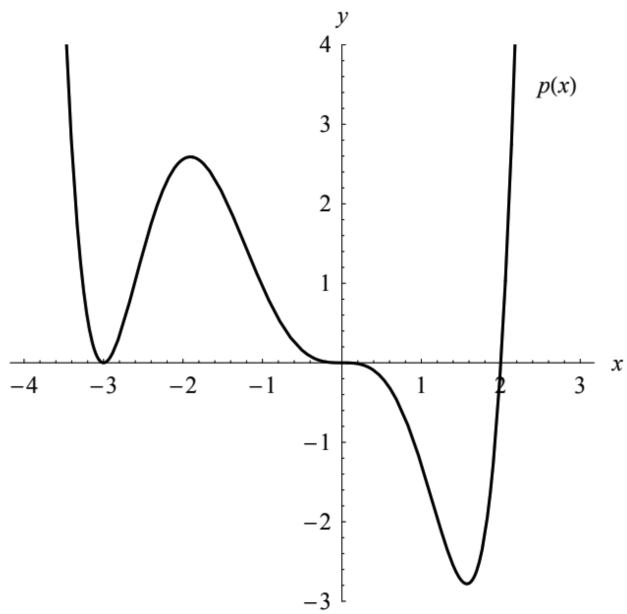
Practice Problems for Math Success

Power and Polynomial Functions

These **practice problems** are designed to help you **prepare for our course exams** and **assess your understanding** of the course material at the expected level. Aim to complete them **in class, during tutoring, office hours, or on your own**, and try to solve them **without notes or a calculator**, just like on the **actual exams**. Remember, **practice makes perfect**, so don't hesitate to **ask for help** if you get stuck.

1. Find a formula for the **power** function g with the following properties:
   - $g\left(-\frac{1}{5}\right) = 25$
   - $g(2) = -\frac{1}{40}$.

2. Given below is a graph of a polynomial function $p(x)$. The window is large enough to show the global behavior.



In each of the following parts circle **ONE** choice. Explain your answer.

(I) The number of distinct zeros of the polynomial is

(A) 3 (B) 4 (C) 5

(II) The coefficient of the leading terms is

(A) Positive (B) Negative

(III) The power of the leading terms is

(A) Even (B) Odd

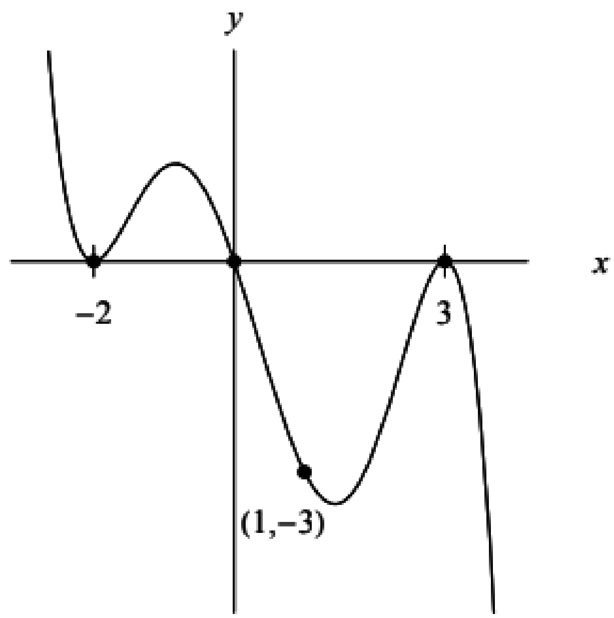
(IV) The multiplicity of the zero at $x = 0$ could be

(A) 1 (B) 2 (C) 3

(V) The degree of the polynomial is at least

(A) 3 (B) 4 (C) 6 (D) 8

3. Find a possible formula for the polynomial graphed below.



4. The following statements about $g(x)$ are true:

   - g has exactly three zeros at $x = -2$, $x = 3$, and $x = 5$.
   - g has a y-intercept at -5.
   - As $x \to \infty$, $y \to \infty$.
   - As $x \to -\infty$, $y \to -\infty$.

   Circle **all** possible formulas for $g(x)$:

   (a) $\frac{1}{36}(x+2)^2(x-3)^2(x-5)$

   (b) $-\frac{1}{60}(x+2)^2(x-3)(x-5)(x+5)$

   (c) $\frac{1}{60}(x+2)^2(x-3)(x-5)^2(x^2+x+1)$

   (d) $\frac{1}{72}(x+2)^2(x-3)^2(x-5)(x^2+2x+2)$

   (e) $-\frac{1}{36}(x+2)^2(x-3)^2(x-5)(-x^2-x-1)$

5. Find ONE possible formula for a polynomial with the following properties:

   - g has exactly three zeros at $x = -5$, $x = 1$, and $x = 2$.
   - g has a y-intercept at 20.
   - As $x \to \infty$, $y \to \infty$.
   - As $x \to -\infty$, $y \to \infty$.