

MAT 114 Spring 2005 Final Answer Key

Note: Problems marked N/A are not on this year's syllabus (Spring 2007)

True/False questions (True=T; False=F)

1. F; 2. T, local max; 3. F; 4. T, local min; 5. T, saddle point; 6. F; 7. T; 8. F; 9. T; 10. N/A

Multiple Guess

1. B; 2. C; 3. A; 4. D; 5. F; 6. D; 7. B; 8. A; 9. C; 10. E; 11. N/A; 12. C; 13. missing; 14. D.

Free response

1. a) $P'' = 2P(2 - P)(4 - P)$, $P''(0) = 6$.

b) Only graph iii) could be the graph of $P(t)$, being both increasing and concave upwards.

c) The graph of $P(t)$ cannot look like either graph. It cannot look like graph 1), because P is increasing in $P < 4$, and it cannot look like graph 2), because P is decreasing if $P > 4$.

d) The graph of P is increasing, approaching asymptotically the line $P = 4$. By part a), it is concave upward if $P < 2$ and concave downward if $P > 2$, with an inflexion point at $P = 2$.

2.

$$y(t) = e^{t/2} \left(\cos \frac{\sqrt{7}}{2}t + \frac{1}{\sqrt{7}} \sin \frac{\sqrt{7}}{2}t \right)$$

3. Answer: $r = h/2 = 10/\sqrt{\pi}$

4.

$$y(t) = \frac{1}{144} [8x^2 + 8x + 1 + e^{4x}(141 - 143 \cdot 4x)]$$

5. N/A.