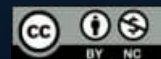




Bag A or Bag B?

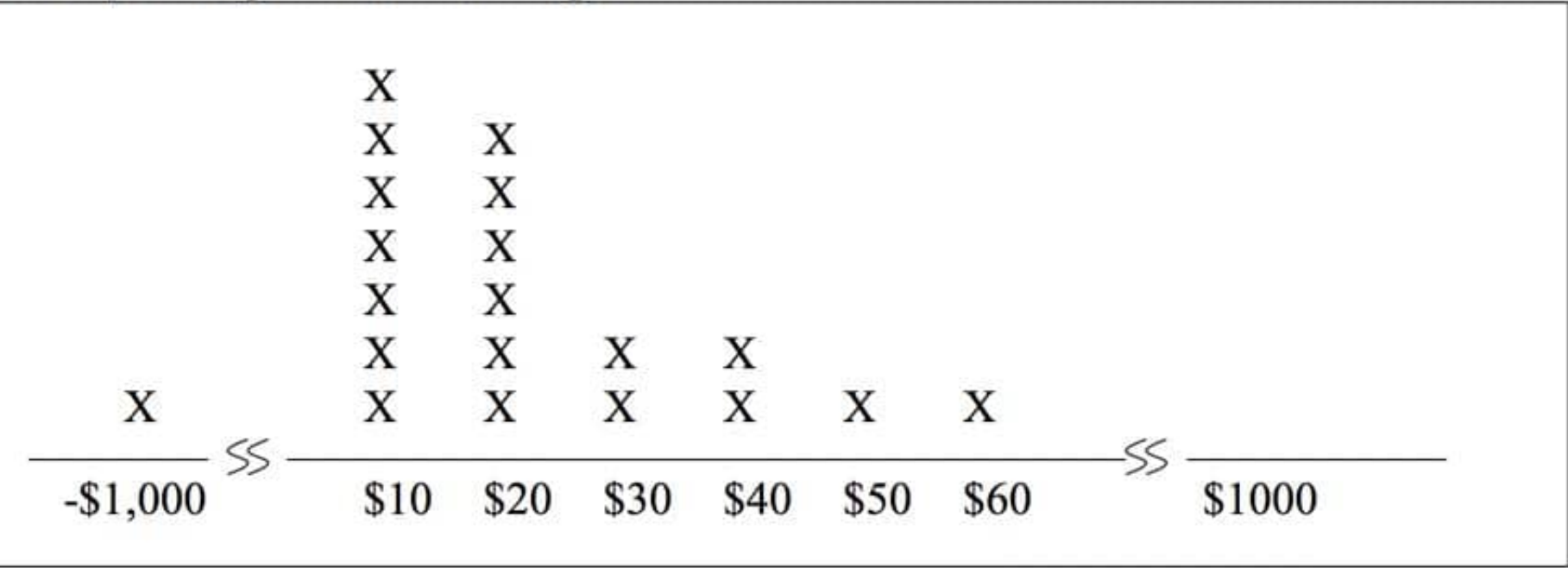
Brenda Gunderson



Bag A or Bag B?

BAG A		BAG B	
Face Value	Frequency	Face Value	Frequency
- 1,000	1		
10	7	10	1
20	6	20	1
30	2	30	2
40	2	40	2
50	1	50	6
60	1	60	7
		1,000	1
Total Value: -\$560		Total Value: -\$1890	

Frequency Plot for Bag A:



Select one voucher at random
from shown bag and decide
between two competing theories

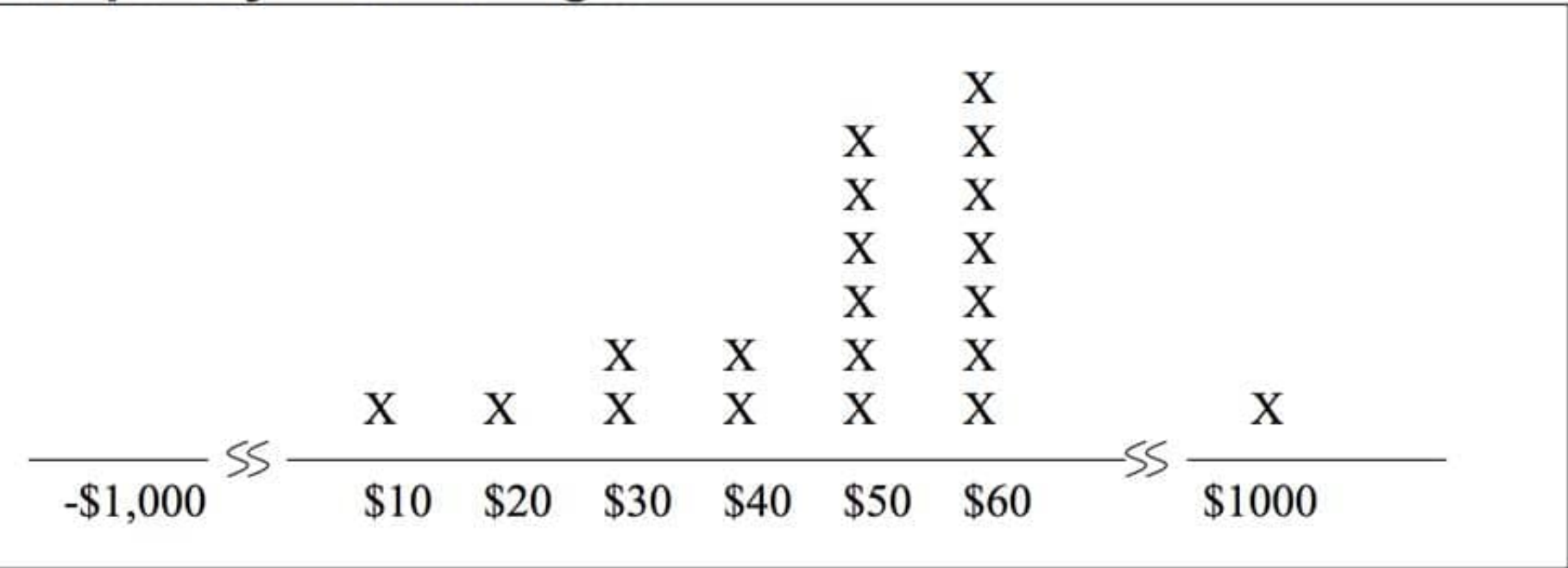
Null:

