

Direction: Choose the best answer for each of the following questions.

1. Determine the **y-intercept(s)** for the polynomial $y = (x - 1)^2(x + 3)$

a. $(1, 0)$ and $(-3, 0)$

b. $(3, 0)$

c. $(0, 3)$

d. $(0, -3)$

2. Factor: $x^3 - 10x^2 + 29x - 20$

a. $(x - 4)(x - 1)(x - 5)$

b. $(x + 4)(x - 1)(x + 5)$

c. $(x - 4)(x + 1)(x + 5)$

d. $(x + 4)(x + 1)(x - 5)$

3. Find all the zeros for $f(x) = 2x^3 + 11x^2 + 13x + 4$

a. $\pm \frac{1}{2}, \pm 1, \pm 2, \pm 4$

b. $1, 2, 4$

c. $\frac{1}{2}, 4, 1$

d. $-\frac{1}{2}, -4, -1$

4. Find all the zeros of $f(x) = x^3 + x^2 - x + 15$ if $1 + 2i$ is a zero.

- a. $1 + 2i, 3, -3$
- b. $1 + 2i, 1 - 2i, 3$
- c. $1 + 2i, 1 - 2i, 3, -3$
- d. $1 + 2i, 1 - 2i, -3$

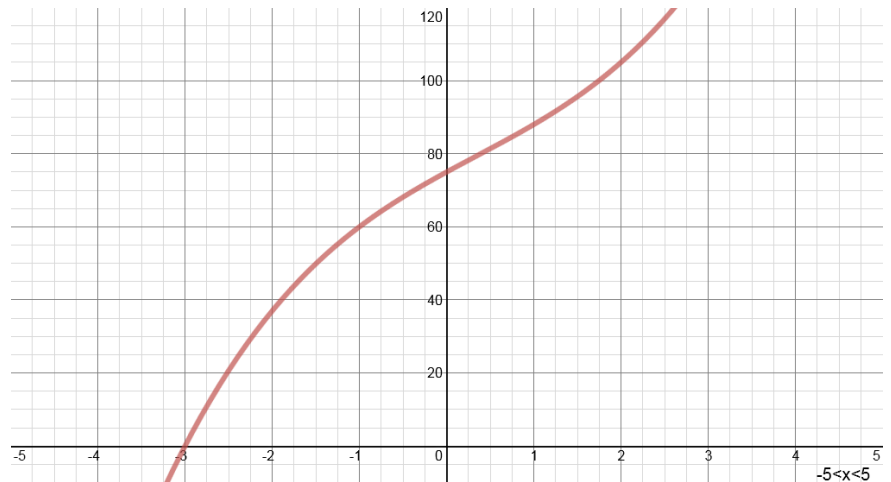
5. What is the remainder for $(x^4 + 2x^3 - 5x^2 + 1) \div (x + 1)$?

- a. 7
- b. -1
- c. -5
- d. -7

6. Find all zeros in exact form of the polynomial that is graphed below:

$$f(x) = x^3 - x^2 + 13x + 75.$$

- a) -3 (multiplicity of 3)
- b) -3, $2 \pm i\sqrt{21}$
- c) -3, $2 \pm 2i\sqrt{21}$
- d) 3, $2 \pm i\sqrt{21}$



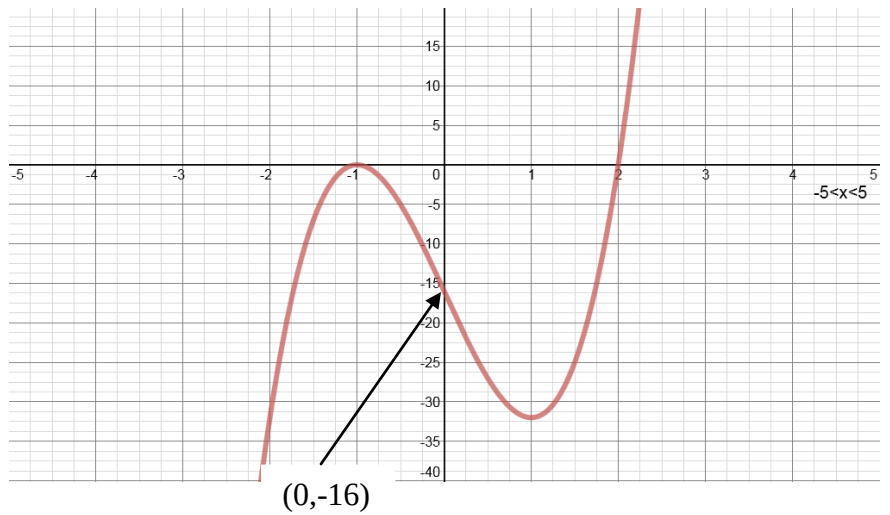
7. Derive the polynomial function of **lowest degree** for the graph below.

