

Midterm II

Saturday, June 55, 2038

MATH 104

7:75 – 8:75 PM Founders Auditorium

Instructions: Show all work. Failure to show work may result in loss of credit. Write your solutions in the space provided on the *answer sheets*. Do *not* hand in scratch paper. There are eleven questions. You may use your graphing calculators (*not* those with CAS capabilities!) for all questions, but your answers must be exact, not just decimal approximations. Please remember to *simplify* your answers. Some partial credit *may* be given. **Good Luck!**

- 1) Calculate i^{438} . Express the result in standard $a + bi$ form.
- 2) Calculate $\frac{3+i}{2+5i}$. Express the result in standard $a + bi$ form.
- 3) Construct a cubic equation in x with the following solutions: 3, 5, -1 . Simplify the answer.
- 4) Graph $y = 5x^3 + 8x^2 - 9x + 2$. Use this graph to factor $5x^3 + 8x^2 - 9x + 2$ completely.
- 5) Factor completely: $x^3 + 7x^2 + 7x + 1$.
- 6) Factor completely: (a) $64y^6 - 1$; (b) $4abx^2 + 7abx - ab$.
- 7) Solve algebraically: (a) $5x^2 - 6x + 2 = 0$; (b) $2x^3 + 7x^2 + 3x = 0$.
- 8) Factor completely: $6x^2 + 7xy - 5y^2$.
- 9) The profit P (in dollars) is given by $P(x) = -100x^2 + 14,000x - 240,000$, when x units are produced and sold. Graph $P(x)$ and use the graph to determine the following:
(a) Overhead costs; (b) Break-even values; (c) Maximum profit that can be made and the number of units to sell to create this profit.
- 10) Find two consecutive even integers whose product is 288.
- 11) Solve: (a) $-x^2 + 2x + 8 \leq 0$; (b) $x^2 - 11 < 0$.

Points: 7, 7, 7; 7, 7, 7+7, 7+7; 7, 3+3+3, 7, 7+7.

You are welcome to keep this *Questions sheet* for your files.