Shown bag is **Bag A**

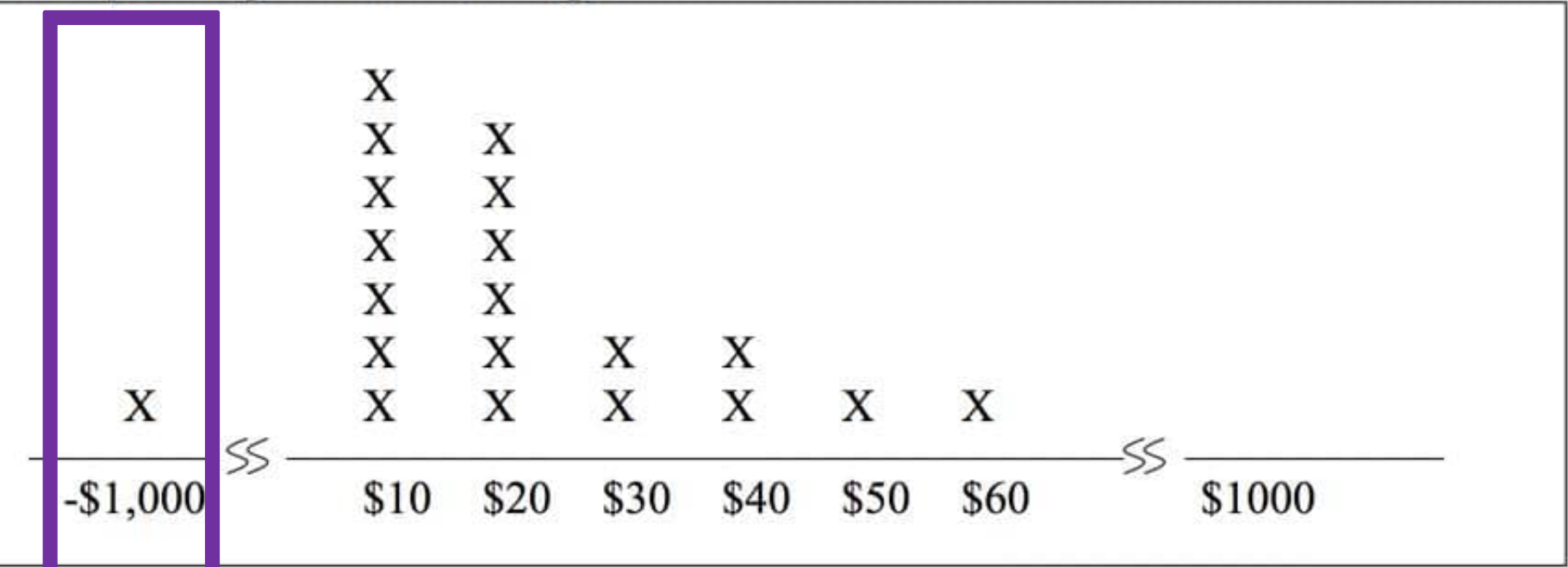
Alternative:

Shown bag is **Bag B**

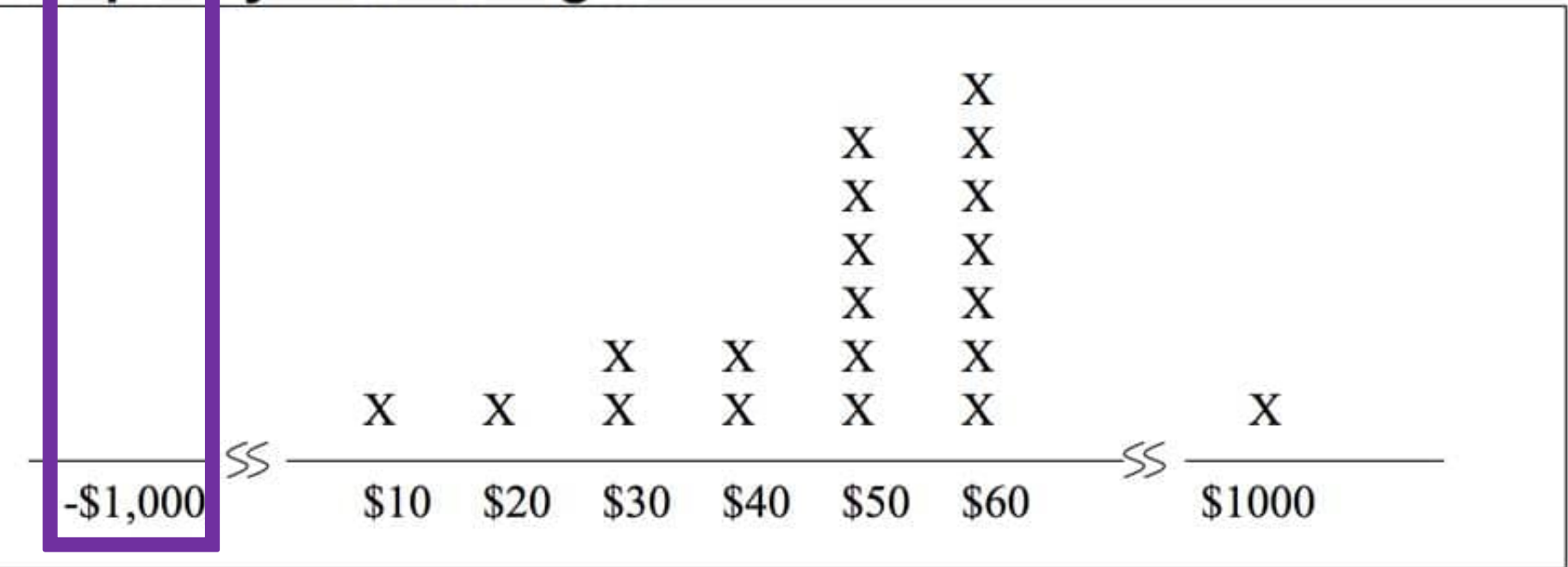
Frequency Plot for Bag B:



Frequency Plot for Bag A:



Frequency Plot for Bag B:



Null:

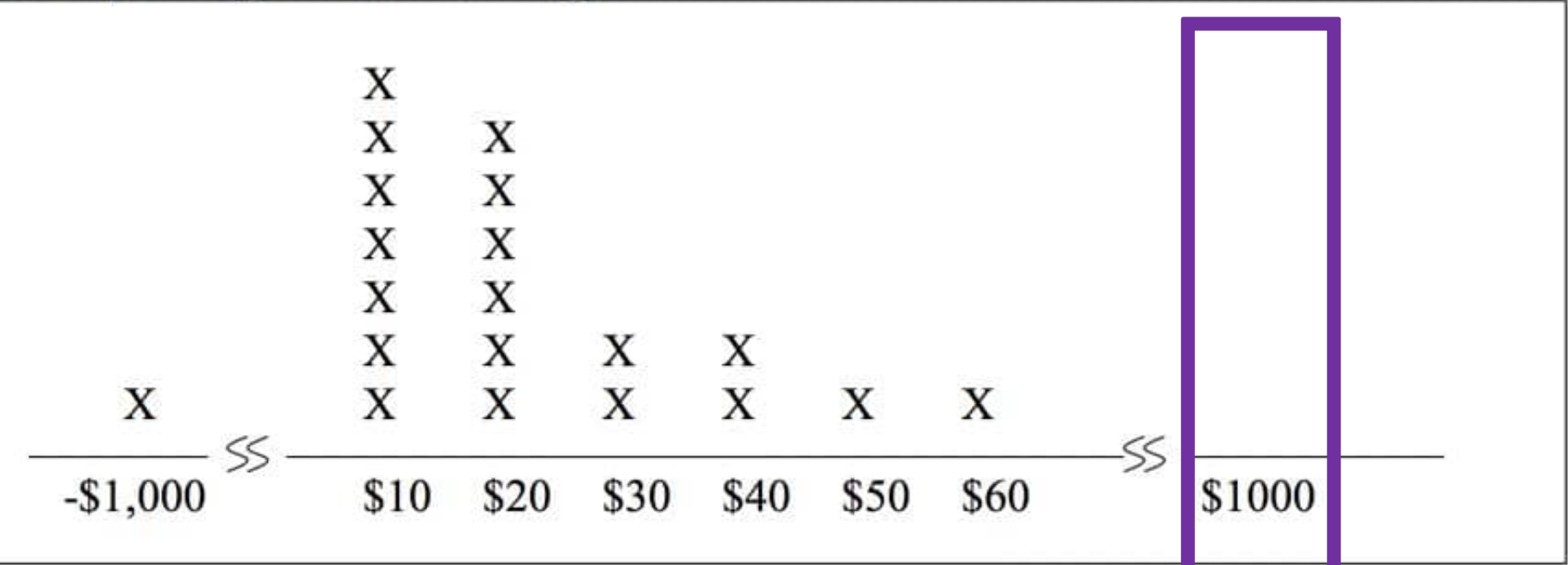
Shown bag is **Bag A**

Alternative:

