Exercise: From joint PDFs to the marginals

(5/5 points)

For each one of the following formulas, identify those that are always true. All integrals are meant to be from $-\infty$ to ∞.

$$f_{X,Z}(a,b) = \int f_{X,Y,Z}(a',b,c)\,da'$$

No ✔ **Answer:** No

$$f_{X,Z}(a,c) = \int f_{X,Y,Z}(a,b,c)\,db$$

Yes ✔ **Answer:** Yes

$$f_{X,Z}(a,b) = \int f_{X,Y,Z}(a,b,c)\,dc$$

No ✔ **Answer:** No

$$f_Y(a) = \int\int\int f_{U,V,X,Y}(a,b,c,s)\,db\,dc\,ds$$

No ✔ **Answer:** No

$$f_Y(a) = \int\int\int f_{U,V,X,Y}(s,c,b,a)\,db\,dc\,ds$$

Yes ✔ **Answer:** Yes

Answer:
In each case, we need to “integrate out" the arguments associated with random variables that do not appear on the left-hand side. Thus, the correct formulas are:

$$f_{X,Z}(a,c) = \int f_{X,Y,Z}(a,b,c)\,db$$

and

$$f_Y(a) = \int\int\int f_{U,V,X,Y}(s,c,b,a)\,db\,dc\,ds.$$

You have used 1 of 1 submissions

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