**MATH 220** **Test 2** **Fall 2011**

**Name** _____ **NetID** _____

- Sit in your assigned seat (circled below).
- Circle your TA discussion section.
- Do not open this test booklet until I say *START*.
- Turn off all electronic devices and put away all items except a pen/pencil and an eraser.
- Remove hats and sunglasses.
- You must show sufficient work to justify each answer.
- While the test is in progress, we will not answer questions concerning the test material.
- Do not leave early unless you are at the end of a row.
- Quit working and close this test booklet when I say *STOP*.
- Quickly turn in your test to me or a TA and show your Student ID.

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- ▷ **BD1**, TR 11:00-12:50, Vicki Reuter
- ▷ **BD2**, TR 9:00-9:50, Tom Mahoney
- ▷ **BD3**, TR 10:00-10:50, Kyle Knee
- ▷ **BD4**, TR 2:00-2:50, Neha Gupta
- ▷ **BD5**, TR 12:00-12:50, Nate Orlow
- ▷ **BD6**, TR 9:00-10:50, Ser-Wei Fu
- ▷ **BD7**, TR 3:00-3:50, Chayapa Darayon
- ▷ **BD8**, TR 1:00-1:50, Eliana Duarte

- ▷ **DD1**, TR 11:00-11:50, Nate Orlow
- ▷ **DD2**, TR 10:00-10:50, Santiago Camacho
- ▷ **DD3**, TR 9:00-9:50, Sarah Loeb
- ▷ **DD4**, TR 12:00-12:50, Lisa Hickok
- ▷ **DD5**, TR 1:00-1:50, Lisa Hickok
- ▷ **DD6**, TR 1:00-2:50, Jennifer Wise
- ▷ **DD7**, TR 8:00-8:50, Sarah Loeb
- ▷ **DD8**, TR 1:00-1:50, Abdulla Eid

- ▷ **AD1**, TR 11:00-11:50, Abdulla Eid
- ▷ **AD2**, TR 2:00-2:50, Ilkyoo Choi
- ▷ **AD3**, TR 1:00-1:50, Ilkyoo Choi
- ▷ **AD4**, TR 9:00-9:50, Michael Santana
- ▷ **AD5**, TR 3:00-3:50, Santiago Camacho
- ▷ **AD6**, TR 4:00-4:50, Joe Nance
- ▷ **AD7**, TR 3:00-3:50, Neha Gupta

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| 263 | 264 | 265 | 266 | 267 | 268 | 269 | 270 | • | 271 | 272 | 273 | | | | | 278 | 279 | • | 280 | 281 | 282 | 283 | 284 | 285 | 286 | 287 |
| | 240 | 241 | 242 | 243 | 244 | 245 | 246 | • | 247 | 248 | 249 | 250 | 251 | 252 | 253 | 254 | 255 | • | 256 | 257 | 258 | 259 | 260 | 261 | 262 | |
| | 217 | 218 | 219 | 220 | 221 | 222 | 223 | • | 224 | 225 | 226 | 227 | 228 | 229 | 230 | 231 | 232 | • | 233 | 234 | 235 | 236 | 237 | 238 | 239 | |
| | 194 | 195 | 196 | 197 | 198 | 199 | 200 | • | 201 | 202 | 203 | 204 | 205 | 206 | 207 | 208 | 209 | • | 210 | 211 | 212 | 213 | 214 | 215 | 216 | |
| | 171 | 172 | 173 | 174 | 175 | 176 | 177 | • | 178 | 179 | 180 | 181 | 182 | 183 | 184 | 185 | 186 | • | 187 | 188 | 189 | 190 | 191 | 192 | 193 | |
| | 148 | 149 | 150 | 151 | 152 | 153 | 154 | • | 155 | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | • | 164 | 165 | 166 | 167 | 168 | 169 | 170 | |
| | • | • | • | • | • | • | • | • | 139 | 140 | 141 | 56 | 143 | 144 | 13 | 146 | 147 | • | • | • | • | • | • | • | • | |
| | 116 | 117 | 118 | 119 | 120 | 121 | 122 | • | 123 | 124 | 125 | 126 | 127 | 132 | 145 | 130 | 131 | • | 16 | 133 | 134 | 135 | 136 | 137 | 138 | |
| | 93 | 94 | 95 | 96 | 97 | 98 | 99 | • | 100 | 101 | 102 | 103 | 128 | 105 | 106 | 107 | 108 | • | 109 | 110 | 111 | 112 | 113 | 114 | 115 | |
| | 70 | 71 | 72 | 73 | 74 | 75 | 76 | • | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | • | 86 | 87 | 88 | 89 | 90 | 91 | 92 | |
| | 47 | 48 | 49 | 50 | 51 | 52 | 53 | • | 54 | 55 | 104 | 57 | 58 | 59 | 60 | 61 | 62 | • | 63 | 64 | 65 | 66 | 67 | 68 | 69 | |
| | 24 | 25 | 26 | 27 | 28 | 29 | 30 | • | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | • | 40 | 41 | 42 | 43 | 44 | 45 | 46 | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | • | | | | | | | | | | • | 17 | 18 | 19 | 20 | 21 | 22 | 23 | |

FRONT OF ROOM – 314 Altgeld Hall

1. (8 points) Find $g'(t)$ given that $g(t) = 5t^6 - 4t^3 + 10t - e^2$

2. (8 points) Find $\dfrac{dv}{dt}$ given that $v = 5t^4 \tan^{-1} t$

3. (8 points) Find $f'(x)$ given that $f(x) = \dfrac{\ln x}{x^3 + 4}$

4. (8 points) Find $h'(t)$ given that $h(t) = \sin\left(e^{2t}\right)$

5. (8 points) Find the slope of the line tangent to the curve $x^2y^3 = 3x - 2y$ at the point $(2, 1)$.

6. (8 points) A function $f(x)$ has the following second derivative.

   $f''(x) = (x+5)^2 - 4$

   What is the largest open interval upon which the graph of $f(x)$ is concave down?

7. (8 points) A particle moves along the curve given below. As the particle passes through the point $(3, 4)$, its $x$-coordinate increases at a rate of 15 cm/s. How fast is the distance from the particle to the origin changing at this instant?

$$y = \frac{4}{9}x^2$$

8. (8 points) A function $g(x)$ has the following derivative.

$$g'(x) = 5e^x(x-1)^2(x-2)^3(x-3)^4$$

Determine the $x$-value for each local maximum and local minimum on the graph of $g(x)$.

9. (12 points) A ball is tossed straight up with an initial velocity of 16 feet per second. The ball is 5 feet above the ground when it is released. Its height at time $t$ is given by

$$h = -16t^2 + 16t + 5$$

What is the ball's maximum height?

10. (8 points each) Evaluate the following limits.

(a) $\lim_{x \to 1} \dfrac{x^2 + 3x - 4}{\sin(x - 1)}$

(b) $\lim_{x \to \pi/4} \dfrac{4x - \pi}{4 \tan x}$

(c) $\lim_{x \to \infty} \left(1 - \dfrac{2}{x}\right)^{3x}$

**Students – do not write on this page!**

1. (8 points) _____

2. (8 points) _____

3. (8 points) _____

4. (8 points) _____

5. (8 points) _____

6. (8 points) _____

7. (8 points) _____

8. (8 points) _____

9. (12 points) _____

10a. (8 points) _____

10b. (8 points) _____

10c. (8 points) _____

**TOTAL (100 points)** _____