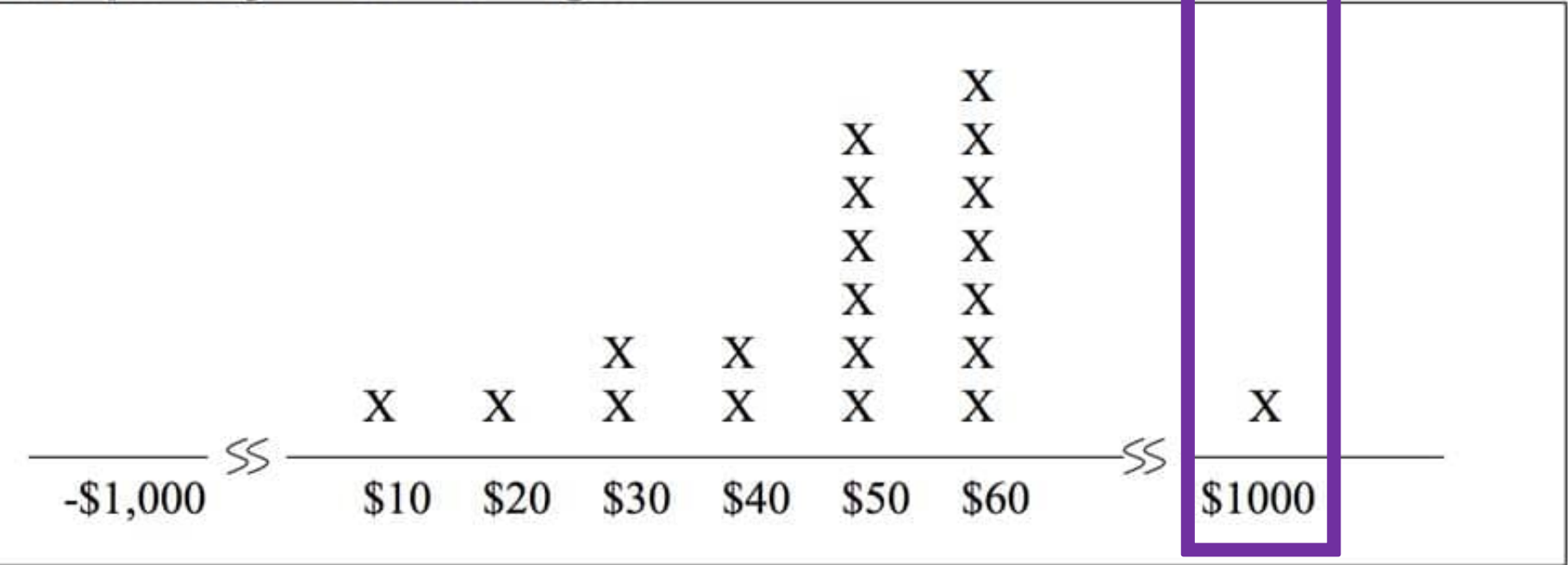
Shown bag is **Bag B**

What if select -\$1,000?

Frequency Plot for Bag A:



Frequency Plot for Bag B:

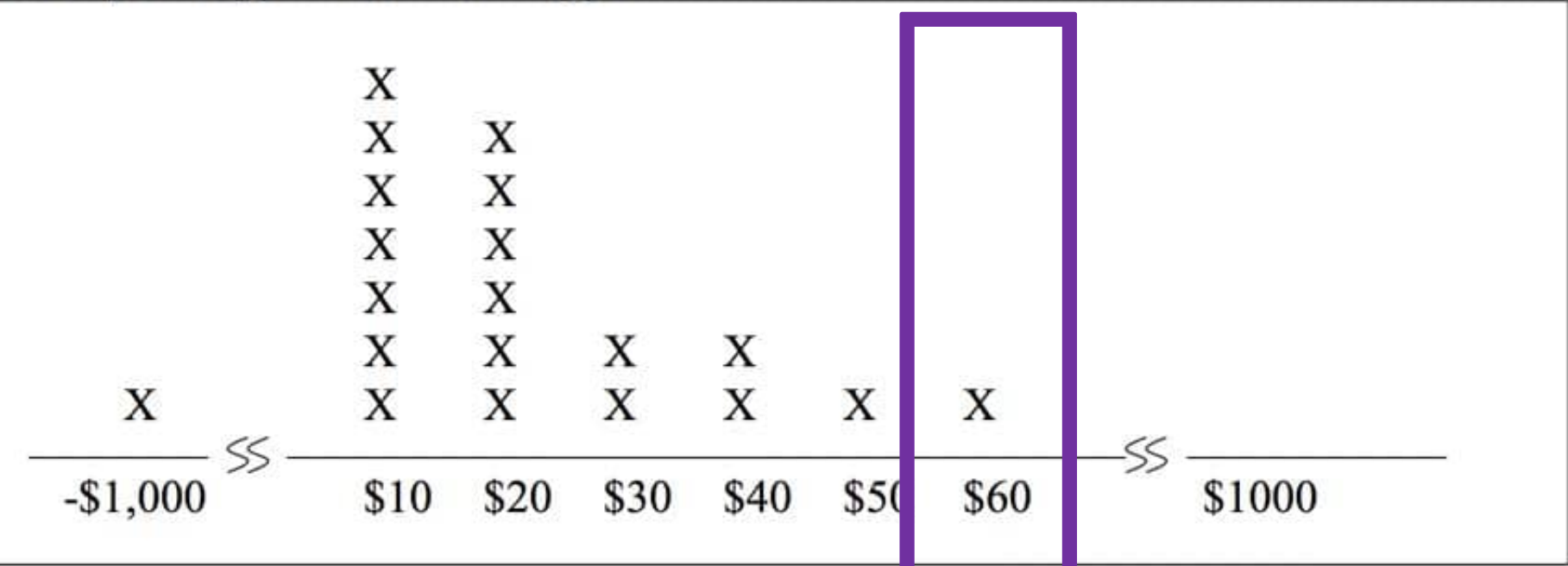


Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

What if select \$1000?

Frequency Plot for Bag A:



Frequency Plot for Bag B:

