

## Math 133 — Quiz 5A

(1) (4 points) Quickly, from memory, write the integral:

$$(a) \int \frac{dx}{\sqrt{4-x^2}} = \sin^{-1}\left(\frac{x}{2}\right) + C \quad (b) \int \sinh u \, du = \cosh(u) + C$$

(2 pts) (2 pts)

(2) (4 points) Find  $\int \frac{dr}{r^2 - 4r + 11}$ . =  $\int \frac{dr}{(r-2)^2 + 7}$  complete square (1 pt.)

$u = r-2$   
 $du = dr$   $\rightarrow$  =  $\int \frac{du}{u^2 + (\sqrt{7})^2}$  substitute (1 pt.)

=  $\frac{1}{\sqrt{7}} \tan^{-1}\left(\frac{u}{\sqrt{7}}\right) + C$  integrate (1 pt.)

=  $\frac{1}{\sqrt{7}} \tan^{-1}\left(\frac{r-2}{\sqrt{7}}\right) + C$   $u = r-2$  and  $+C$  (1 pt.)

(3) (4 points) Find  $\int x \sec^2(4x) \, dx$ .  $\left[ \begin{array}{l} u = x \\ du = dx \end{array} \right.$   $dv = \sec^2(4x) \, dx$

by parts (+2)  $v = \frac{1}{4} \tan(4x)$

=  $\frac{x}{4} \tan(4x) - \int \frac{1}{4} \tan(4x) \, dx$

=  $\frac{x}{4} \tan(4x) - \frac{1}{16} \int \tan(u) \, du$

=  $\frac{x}{4} \tan(4x) - \frac{1}{16} \ln|\sec(4x)| + C$

$u = 4x$   
 $du = 4 \, dx$   
 $\frac{1}{4} du = dx$  substitute +1

from chart of known integrals  
1 pt.