Privily) can be united as two functions that contain only x and y respectively V

$$f(y) = \int_{-1}^{1} (1 + f(y) + f(y)) dx$$

$$= \int_{-1}^{1} (1 + f(y) + f(y)) dx$$

$$= \int_{-1}^{2} (1 + f(y) + f(y)) dx$$

$$= \frac{2}{3} (-x^{-1}) \begin{pmatrix} x = 0 \\ x = 1 \end{pmatrix}$$

$$= \frac{2}{3} (-x^{-1}) \begin{pmatrix} x = 0 \\ x = 1 \end{pmatrix}$$

$$= \frac{2}{3} (-0 + 1)$$

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Notice that the ranges of x and y are dependent on each other. So x Y are not independent

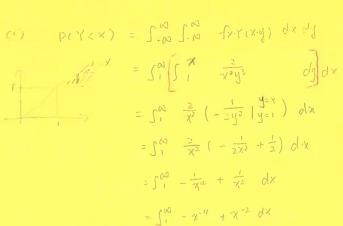
$$f(y) = \int_{-10}^{10} f(x) y(y) dx$$

$$= \int_{-10}^{\infty} \frac{3}{x^2 y^5} dx$$

$$= \frac{3}{y^3} \left(-\frac{1}{x}\right) \left(\frac{x}{x^2 y}\right)$$

$$= \frac{3}{y^4}$$

$$(x, frey) = \begin{cases} \frac{3}{y^4}, & 1 \le y < \infty \\ 0, & \text{otherwise} \end{cases}$$



= (0-3)+(-0+1)

Midtern 2, 2016

Question # 1

Xuehan Zhao

2. (a) let X be the # of times Fred stops Fred will be late if
$$X \ge 3$$
; $P(X \ge 3) = 1 - P(X = 0) - P(X = 1) - P(X = 2)$ XN Bin(8, 3)

$$P(X_{7}3) = 1 - {8 \choose 0} {\frac{1}{3}}^{8} - {8 \choose 1} {\frac{1}{3}}^{7} - {8 \choose 2} {\frac{1}{3}}^{2} {\frac{1}{3}}^{6}$$

- (b) Only one out of the first 6 lights was red Fred will be late if the last two lights are all red $P(last two all red) = (\frac{1}{3})^2 = |\frac{1}{9}|$
 - (c) The 31d red light was at stop 5, this is a NegBin $(3, \frac{1}{3})$ Let X be the stop that Fred met the 3rd red light $P(X=5) = {4 \choose 2} {(\frac{1}{3})^3} {(\frac{2}{3})^2} = 6 \cdot {(\frac{1}{27}) \cdot (\frac{1}{9})} = \frac{8}{81}$
 - (d) Fred has 3 stops left, and at each stop with $\frac{1}{3}$ probability of getterng red. this is Bin (3, $\frac{1}{3}$). The expected amount of red light in the next 3 stops is $3 \cdot \frac{1}{3} = 1$. The expected total amount of red lights that day is $3 + 1 = \frac{1}{4}$.

