

MeTEOR Performance Task

Algebra II

Mathematics

Factoring a Wood Sculpture

Performance Task Item: Factoring a Wood Sculpture

Task/Question 1:

- A. The zeros of a polynomial function identify the following:
- B. What is the difference between a quartic polynomial and a quadratic polynomial?
- C. Write the factored form of each given polynomial:

$$x^3 + 7x^2 + 10x$$

$$x^3 + 9x^2 + 20x$$

$$9x^3 + 6x^2 - 3x$$

- D. Find the zeros for each:

$$y = (x + 4)(x + 5)$$

$$y = x(x - 3)(x + 7)$$

$$y = (x + 1)(x - 2)(x + 3)$$

- E. Several geologists were viewing the graph of an earthquake's waves. On the graph, the x-intercepts were (-3, 0), (0,0) and (2,0). What was the polynomial function?

Task/Question 2:

A. What do the zeros of a polynomial function tell you about the function's graph?

B. Write each of the polynomial functions in standard form with the given zeros:

$x = 2, 4, 6$

$x = -3, 5, -2$

$x = -5, -5, 3$

$x = 4, 0, -1$

C. Factor each polynomial and write the zeros:

$x^2 + 5x + 6$

$5x^3 + 35x + 60x$

$x^2 - 4x + 3$

D. Your friend, Susan, missed school the last two days. Your teacher, Ms. Rouse, went over how to solve a function by factoring and how to solve to find zeros. Explain to Susan how to solve the two functions below by factoring so you can find the zeros.

$$f(x) = 2x^2 - 5x - 7$$

$$f(x) = 2x^2 - 32$$

Task/Question 3:

- A.** What is the polynomial function, in factored form, whose zeros are -2, 4, and 6, and whose leading coefficient is -2?
- B.** You are given the polynomial function $y = 2x^2 - x + 1 = 0$. You have a hard time factoring it to find the zeros. Name another method you could use.
- C.** The volume of a rectangular box, expressed as a polynomial, is $12x^3 - 27x$ cubic units. What are the three side lengths of this box?

- D.** Explain how you found the side lengths in Part C.

- E.** The volume of the box in Part C was changed to $2x^3 + 10x^2 + 12x$ cubic units. What are the three side lengths for the box?

Task/Question 4:

Danielle, a local artist, has a block of wood that she wants to use to make a wood sculpture. The block is currently $6x$ units in length, $3x$ units wide and, $9x$ units high.

- A. What is the volume of the wooden block?

- B. Danielle feels she needs to make each side 2 units smaller before she begins making the sculpture. What will the volume of the new piece of wood Danielle will work with become?

- C. Danielle believes removing two units from each side is too much and decides to remove only one unit from each side. Calculate the new volume. Explain any pattern you see.

- D. If you remove the volume calculated in Part C, how much will Danielle remove from the original block?

- E. Explain how determined the answer to Part D. Justify and defend how your approach to solving this is the **most efficient**.



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