Calculus II, Spring 2022 (Thomas' Calculus Early Transcendentals 13ed), http://www.math.nthu.edu.tw/~wangwc/

Brief solutions to selected problems in homework week 8

1. Problem 2:

f(x,y) is diff. at (20, yo) 1 le $y) = \sqrt{\chi^{2} + y^{2}},$ ()(,,4)=10,0) is the lineor part? What ſ (0,0),hat -RN do Dart

Figure 1: Problem 2

 $Eg_{2}(f_{2}(\alpha, y)) = 2x_{1}$ 2 X+ linear (x,y)->10,0) 5 (),,v (),v (0,6) (0,6) $\chi^2_+ u$ 0 A -fx(0,U) (= to Iry fy(); (In

Figure 2: Problem 2, continued

If
$$f(x, y)$$
 is diff. at (x, y)
 $T = \int_{u, x_{0}, y_{0}} f = \int_{u} f(x_{0}, y_{0}) \cdot \hat{u}$
 $T = \int_{u, x_{0}, y_{0}} f = \int_{u} f(x_{0}, y_{0}) \cdot \hat{u}$
Bit $D - f_{3} = \cos^{3}\theta + \sqrt{f} \cdot \hat{u} = \cos\theta$
 f_{3} is not diff. at $(0, 0)$
 f_{3} is not diff. at $(0, 0)$
 $f_{4}(x, y) = 1 + 2x + 3y + 4x + 5xy + 6y^{2}$
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 $I_{5} f_{5}(x, y) = 1 + 2x + 3y + 4x + 5xy + 6y^{2}$
 $I_{5} f_{5}(x, y) = 1$

Figure 3: Problem 2, continued

2. (Extra credit) True or False?

If $f_x(0,0)$, $f_y(0,0)$ and $D_{(\cos\theta,\sin\theta),(0,0)}f$ all exist and

 $D_{(\cos\theta,\sin\theta),(0,0)}f = f_x(0,0)\cos\theta + f_y(0,0)\sin\theta,$

then f is differentiable at (0, 0).