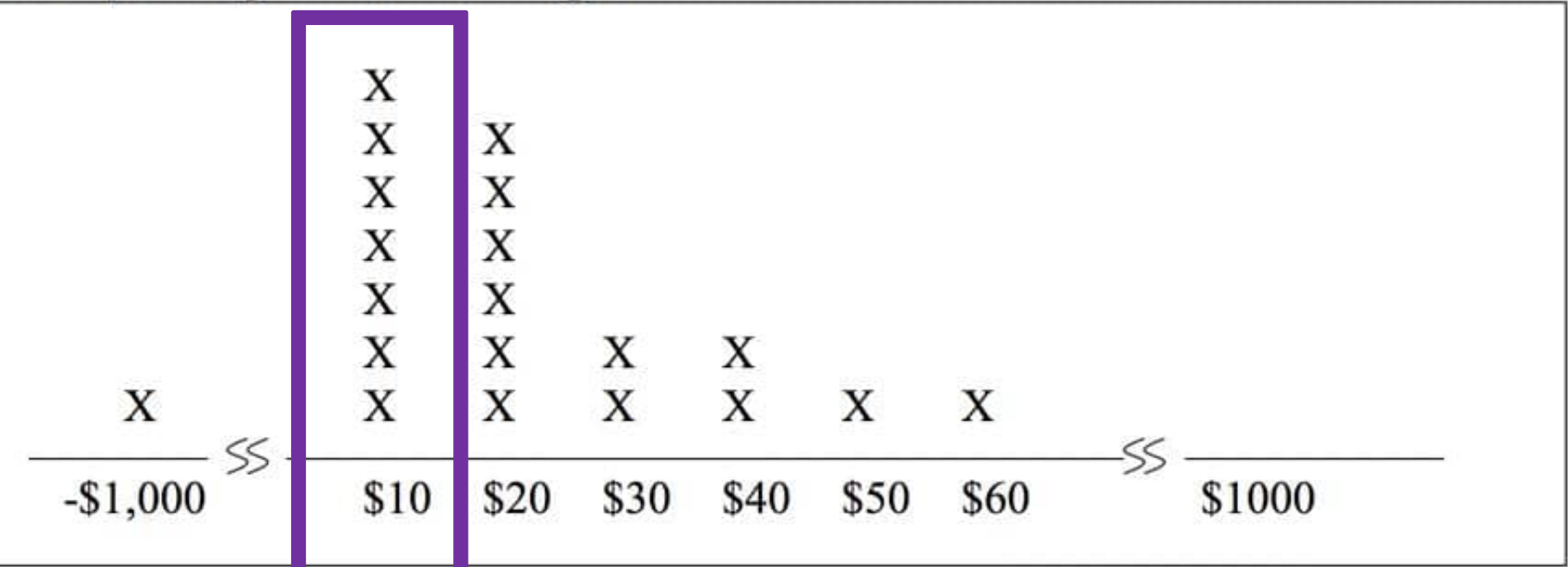


Null:
Shown bag is **Bag A**

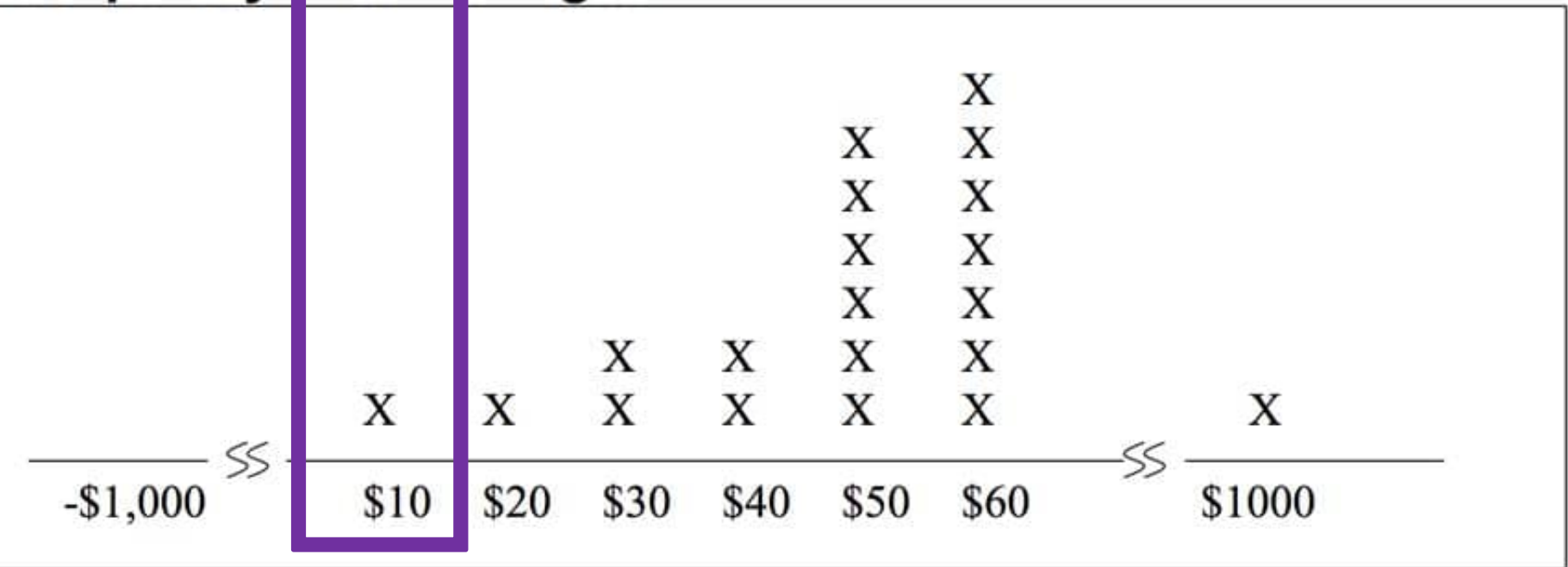
Alternative:
Shown bag is **Bag B**

What if select \$60?

Frequency Plot for Bag A:



Frequency Plot for Bag B:



Null:

Shown bag is **Bag A**

Alternative:

Shown bag is **Bag B**

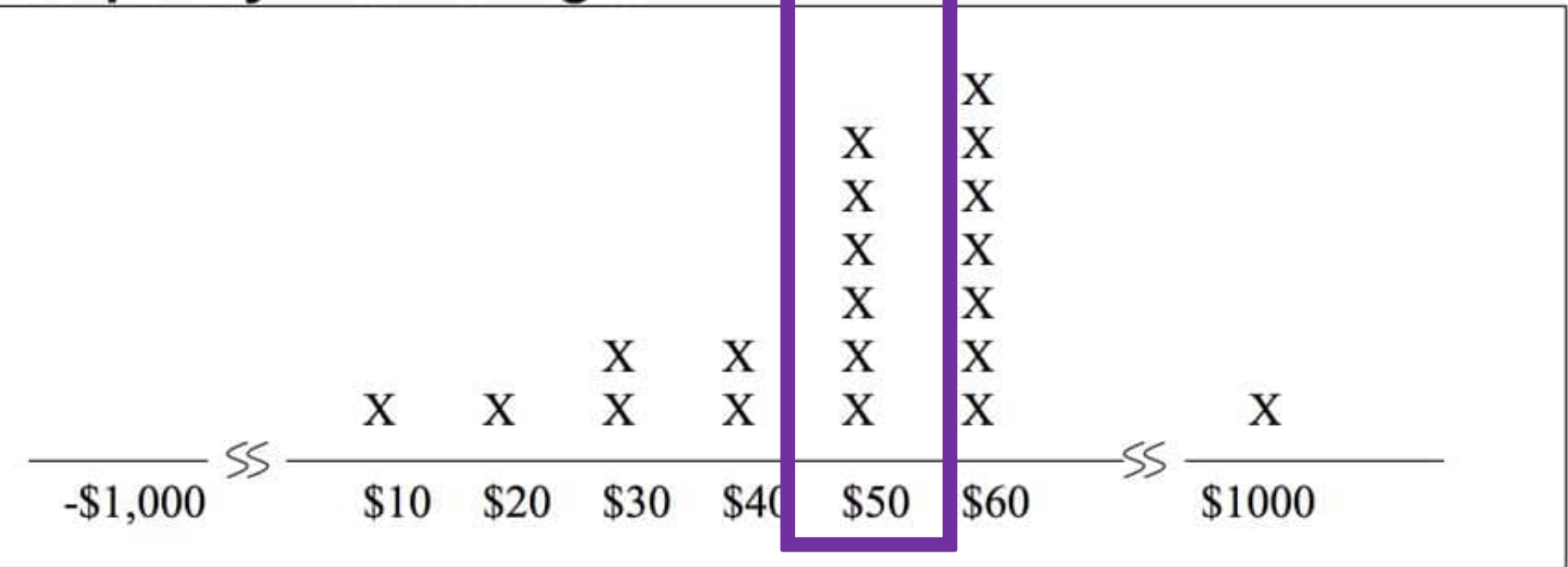
What if select \$10?

