Name _____ Date _____

What Makes You So Special?

Special Products

1. Ms. Frances writes the expression $36x^2 - 100$ on the board and asks her students to factor it completely. The work of two of her students, Justin and Nakia, is shown. Determine which student factored the expression correctly. Then, identify the mistake the other student made. Explain how you determined your answers.

Justin

$36x^2 - 100 = (6x + 10)(6x - 10)$
$= 2(3x + 5)(3x - 5)$

Nakia

$36x^2 - 100 = 4(9x^2 - 25)$
$= 4(3x + 5)(3x - 5)$

2. Is the expression $\frac{4}{9}x^2 + \frac{4}{3}x + 1$ a perfect square trinomial? Explain how you determined your answer. If possible, factor the expression completely.

3. Nina claims that the expression $3x^2 - 24$ is the difference of two cubes. Perry argues that it is not. Who is correct? Explain your reasoning. If possible, factor the expression completely.

4. Ms. Morrison writes the expression $r^{12} - 64$ on the board. Kitsy says that the expression is the difference of two squares. Angel argues that it is the difference of two cubes. Their work is shown below. Who factored the expression correctly? Explain how you determined your answer. Support your answer by checking Kitsy's and Angel's work.

Kitsy's Work

$r^{12} - 64 = (r^6 - 8)(r^6 + 8)$

$= (r^2 - 2)(r^4 + 2r^2 + 4)(r^2 + 2)(r^4 - 2r^2 + 4)$

$= (r^2 - 2)(r^2 + 2)(r^4 + 2r^2 + 4)(r^4 - 2r^2 + 4)$

Angel's Work

$r^{12} - 64 = (r^4 - 4)(r^8 + 4r^4 + 16)$

$= (r^2 + 2)(r^2 - 2)(r^8 + 4r^4 + 16)$

12

5. Mr. Peters writes the expression $b^{15} + 125$ on the board. Galen says that the expression is the sum of two cubes. Paul argues that it can't be the sum of two cubes, because 15 is not a perfect cube. Who is correct? Explain your reasoning. If possible, factor the expression completely.