MA121 Mock Exam

Answers

(Full Solutions will NOT be posted;
use the MaSt's drop-in help centre, in LH1018, if you have any questions.)

**** Please remember that the mock test was meant as a means of providing an extra set of practice questions and basis for a review class. Do not study for the exam based solely on the topics covered by the mock test! Go back through notes/labs/homework to ensure you have reviewed all concepts discussed in the course.

1. (a) —— (use known equivalencies)

   (b) $(p \wedge q \wedge r) \vee (p \wedge q \wedge \tilde{} r) \vee (p \wedge \tilde{} q \wedge \tilde{} r) \vee (\tilde{} p \wedge q \wedge \tilde{} r) \vee (\tilde{} p \wedge \tilde{} q \wedge \tilde{} r)$

2. (a) statement is true (contrapositive)

   (b) statement is true (direct) (c) statement is true (direct, or contrapositive)

   (d) statement is true (vacuous) (e) disprove with counterexample

   (f) statement is true (constructive, or contradiction)

3. ——

4. ——

5. (a) direct,or constructive proof (b) direct proof

6. (a) —— (b) $[2]_{13}$ (c) $[4]_{13}$

7. ——

8. no [$(2\ 345\ 678)^{8\ 765\ 432} + 1 \equiv 2 \pmod 9$]

9. $x = -4$, $y = 11$

10. (a) $\dfrac{20-\sqrt{3}}{28} + \dfrac{5+4\sqrt{3}}{28}i$ (b) $31 + 2i$ (c) —— [compare imaginary parts]

11. $\dfrac{1}{256} - \dfrac{1}{256}i$ $\left[= 2^{-15/2} e^{i(7\pi/4)}\right]$

12. (i) $\varnothing$ (ii) $\left\{\sqrt{2}+\sqrt{2}i,\ -\sqrt{2}+\sqrt{2}i,\ -\sqrt{2}-\sqrt{2}i,\ \sqrt{2}-\sqrt{2}i\right\}$