Quiz 1 Key
MAC 2312

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S Hudson

1. (60 pts) Compute the integrals.

(a) $\int_1^4 |x-2|\ dx$

(b) $\int_0^1 e^{2x}\ dx$

(c) $\int \frac{1}{1+x^2}\ dx$

2. (20 pts) Answer each with True or False. You do not have to explain these.

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The area between the curves $y=2x$ and $y=x^2$ is $A=\int_0^2 2x-x^2\ dx$.

$\sum_{k=1}^{100} k^2 = 5050$.

3. (20 pts) Find the average value of $f(x)=x^2-1$ on the interval $[0,\sqrt{2}]$.

Remarks, Answers: The average grade among the top 20 was approx 65/100 (up from 60/100 among the same students on Quiz 0), a fairly normal result. The two highest scores were 97 and 95. No official scale, but a low C would be approx 52.

1a) 5/2. A sketch shows two triangles with areas 1/2 and 2, but geometry won't always work. The general method uses the abc-theorem, and $\int_1^2 |x-2|\ dx = -\int_1^2 x-2\ dx = \cdots 1/2$, etc.

1b) $(e^2-1)/2$ from setting $u=2x$. Some people tried $u=e^x$ or $u=e^{2x}$ instead. These might work, but they seem a bit harder, and I don't think anyone succeeded with them.

Practice your technique and practice trial-and-error. You will need these skills later.

1c) $\tan^{-1} x + C$. This is a memorization problem that you should know from MAC 2311. If not, start memorizing these !

2) FTTF. We went over these quickly in class, but feel free to ask me about them.

3) $\frac{1}{\sqrt{2}} \int_0^{\sqrt{2}} x^2-1\ dx = \cdots = -1/3$.