Investigation on Quadratic functions

Part I (Factor form)

Objective: At the end of this activity, students will be able to identify the roots of quadratic equation of form $y = a(x-p)(x-q)$ and $y = a(x-p)^2$

Use of Graphing calculator is required for this activity (Casio cg20 or Casio cg50 is recommended)

1. Sketch the following curves using your GDC and answer the questions that follow.
   a. $y_1 = (x-2)(x-5)$
   b. $y_2 = 2(x-2)(x-5)$
   c. $y_3 = 4(x-2)(x-5)$
   d. $y_4 = \frac{1}{2}(x-2)(x-5)$
   e. $y_5 = \frac{1}{4}(x-2)(x-5)$

   Write down the roots of each function

   a) _____

   b) _____

   c) _____

   d) _____

   e) _____

   What do you observe by changing the value of a in $y = a(x-2)(x-5)$ in each equation?

   _____

2. Sketch the following curves using your GDC and answer the questions that follow.
   a. $y_1 = 2(x-2)(x-5)$
   b. $y_2 = 2(x-7)(x-9)$
   c. $y_3 = 2(x+2)(x-5)$
   d. $y_4 = 2x(x-5)$
   e. $y_5 = 2(x+2)(x+5)$

   Write down the roots of each function

   a) _____

   b) _____

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c) _____

d) _____

e) _____

What do you observe by changing the value of p and q in $y = 2(x - p)(x - q)$ in each equation?

_____

3. Sketch the following curves using your GDC and answer the questions that follow.
   a. $y_1 = 2(x - 2)^2$
   b. $y_2 = 2(x + 7)^2$
   c. $y_3 = 2(x - 5)^2$
   d. $y_4 = 2x^2$
   e. $y_5 = 2(x + 2)^2$

   Write down the roots of each function

   a) _____

   b) _____

   c) _____

   d) _____

   e) _____

   What do you observe by changing the value of p in $y = 2(x - p)^2$ in each equation?

   _____

   Summarize your findings about a, p and q in $y = a(x - p)(x - q)$.

   _____

   _____

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