MA129 Mock Midterm – Answers

(Full Solutions will NOT be posted;
use the MAC's drop-in help centre 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 midterm 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) $\begin{bmatrix} 5 & -12 & 11 \\ -6 & 8 & -5 \end{bmatrix}$ (b) $\begin{bmatrix} -3 & -10 & -6 \\ -24 & 0 & 7 \end{bmatrix}$

2. (a) $8x^{14}y^4$ (b) $\dfrac{x\,(x-2)\,(2x-1)}{3\,(x-1)\,(x^2-3x-2)}$

3. $x \in [-10, 0) \cup (5, \infty)$

4. Change system of equations to:
$$\begin{aligned} 3x - 2y + z &= 2 \\ 4x - 5z &= -1 \\ -10x + \mathbf{4y} + 8z &= 4 \end{aligned}$$
Sol'n: $(x, y, z) = \left(\frac{3}{2}, \frac{39}{20}, \frac{7}{5}\right)$

5. $F = \$62,\ \ R = \$90/hr$

6. $y = -\dfrac{3}{4}x + \dfrac{9}{4}$

7. (a) $x = 1, 5$ (b) $(3, -8)$

8. (a) $D_f : (-\infty, -3) \cup (-3, 3) \cup (3, \infty),\quad D_g : (-\infty, 4]$

   (b) $f\,(2+h) = \dfrac{h+7}{(h+5)\,(h-1)}$ (c) $f\,(g\,(x)) = \dfrac{\sqrt{4-x}+5}{-\,(x+5)},\ \ f\,(g\,(-12)) = \dfrac{9}{7}$

9. (a) $\dfrac{11}{4}$ (b) $\dfrac{1}{2}\left(\ln\dfrac{23}{4} + 1\right)$ (c) 81 (d) $-2 + 2\sqrt{3}$

10. ——

11. (a) $B;\ 0$ (b) (i) 1 (ii) 0

12. (a) $f'\,(x) = \dfrac{3}{2}x^{1/2} - x^{-1/2} - \dfrac{5}{2}x^{-3/2}$

    (b) $g'\,(x) = 12\,(2x-3)^5 \ln\left(3x^2 - x + 4\right) + \dfrac{(6x-1)\,(2x-3)^6}{3x^2 - x + 4}$

    (c) $h'\,(x) = \dfrac{\left(3x^2 e^{x^3} + 4\ln 2 \cdot 2^{3-4x}\right)\left(x^2+1\right) - (2x)\left(e^{x^3} - 2^{3-4x}\right)}{\left(x^2+1\right)^2}$