Starting for form
a decision rule

Frequency Plot for Bag A:



Frequency Plot for Bag B:

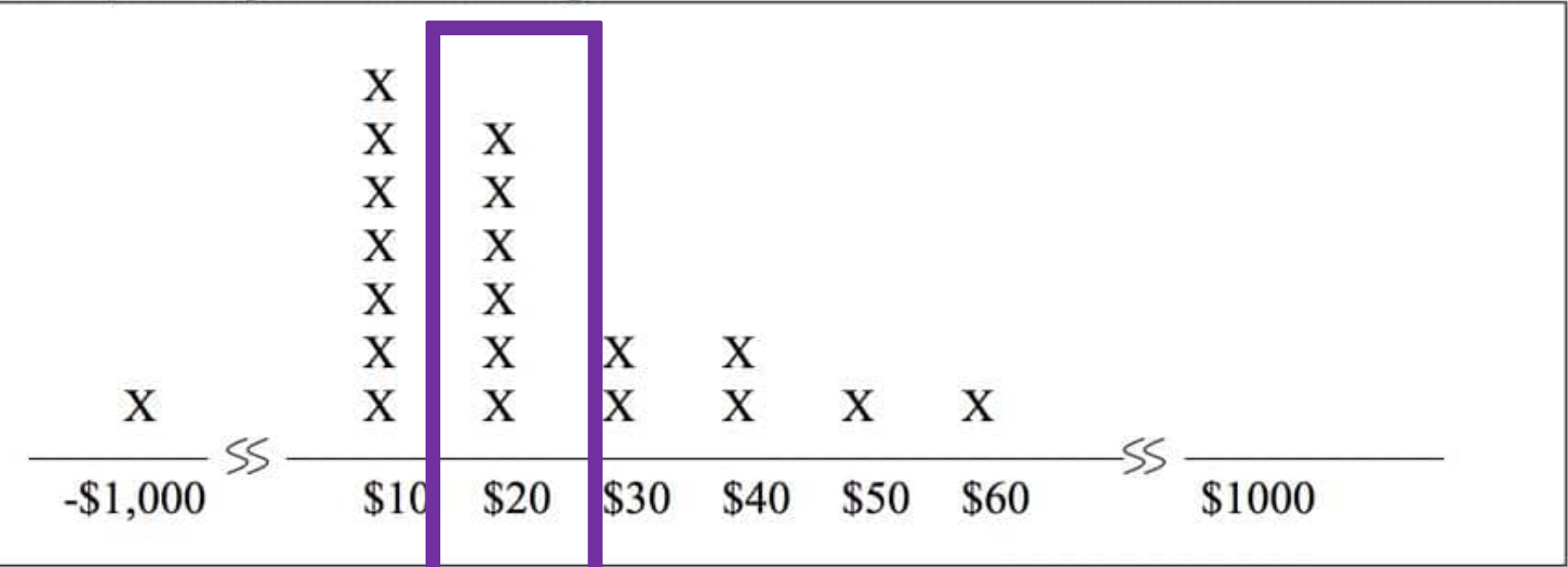


Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

What if select \$50?

Frequency Plot for Bag A:



Frequency Plot for Bag B:



Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

What if select \$20?

Frequency Plot for Bag A:



Frequency Plot for Bag B:

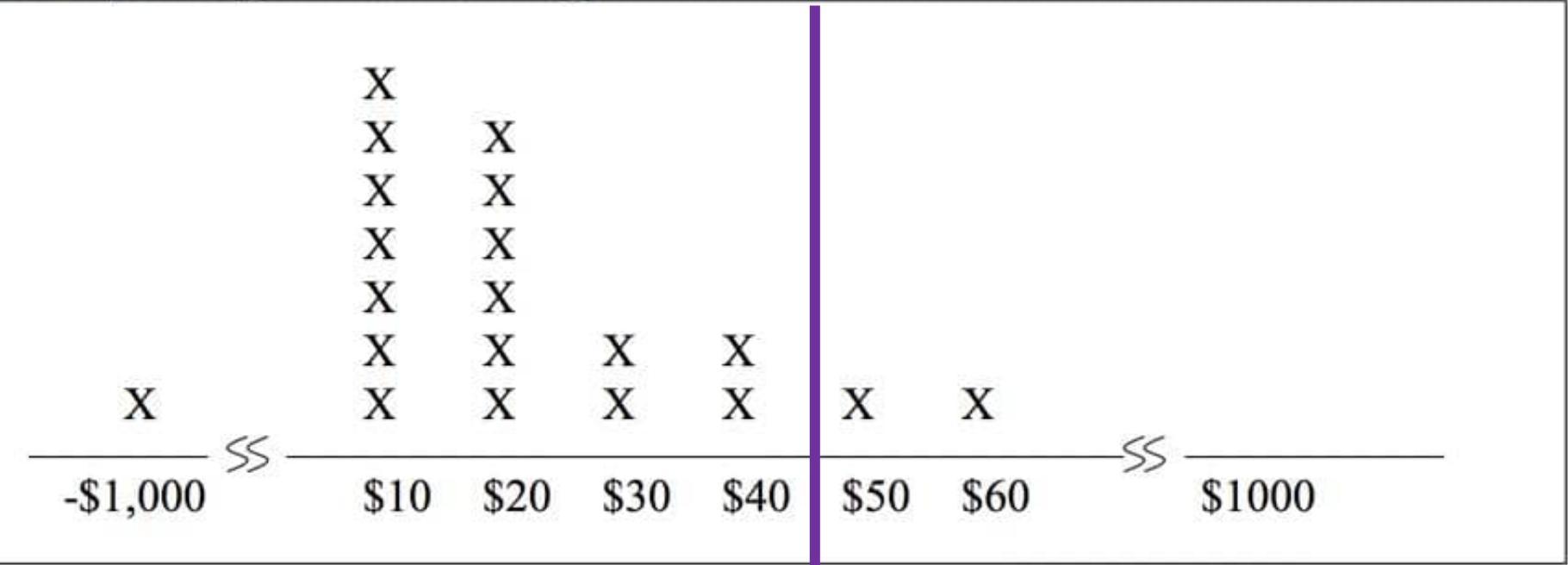


Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

What if select \$40 or \$30?

Frequency Plot for Bag A:



Frequency Plot for Bag B:



Reject the Null

Null:

Shown bag is **Bag A**

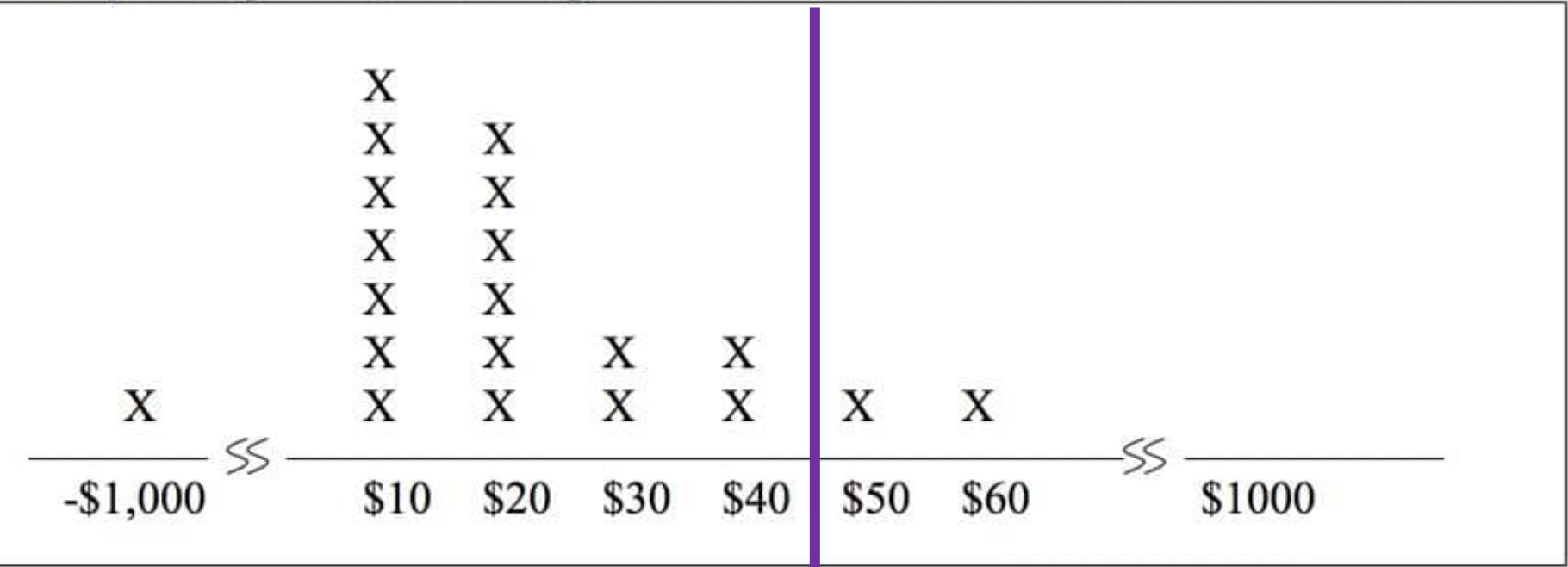
Alternative:

