Entropy and Mutual Information Basics

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1. Consider the following pmf.

	$p(x,y)$	y fish	cat	dog
	1	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{16}$
x	2	$\frac{1}{16}$	0	$\frac{1}{4}$
	3	0	$\frac{1}{8}$	$\frac{1}{16}$
	4	$\frac{1}{16}$	0	0

Find the following:

a) $H(X,Y)$

b) $H(X)$

c) $H(Y)$

d) $H(X|Y)$

e) $H(Y|X)$

f) $I(X;Y)$

g) $I(Y;X)$

h) Draw a Venn diagram with two partially overlapping circles, and label the diagram with the quantities above.