

Homework 4: Partial Fractions and Trig. Substitution (due February 2)

1. Compute  $\int \frac{x^4 + 12x^3 + 15x^2 + 25x + 11}{x^3 + 12x^2 + 11x} dx$ . Use long division and  $\frac{A}{x} + \frac{B}{x+1} + \frac{C}{x+11}$ .
2. Compute  $\int \frac{z-1}{\sqrt{2z-z^2}} dz$ . (Hint: There is a very simple substitution, not necessarily trigonometric, that you can make)
3. Use a trig. substitution to find  $\int \frac{x^2}{\sqrt{9-x^2}} dx$
4. Compute the exact area of the region bounded by  $y = \frac{x^3}{\sqrt{4-x^2}}$ ,  $y = 0$ ,  $x = 0$  and  $x = \sqrt{2}$ .
5. Compute the exact area of the region bounded by  $y = \frac{1}{x\sqrt{x^2+9}}$ ,  $y = 0$ ,  $x = \sqrt{3}$  and  $x = 3$ .
6. Compute  $\int \frac{x}{(x-1)(x-2)} dx$ . You can use an integral table only to check your answer.
7. Compute  $\int \frac{x}{(x-3)^2} dx$ . You can use an integral table only to check your answer.
8. Compute  $\int \frac{1}{x^2-16} dx$ . You can use an integral table only to check your answer.