Exercise

Which one of these association rules has a support of **at least 50%** and the **highest** confidence?

a) Item 3 → Item 5
b) Item 4 → Item 5
c) Item 2 → Item 1
d) Item 5 → Item 3

	Item 1	Item 2	Item 3	Item 4	Item 5
Cart 1	0	0	1	0	1
Cart 2	1	1	0	1	0
Cart 3	1	1	0	0	1
Cart 4	1	1	0	1	0
Cart 5	1	1	1	0	1
Cart 6	0	0	1	0	1
Cart 7	0	0	0	0	0
Cart 8	1	0	0	1	1
Cart 9	1	1	0	0	0
Cart 10	1	0	0	1	1

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$$\text{SUPPORT} = \frac{\#\text{ of instances meeting criteria}}{\text{total \# of instances}}$$

$$\text{CONFIDENCE} = P(\{i_1 \wedge i_2 \wedge i_3\} \mid \{i_1 \wedge i_2\}) \text{ as an example.}$$

ex)

rule		support	confidence
$3 \rightarrow 5$	"3 infers 5"	.3	$\frac{5 \cap 3}{3} = 100\%$
$4 \rightarrow 5$		.2	$.2/.5$
$2 \rightarrow 1$		.5	$.5/.5$
$5 \rightarrow 3$		.3	$.3/.6$

- association rules are evaluated via basic unconditional & conditional probabilities.
  - unconditional → support
  - conditional → confidence
- a common application is to use confidence to determine if two retail goods are substitutes or complements.