Math 45, Fall 2020
September 30, Quiz 05

6.5

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Please show and explain your work where necessary. Good luck!!

1. (*8 points*) For each of the following differential equations, determine whether it is exact or not. (Use math to justify your answer.)

a. (*2 pts*) $x\,dx - y\,dy = 0$ → $x\,dx + (-y)\,dy = 0$

$M(x,y) = x$
$N(x,y) = -y$

$\frac{d}{dx}M = \frac{d}{dx}(x) = 1x^0 = 1$

$\frac{d}{dy}N = \frac{d}{dy}(-y) = -1y^0 = -1$

Not same
Not exact

b. (*3 pts*) $y\,dx + x\,dy = 0$

$M(x,y) = y \rightarrow \frac{d}{dx}(y) = 1$

$N(x,y) = x \rightarrow \frac{d}{dy}(x) = 1$

Exact

c. (*3 pts*) $(y - x)\,dx + (x - y)\,dy = 0$

$M(x,y) = (y-x) \rightarrow \frac{d}{dx}(y-x) \rightarrow \frac{d}{dx}(y) - \frac{d}{dx}(x) \rightarrow 0 - 1 = -1$

$N(x,y) = (x-y) \rightarrow \frac{d}{dy}(x-y) \rightarrow \frac{d}{dy}(x) - \frac{d}{dy}(y) \rightarrow 0 - 1 = -1$

exact

2. (*2 points*) Compute the integrating factor for the differential equation $xy' = 5 - 2y$.

yep

Need to review this section more...

Let me know if you have problems