Task

Student Text Page
144

Suggested Timing
60–75 min

Tools
- graphing calculator
- computer with *The Geometer's Sketchpad®*

Related Resources
- T–2 *The Geometer's Sketchpad®* 4
- BLM 2–12 Task: Can You Tell Just by Looking? Rubric

Ongoing Assessment
- Use **BLM 2–12 Task: Can You Tell Just by Looking? Rubric** to assess student achievement.

Can You Tell Just by Looking?

Teaching Suggestions

Have the students read the question in pairs but then go back to their desks with their graphing technology and work on their own. This will help ESL and ELL students, as well as give students another pair of eyes to interpret the questions so there is no mistaking what is being asked. The task could be assigned as an in-class assignment or as an independent assignment to be completed outside of class.

As student responses for the level of mathematical understanding they represent. As you assess each response, consider the following questions:

- Has the student used a labelled diagram to determine the roots of the equations?
- Did the student comprehend the given information?
- Has the student provided written calculations to determine the roots of the equations?
- Has the student provided clearly communicated responses to parts a), b), c), d), and e)?

Level 3 Sample Response

a) If you are just looking at the page and determining the roots then they may not be very accurate. Using the factor theorem,
  - **i)** The roots are $x = 2$ and $x = 1$. So, the factors are $(x - 2)$ and $(x - 1)$.
  - **ii)** The roots are $x = 3$, $x = 2$, and $x = 1$. So, the factors are $(x - 3)$, $(x - 2)$, and $(x - 1)$.
  - **iii)** The roots are $x = 4$, $x = 3$, $x = 2$, and $x = 1$. So, the factors are $(x - 4)$, $(x - 3)$, $(x - 2)$, and $(x - 1)$.
  - **iv)** The roots are $x = 5$, $x = 4$, $x = 3$, $x = 2$, and $x = 1$. So, the factors are $(x - 5)$, $(x - 4)$, $(x - 3)$, $(x - 2)$, and $(x - 1)$.

b) The roots can be found using graphing technology and the Zero operation on the calculator.
  - **i)** $x = 1$ and $x = 2$
  - **ii)** $x = 1$, $x = 2$, and $x = 3$
  - **iii)** $x = 1$, $x = 2$, $x = 3$, and $x = 4$
  - **iv)** $x = 1$, $x = 2$, $x = 3$, $x = 4$, and $x = 5$

c) The number of roots equals the degree of the equation and the roots are the factorial of the degree (2!, 3!, 4!, and 5!).

d) The constant term in each equation is the product of the roots, with an even-degree function having a positive sign and an odd-degree function having a negative sign. For example, in i) the constant is $2 = 1 \times 2$, in ii) the constant is $-6 = -(1 \times 2 \times 3)$, etc.

e) I conjecture that i) and iii) will have roots but ii) will not.
  - **i)** $x = -3$, $x = 1$, and $x = 2$
  - **ii)** $x = -3$, $x = 1$, and $x = 2$
  - **iii)** $x = 1$, $x = 2$, $x = 3$, $x = 4$, $x = 5$, and $x = 6$