Trig Substitutions

For problems 1 – 4 evaluate the given integral.

1. $\displaystyle\int_{\frac{1}{2}}^{2} t^5 \left(4t^2 - 1\right)^{\frac{3}{2}} dt$ Note that you'll probably need a calculator to deal with the limits.

2. $\displaystyle\int \frac{x^2}{\sqrt{2 - 9x^2}} dx$

3. $\displaystyle\int (x-1)^3 \sqrt{9x^2 - 18x + 13}\, dx$

4. $\displaystyle\int \cos z \sqrt{16 + \sin^2 z}\, dz$ 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.

$$f(x) = \frac{x^5 + x^4 + x^3 + x^2 + x + 1}{x^4 (4 - 3x)(x^2 - 8x + 13)^2}$$

For problems 7 – 10 evaluate the given integrals.

6. $\displaystyle\int_{-1}^{0} \frac{4 - 7x}{(x+2)(3x-2)} dx$

7. $\displaystyle\int \frac{3t^2 + 1}{(t-1)(t+2)^2} dt$

8. $\displaystyle\int \frac{4 - z}{z^2 (z^2 + 16)} dz$

9. $\displaystyle\int \frac{x^4}{(x-4)(x^2 + 3)} dx$