

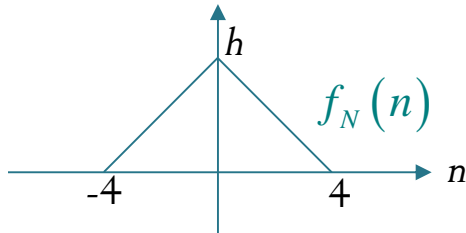
ECS 452: In-Class Exercise #20

Instructions

1. Separate into groups of no more than three persons. **The group cannot be the same as any of your former groups after the midterm.**
2. **Write down all the steps** that you have done to obtain your answers. You may not get full credit even when your answer is correct without showing how you get your answer.
3. **Do not panic.**

Date: 03/05 / 2019			
Name			ID (last 3 digits)
Prapun			5 5 5

In a binary antipodal signaling scheme, the message S is randomly selected from the alphabet set $\mathcal{S} = \{-3, 3\}$ with $p_1 = P[S = -3] = 0.6$ and $p_2 = P[S = 3] = 0.4$. The message is corrupted by an independent additive noise N whose pdf is shown below:

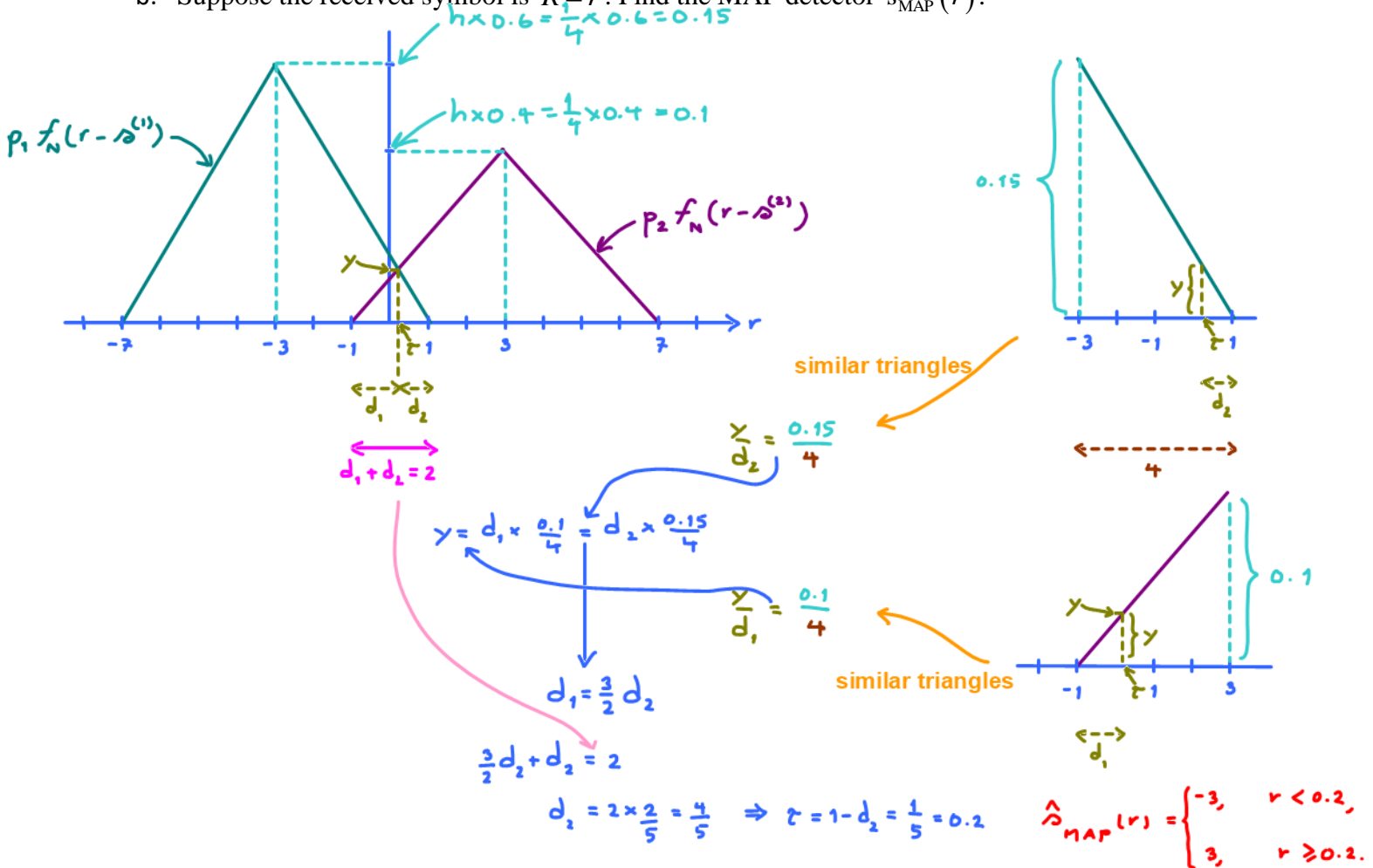


a. What is the value of h ?

To be a pdf, we need $\int_{-\infty}^{\infty} f_N(n) dn = 1$.

$$\frac{1}{2} \times 8 \times h = 1 \Rightarrow h = \frac{1}{4}$$

b. Suppose the received symbol is $R=r$. Find the MAP detector $\hat{s}_{MAP}(r)$.



c. (Optional) Evaluate the corresponding error probability of the MAP detector.

