MATH 253 Week 6

This does **NOT count for credit**

1. If we let $2x + 1 = 11\tan\theta$, then $\int \dfrac{1}{4x^2 + 4x + 122}dx$ becomes:

a $11/2 \int \sec\theta d\theta$.

b $1/22 \int d\theta$.

c $11/2 \int \cos\theta d\theta$.

d $1/22 \int \cos\theta d\theta$.

e $1/2 \int \sec\theta d\theta$.

2. If we let $3x - 2 = 5\sin\theta$, then $\int \dfrac{1}{\sqrt{21 + 12x - 9x^2}}dx$ becomes:

a $1/3 \int \sec\theta d\theta$.

b $5/2 \int \sec\theta d\theta$.

c $1/3 \int \cos\theta d\theta$.

d $5/3 \int \cos\theta d\theta$.

e $1/3 \int d\theta$.

In 3-6 determine whether the integrals are convergent or divergent.
If convergent find their values.

3. $\int_0^1 \dfrac{x}{x^2 - 1} \, dx.$

4. $\int_0^\infty \dfrac{x^2}{x^3 + 1} \, dx.$

5. $\int_0^\infty x^2 e^{-2x} \, dx.$

6. $\int_0^2 \dfrac{1}{x^3 - 1} \, dx.$

7. Discuss the convergence/divergence of $\displaystyle\int_0^\infty \frac{|\cos x|}{1 + e^x}\,dx$.

8. Discuss the convergence/divergence of $\displaystyle\int_e^\infty \frac{1}{x(\ln(x))^x}\,dx$.