a) $y = -8(x-1)^2(x+2)$

b) $y = 8(x+1)^2(x-2)$

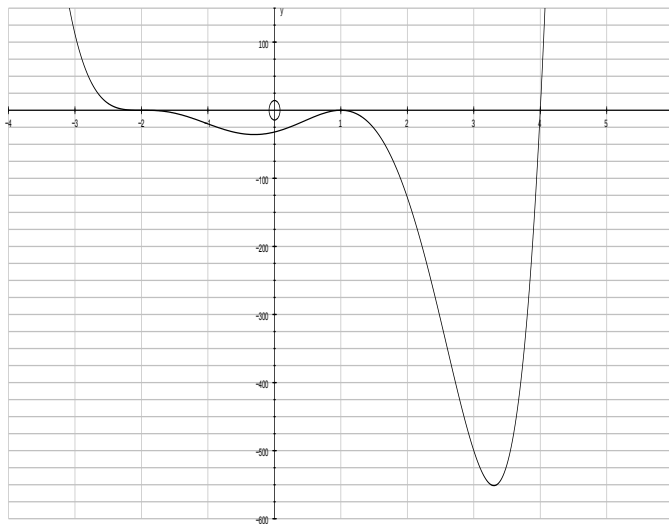
c) $y = -2(x-1)^2(x+2)^3$

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

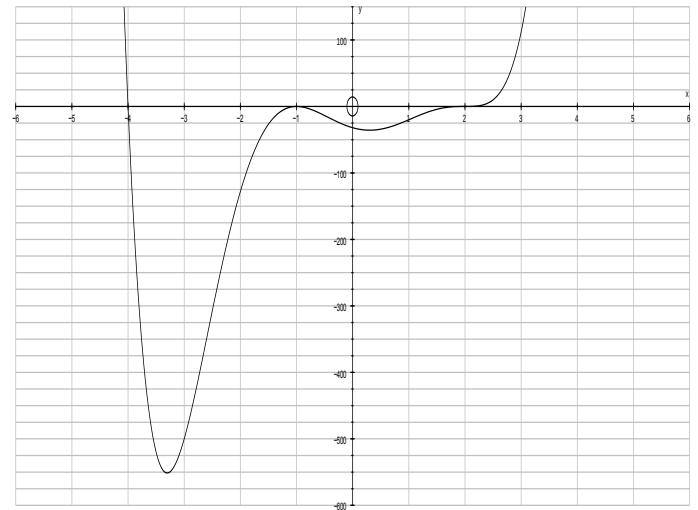


8. Which graph is the graph of $y = (x+2)^3(x-1)^2(x-4)$

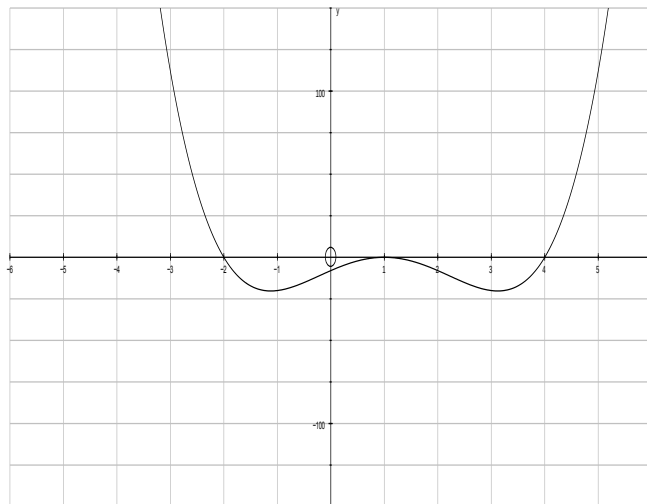
A.



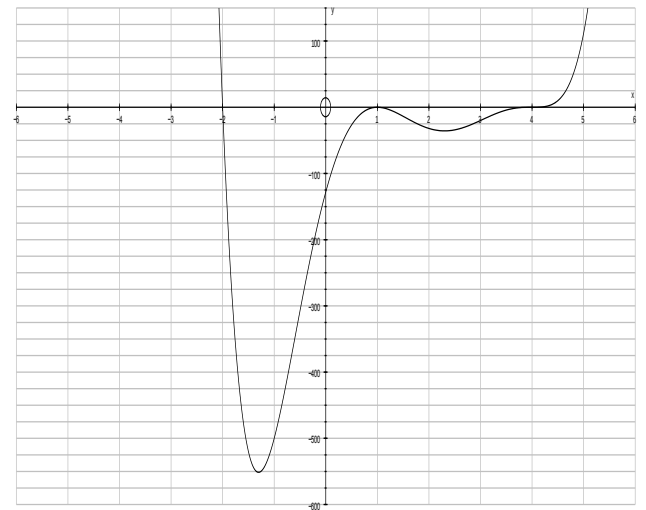
B.



C.



D.



Graphing Polynomials Broken down

Standard: N.CN.1 - Perform arithmetic operations with complex numbers.

N.CN.7 - Solve quadratic equations with real coefficients that have complex solutions.

N.CN.8 - Extend polynomial identities to the complex numbers. *For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.*

A.SSE.1.a - Interpret parts of an expression, such as terms, factors, and coefficients.

F.IF.4 - For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

F.IF.7 - Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

F.IF.8 - Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

A.CED.2 - Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.APR.6 - Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form $q(x) + \frac{r(x)}{b(x)}$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.

Task: Students will successfully complete the questions on the assessment.