and maximum values of the width of the field?

B. What equations describe each?
i) the relationship between the length and width of the field
ii) the relationship between the area and width of the field

C. Copy and complete this table of values for widths that go from the least to the greatest possible values in intervals of 50 m.

Width (m)	Length (m)	Area (m^2)

D. Graph the data you wrote in the first two columns. Use width as the **independent variable**. Describe the graph. What type of relationship is this?

E. Now graph the data you wrote in the first and third columns. Use width as the independent variable again. Describe the graph. What type of relationship is this?

F. How could you have used the table of values to determine the types of relationships you reported in parts D and E?

G. How could you have used the equations from part B to determine the types of relationships you reported in parts D and E?