

MATH325: Discrete Mathematics II
Quiz q080402Name: nweadick1@cougars.ccis.eduScore:

Open `main.tex` and enter answers (look for `answercode`, `answerbox`, `answerlong`). Turn the page for detailed instructions. To rebuild and view pdf, in bash shell execute `make`. To build a gzip-tar file, in bash shell execute `make s` and you'll get `submit.tar.gz`.

This is a 10-min quiz.

Q1. Let

$$\frac{1+x+x^2+x^3}{1+2x+3x^2} = P(x) + \frac{Q(x)}{1+2x+3x^2}$$

where $P(x), Q(x)$ are polynomials with degree of $Q(x) < 2$ (by long division). Write down the coefficients of $P(x)$ and $Q(x)$ starting with the lowest degree. For instance if $P(x) = 2/3 - 3/4x$ and $Q(x) = 5x$, you write $2/3, -3/4; 0, 5$.

ANSWER:

(You only need to state the answer.)

Q2. Let

$$\frac{1+x}{(1+2x)(1+3x)} = \frac{A}{1+2x} + \frac{B}{1+3x}$$

State A and B . For instance if $A = 2$ and $B = 3/4$, you write $2, 3/4$.

ANSWER:

(You only need to state the answer.)

Q3. Let

$$\frac{1+x}{(1+7x)(1+3x)^2} = \frac{A}{1+7x} + \frac{B}{1+3x} + \frac{C}{(1+3x)^2}$$

State A, B, C . For instance if $A = 2, B = 3/4$ and $C = 0$, you write $2, 3/4, 0$.

ANSWER:

(You only need to state the answer.)

INSTRUCTIONS

In `main.tex` change the email address in

```
\renewcommand\AUTHOR{jdoe5@cougars.ccis.edu}
```

yours. In the bash shell, execute “`make`” to recompile `main.pdf`. Execute “`make v`” to view `main.pdf`. Execute “`make s`” to create `submit.tar.gz` for submission.

For each question, you’ll see boxes for you to fill. You write your answers in `main.tex` file. For small boxes, if you see

```
1 + 1 = \answerbox{}
```

you do this:

```
1 + 1 = \answerbox{2}
```

`answerbox` will also appear in “true/false” and “multiple-choice” questions.

For longer answers that needs typewriter font, if you see

```
Write a C++ statement that declares an integer variable name x.  
\begin{answercode}  
\end{answercode}
```

you do this:

```
Write a C++ statement that declares an integer variable name x.  
\begin{answercode}  
int x;  
\end{answercode}
```

`answercode` will appear in questions asking for code, algorithm, and program output. In this case, indentation and spacing is significant. For program output, I do look at spaces and newlines.

For long answers (not in typewriter font) if you see

```
What is the color of the sky?  
\begin{answerlong}  
\end{answerlong}
```

you can write

```
What is the color of the sky?  
\begin{answerlong}  
The color of the sky is blue.  
\end{answerlong}
```

For students beyond 245: You can put \LaTeX commands in `answerbox` and `answerlong`.

A question that begins with “T or F or M” requires you to identify whether it is true or false, or meaningless. “Meaningless” means something’s wrong with the statement and it is not well-defined. Something like “ $1+_2$ ” or “ $\{2\}^{\{3\}}$ ” is not well-defined. Therefore a question such as “Is $42 = 1+_2$ true or false?” or “Is $42 = \{2\}^{\{3\}}$ true or false?” does not make sense. “Is $P(42) = \{42\}$ true or false?” is meaningless because $P(X)$ is only defined if X is a set. For “Is $1 + 2 + 3$ true or false?”, “ $1 + 2 + 3$ ” is well-defined but as a “numerical expression”, not as a “proposition”, i.e., it cannot be true or false. Therefore “Is $1 + 2 + 3$ true or false?” is also not a well-defined question.

When writing results of computations, make sure it’s simplified. For instance write 2 instead of $1 + 1$. When you write down sets, if the answer is $\{1\}$, I do not want to see $\{1, 1\}$.

When writing a counterexample, always write the simplest.

Here are some examples (see `instructions.tex` for details):

1. T or F or M: $1 + 1 = 2$ T

2. T or F or M: $1 + 1 = 3$ F

3. T or F or M: $1+_2 =$ M

4. $1 + 2 =$ 3

5. Write a C++ statement to declare an integer variable named **x**.

`int x;`

6. Solve $x^2 - 1 = 0$.

Since $x^2 - 1 = (x - 1)(x + 1)$, $x^2 - 1 = 0$ implies $(x - 1)(x + 1) = 0$. Therefore $x - 1 = 0$ or $x = -1$. Hence $x = 1$ or $x = -1$.

7. Which is true? C

(A) $1 + 1 = 0$

(B) $1 + 1 = 1$

(C) $1 + 1 = 2$

(D) $1 + 1 = 3$

(E) $1 + 1 = 4$