Shown bag is **Bag B**

Decision Rule:

**Reject the Null if
voucher is
\$50 or higher**

Frequency Plot for Bag A:



Reject the Null

Frequency Plot for Bag B:



Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

Decision Rule:
Reject the Null if
voucher is
\$50 or higher

Error: Reject Null when Null True

A dot plot showing the distribution of the number of hours worked per week. The horizontal axis represents hours, with labels at -\$1,000, \$10, \$20, \$30, \$40, \$50, \$60, and \$1000. There are breaks in the axis between -\$1,000 and \$10, and between \$60 and \$1000. The data points are represented by 'X' marks: 1 X at -\$1,000, 7 X's at \$10, 5 X's at \$20, 3 X's at \$30, 2 X's at \$40, 1 X at \$50, and 1 X at \$60. A green rectangle highlights the area from \$50 to \$1000, and a vertical purple line is at \$40.

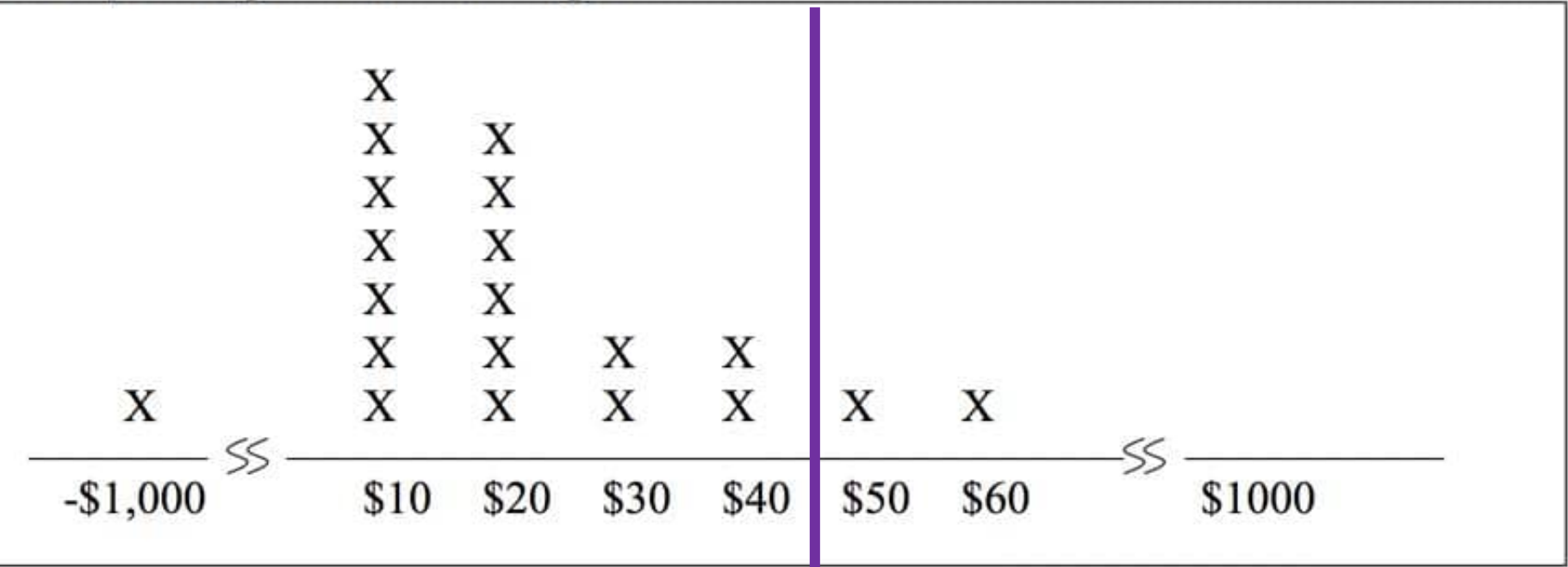
Reject the Null 

[illegible]

Shown bag is **Bag B**

Error: Reject Null when Null True

Frequency Plot for Bag A:



Reject the Null

Frequency Plot for Bag B:



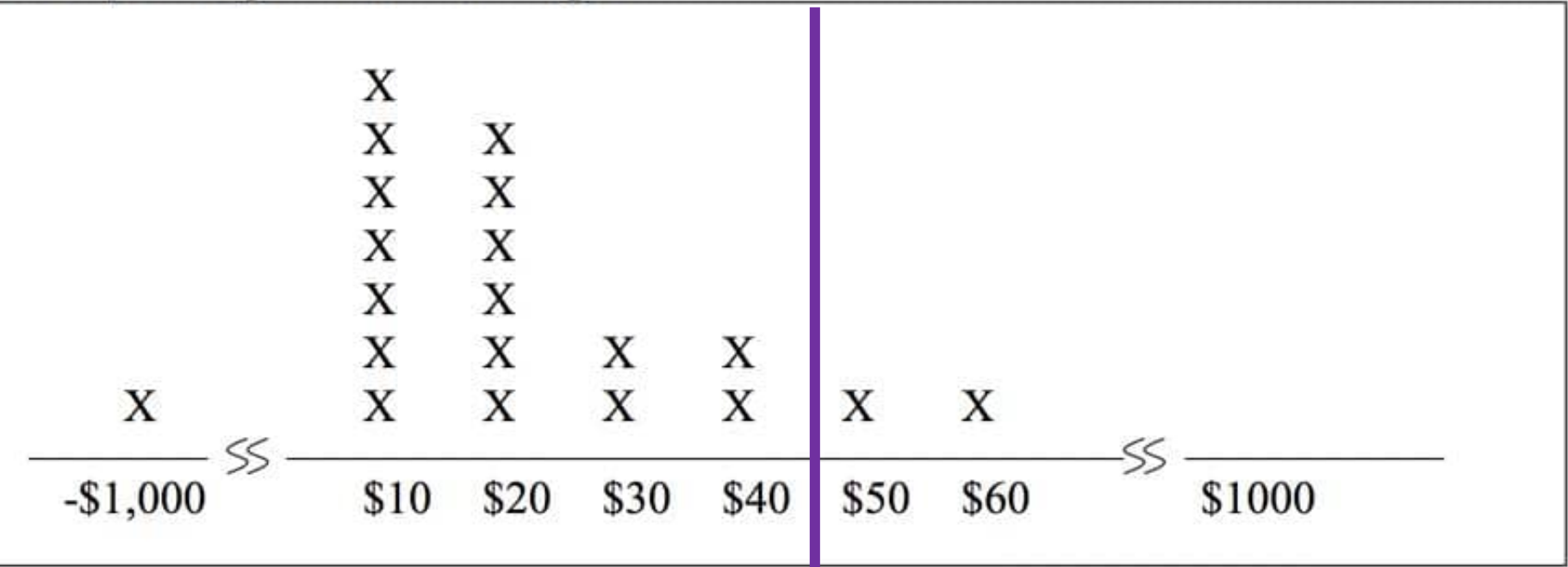
Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

