SOLUTIONS

Math 122 **Fall 2008**

Quiz #1

Questions 1-4 are multiple-choice questions. Read each question carefully and circle the answer that seems best to you.

Questions 5 and 6 are longer questions. In each case, be careful to indicate your final answer **and show how you obtained it**. Answers with no supporting work will get no credit.

1. **(1 point)** Which of the following best summarizes the policy on late homework? **(CIRCLE ONE)**

(a) Homework is due at the start of recitation on Thursday. Late homework is never accepted after that.

(b) Homework is due at the start of recitation on Tuesday. If it is turned in after this but before noon on the following Wednesday it is accepted with a 50% penalty.

acceptable if it means the Wednesday immediately after the due date

Either acceptable

(c) Homework is due at the start of recitation on Tuesday. Late homework is never accepted after that.

(d) Homework is due at the start of recitation on Tuesday. If it is turned in after this but before noon on Wednesday it is accepted with a 50% penalty.

(e) Late homework is never a problem because you can drop the late homework scores.

2. **(1 point)** Each homework assignment consists of ten problems from the textbook. Which of the following statements best describes the problems that are graded? **(CIRCLE ONE)**

(a) Every homework problem that is assigned is graded on a 0-3 point scale.

(b) One of the ten problems is selected at random and graded on a 0-3 point scale.

(c) Only the hardest problem is selected for grading. This is graded on a 0-3 point scale.

(d) Five of the ten problems are selected and graded on a 0-3 point scale.

(e) The last five questions of every assignment are graded on a 0-3 point scale.

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3. **(1 point)** Which of the following best describes the expectations for written homework solutions? **(CIRCLE ONE)**

(a) Solutions should be written by each individual student, be complete, clearly indicate the final answer and show how this answer was obtained.

(b) The final answer should always be circled so it is easy to find. Nothing outside of te circle will be considered by the grader.

(c) If the final answer is correct, you always get full credit (3 out of 3).

(d) If you couldn't solve a problem then it is okay to copy someone else's solution for that particular problem only.

(e) If you didn't have time to do the homework then it is okay to copy someone else's from time to time.

4. **(1 point)** Suppose at the end of the semester the average of your homework, quiz and test scores came out to be 79.2. Which of the following would best describe your final grade situation? **(CIRCLE ONE)**

(a) You will get a final grade of "A" in Math 122.

(b) You will get a final grade of "B" in Math 122.

(c) You are guaranteed to get a grade of at least "C" in Math 122 but might get a "B" if the grade cut-offs were lowered during the semester.

(d) You will guaranteed to get a grade of at least "B" in Math 122 but could get a "A" if the grade cut-offs were lowered during the semester.

(e) You will guaranteed to get a grade of at least "C" in Math 122 but could get a "A" if the grade cut-offs were lowered a lot during the semester.

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5. **(3 points)** Say which of the following techniques would be most helpful in evaluating the integral given below.

(I) u-substitution. (II) Integration by Parts.

Then use the technique you have chosen to calculate the indefinite integral. Show all of your work – **no work = no credit**.

$$\int \frac{x}{\sqrt{1+x^2}}\,dx.$$

NOTE: You may not use your calculator on this problem.

u-substitution is probably the easiest way to evaluate the indefinite integral.

① Choose u: $u = 1 + x^2$

② Calculate $\frac{du}{dx}$: $\frac{du}{dx} = 2x$

③ Make dx the subject: $dx = \frac{du}{2x}$

④ Substitute into integral:

$$\int \frac{x}{\sqrt{1+x^2}}\,dx = \int \frac{x}{\sqrt{u}}\,\frac{du}{2x}$$

$$= \int \frac{1}{2} u^{-1/2}\,du$$

$$= u^{1/2} + C$$

$$= \sqrt{1+x^2} + C.$$

Final answer: $\int \frac{x}{\sqrt{1+x^2}}\,dx = \sqrt{1+x^2} + C$

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6. **(3 points)** In this problem $f(x)$ is a function. All that you can assume about $f(x)$ is that:

$$f(1) = 7 \qquad f(5) = 10$$

$$\int_1^5 f(x)dx = 14$$

Evaluate the following integral and show all of your work – **no work = no credit.**

$$\int_1^5 (2x + f(x)) \cdot f'(x)dx$$

$$\int_1^5 (2x + f(x)) \cdot f'(x)\,dx = \int_1^5 2x \cdot f'(x)\,dx + \int_1^5 f(x) \cdot f'(x)\,dx.$$

Integrate this using integration by parts.

Integrate this using u-substitution.

$$\int_1^5 2x \cdot f'(x)\,dx = \Big[\, 2x \cdot f(x) \Big]_1^5 - \int_1^5 2 \cdot f(x)\,dx$$

$u = 2x \qquad v' = f'(x)$

$u' = 2 \qquad v = f(x)$

$$= 2(5)(10) - 2(1)(7) - 2(14)$$

$$= 58.$$

$$\int_1^5 f(x) \cdot f'(x) \cdot dx = \int_7^{10} u\,du = \Big[\tfrac{1}{2} u^2 \Big]_7^{10}$$

$u = f(x)$

$u' = f'(x)$

$dx = \dfrac{du}{f'(x)}$

$$= \tfrac{1}{2}(100 - 49)$$

$$= 51/2$$

Putting these together gives:

$$\int_1^5 (2x + f(x)) \cdot f'(x) \cdot dx = 58 + 51/2 = 83.5$$