Name:

Student No.: _

Group A

For each of the following problems, find the correct answer (tick as appropriate!). No justifications are required. Each problem has exactly one correct solution, which is worth 1 mark. q -x JHx signed 0 marks; there are no penalties. Incorrect solutions (including no answer, multiple answers, or unreadable answers) will be asx2+2xyty2

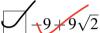
1. The value of $\int_{[0,1]^2} (x+y)^2 d^2(x,y)$ is





2. With $D = \{(x,y) \in \mathbb{R}^2; x^2 + y^2 \le 9, 0 \le x \le y\}$ the integral $\int_D y - x \, d^2(x,y)$ is equal to $y + 9\sqrt{2}$ $y + 9\sqrt{2}$ $y - 9\sqrt{2}$ $y - 9\sqrt{2}$

$$9+9\sqrt{2}$$





6. The function $f(x,y) = x^2 + 3xy + y^2$ has at (x,y) = (0,0)a non-critical point a local maximum

a local minimum

4-9 50

2=0

hyperboloid of 2 sheets

of (x,y)= (2xexy) ellipsoid elliptic paraboloid

8. The surface in \mathbb{R}^3 with equation xy + yz + z = 1 is a hyperboloid of 1 sheet hyperboloid of 2 sheet hyperboloid hyperboloid of 2 sheet hyperboloid of 2 sheet hyperboloid of 2 sheet hyperboloid hyperboloid of 2 sheet hyperboloid hyperboloid of 2 sheet hyperboloid of 2 sheet hyperboloid hyperboloid of 2 sheet hyperboloid hyperboloid of 2 sheet hyperboloid of 2 sheet hyperboloid hyperboloid of 2 sheet hyperboloid hyperboloid

(1,1,1) (-1,1,1) (1,-1,1) (1,1,-1)

 $\sqrt{12}$ The function z = g(x,y) implicitly defined by the equation $x^3y + y^3z + z^3x = -1$ and $g(-1,1) = 1 \text{ has } \nabla g(-1,1) \text{ equal to}$ $(1,-1) \qquad (1,-2)$

Time allowed: $40 \, \text{min} \left(- \right) \, , \, \left(\right) \, \right) \, \text{CLOSED BOOK}$

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31 Good luck!

$$\nabla y \left(-\frac{1}{1} \right) = \left(\frac{3x^{2}y + 2^{3}}{9x} \right) - \left(\frac{1}{15} \right) = \left(\frac{3x^{2}y + 2^{3}}{y^{2} + 32^{2}x} \right) \\
+ \frac{2x^{3}y^{2}}{y^{2} + 32^{2}x} \right) = \left(\frac{4}{-2} \right) - \left(\frac{1}{1} \right) \\
- \left(\frac{2x^{3}}{1} \right) = \left(\frac{2x^{3}}{-2} \right) - \left(\frac{2x^{$$