Decision Rule:
Reject the Null if
voucher is
\$50 or higher

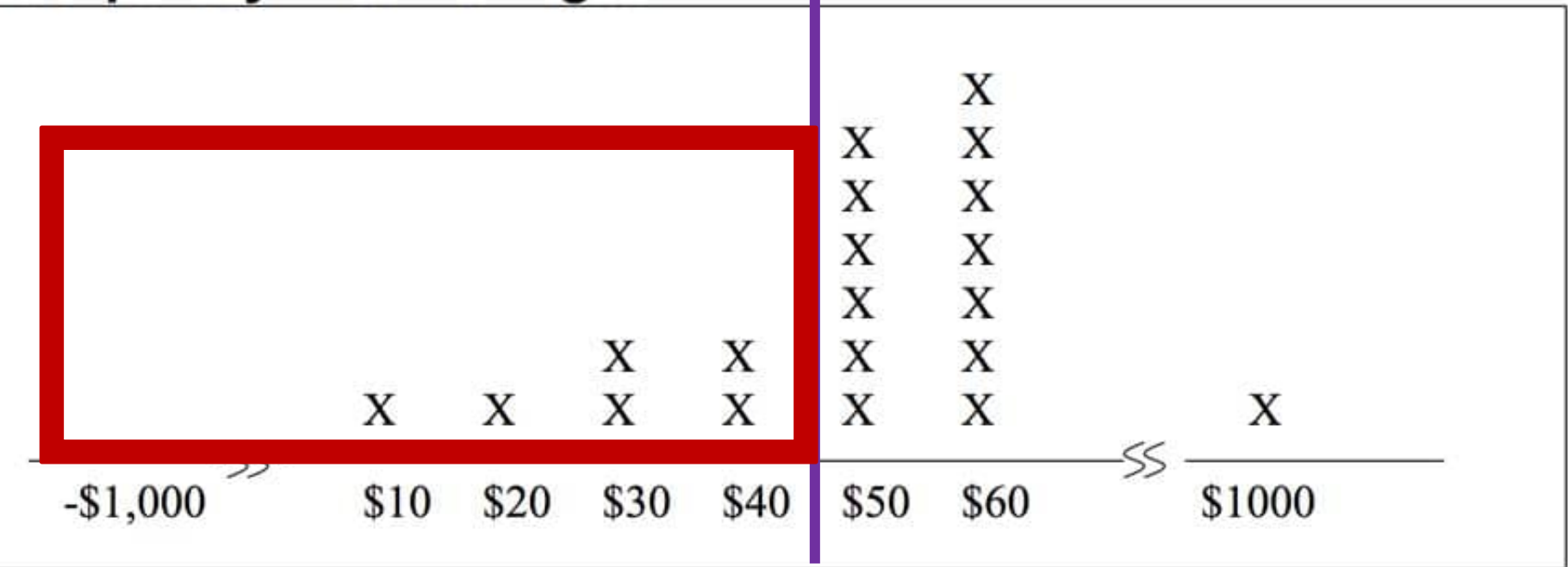
**Other Error: Do not Reject Null
when Alternative True**

Frequency Plot for Bag A:



Reject the Null

Frequency Plot for Bag B:



Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

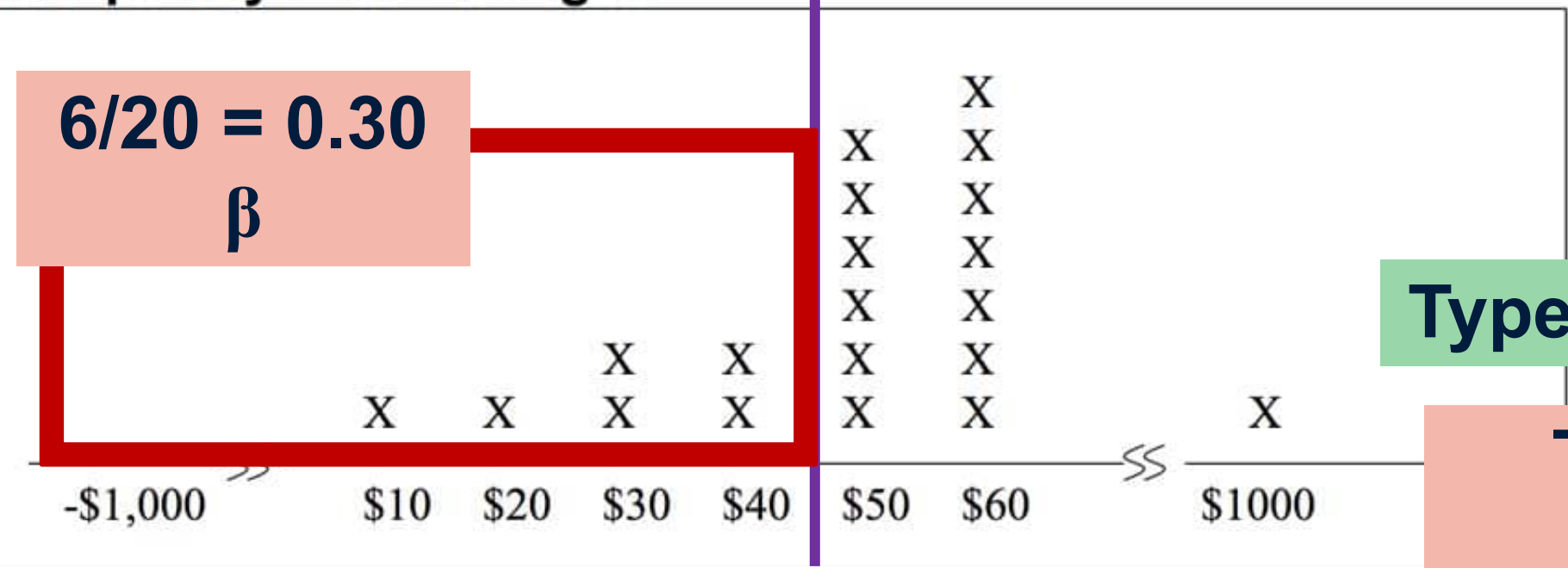
Decision Rule:
Reject the Null if
voucher is
\$50 or higher

**Other Error: Do not Reject Null
when Alternative True**

Frequency Plot for Bag A:



Frequency Plot for Bag B:



