Trig Substitutions
For problems 1 – 4 evaluate the given integral. For any definite integrals use the smallest positive value of \( \theta \) when converting limits.

1. \[ \int \frac{y^5}{(4 - y^2)^2} \, dy \]

2. \[ \int_{-1}^{2} \frac{\sqrt{7x^2 - 1}}{x^4} \, dx \] Note that you’ll need a calculator to deal with the limits.

3. \[ \int \frac{(t+1)^3}{\sqrt{2t^2 + 4t + 11}} \, dt \]

4. \[ \int \sec x \tan x \sqrt{\sec^2 x + 9} \, dx \] Hint: Look for a substitution that will make this look more like the first few problems in this section.

Partial Fractions
5. Find the form of the partial fraction decomposition for the following function. Do not find any of the constants.

\[ f(x) = \frac{2 + x^3 - 9x^4 + 10x^5}{x^4(5x-8)(2x^2 + 7x - 8)^5} \]

For problems 6 – 9 evaluate the given integrals.

6. \[ \int \frac{9 - 2z}{(z-5)(3z+5)} \, dz \]

7. \[ \int_{2}^{6} \frac{6t^2 + t}{(t+3)(t-1)^2} \, dt \]

8. \[ \int \frac{10x^3 - 27x^2 - 30x - 3}{(x^2 + 4)(9x^2 + 1)} \, dx \]

9. \[ \int \frac{t^4 - 3}{t^2(t+7)} \, dt \]