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## Question 5 - 7

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You decide to move out of your college's dorms and get an apartment, and you want to discuss the budget with your roommate. You know that your monthly grocery bill  $G$  will depend on a number of factors, such as whether you are too busy to cook, whether you invite guests for meals frequently, how many special holiday meals you will cook, etc. In particular,  $G$  will have an approximate normal distribution with a variance of 2500 and a mean:

$$\mu = 300 + 10M - 100B + 50H$$

Where  $M$  is the number of meals to which you invite guests, and  $\mathbb{E}[M] = 8$ .  $B$  is a measure for how busy you are with 14.310X problem sets---assume it is  $U[0, 1]$ .  $H$  is a variable that takes on the value 1 for holiday months of November, December, and January and 0 otherwise.

### Question 5

1/1 point (graded)


What is the mean of  $G$  in a November, where  $M = 10$  and  $B = 0.5$ ?

✓ Answer: 400


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Finger Exercises due Nov 07, 2016 at 05:00 IST 

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Homework due Oct 31, 2016 at 05:00 IST 

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## Explanation

We have that:

$$\mathbb{E}[G|M, B, H = 1] = 300 + 10 * 10 - 100 * 0.5 + 50$$

$$\mathbb{E}[G|M, B, H = 1] = 300 + 100 - 50 + 50 = 400$$

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You have used 2 of 2 attempts

✓ Correct (1/1 point)

## Question 6

1 point possible (graded)

For a month chosen at random what is  $\mathbb{E}[G|M, B]$ ? (Select all that apply)

☐ a. It is given by  $\mathbb{E}[300 + 10M - 100B + 50]$

☐ b. It is given by  $\mathbb{E}[300 + 10M - 100B]$

☒ c. It is given by  $300 + 10\mathbb{E}[M] - 100\mathbb{E}[B] + 50 * \mathbb{E}[H]$  ✓

☒ d. It is given by  $312.5 + 10\mathbb{E}[M] - 100\mathbb{E}[B]$  ✓

☐ e. It is given by  $\mathbb{E} \left[ 300 + 10M - 100B + 50 * \frac{3}{4} \right]$

☒ f. It is given by  $\mathbb{E} \left[ 300 + 10M - 100B + 50 * \frac{1}{4} \right]$  ✓

✗

### Explanation

We have that

$$\mathbb{E} [G|M, B] = \mathbb{E} [300 + 10M - 100B + 50H]$$

$$\mathbb{E} [G|M, B] = 300 + 10\mathbb{E}[M] - 100\mathbb{E}[B] + 50 * \mathbb{E} [H]$$

$$\mathbb{E} [G|M, B] = 300 + 10\mathbb{E}[M] - 100\mathbb{E}[B] + 50 * \frac{1}{4}$$

$$\mathbb{E} [G|M, B] = 312.5 + 10\mathbb{E}[M] - 100\mathbb{E}[B]$$

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✗ Incorrect (0/1 point)

**Question 7**

1/1 point (graded)

What is  $E(G)$ ?

342.5

✓ Answer: 342.5

**Explanation**

We have that:

$$E[G | M, B] = 312.5 + 10 E[M] - 100 E[B]$$

$$E[G | M, B] = 312.5 + 10 * 8 - 100 * 0.5$$

$$E[G | M, B] = 312.5 + 80 - 50$$

$$E[G | M, B] = 342.5$$

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✓ Correct (1/1 point)



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