Reject the Null

Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

Decision Rule:
Reject the Null if
voucher is
\$50 or higher

Type 1 Error: Reject Null when Null True

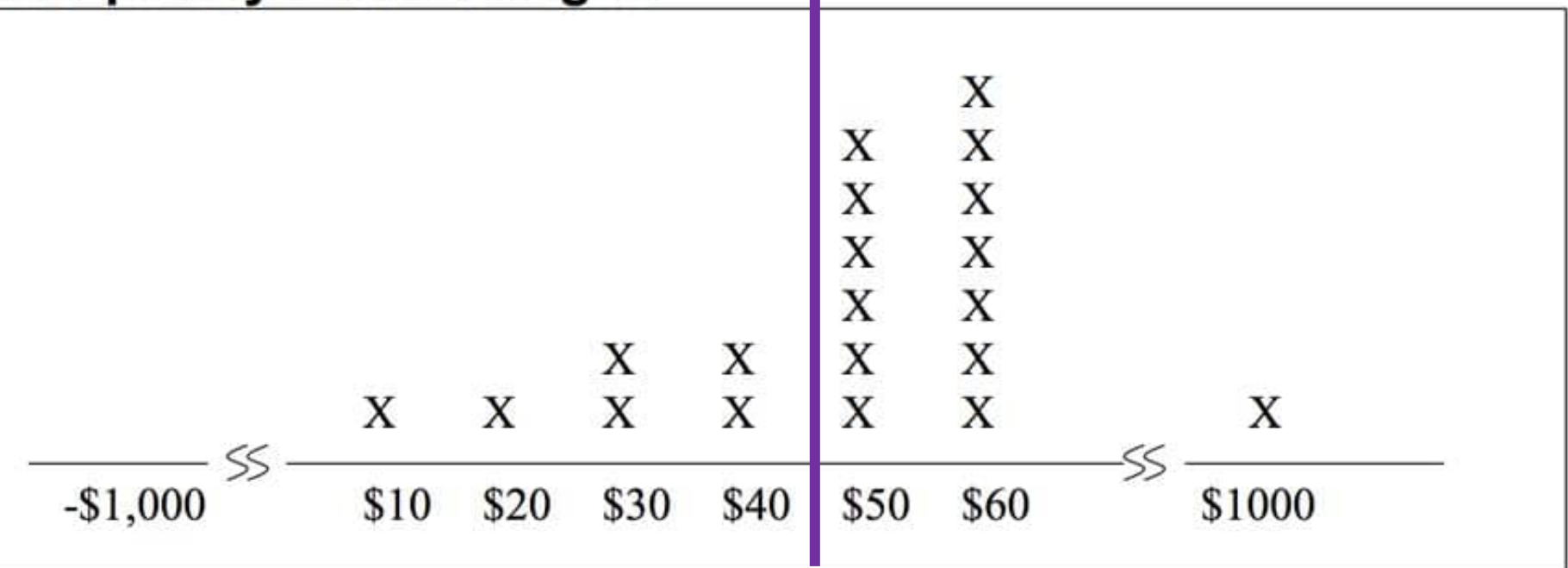
**Type 2 Error: Do not Reject Null
when Alternative True**

Frequency Plot for Bag A:



Reject the Null

Frequency Plot for Bag B:

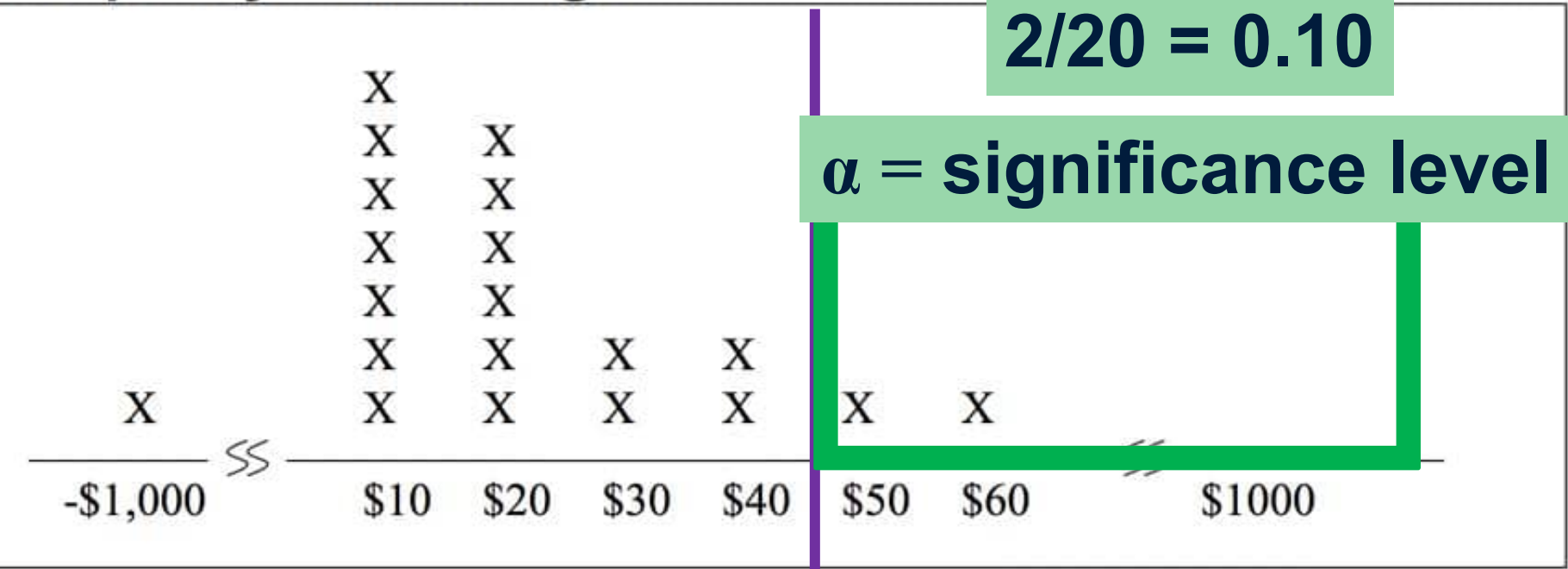


Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

Decision Rule:
Reject the Null if
voucher is
\$50 or higher

Frequency Plot for Bag A:



Reject the Null

Frequency Plot for Bag B:

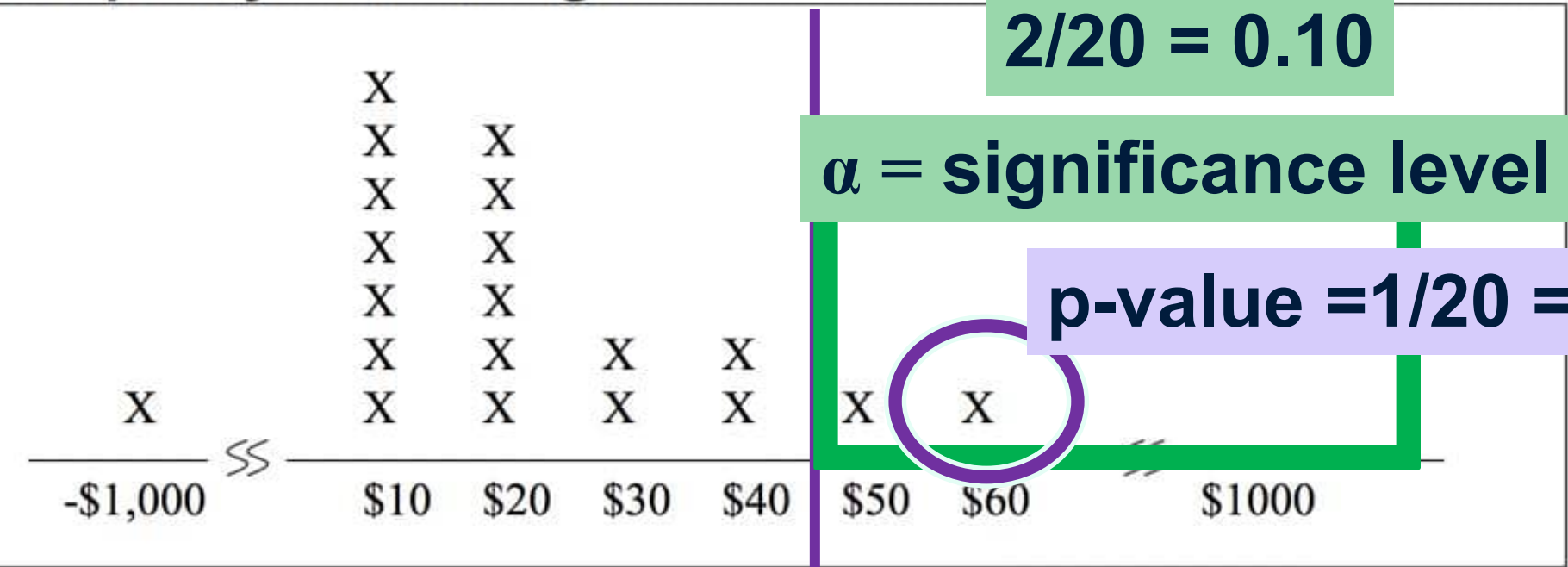


Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

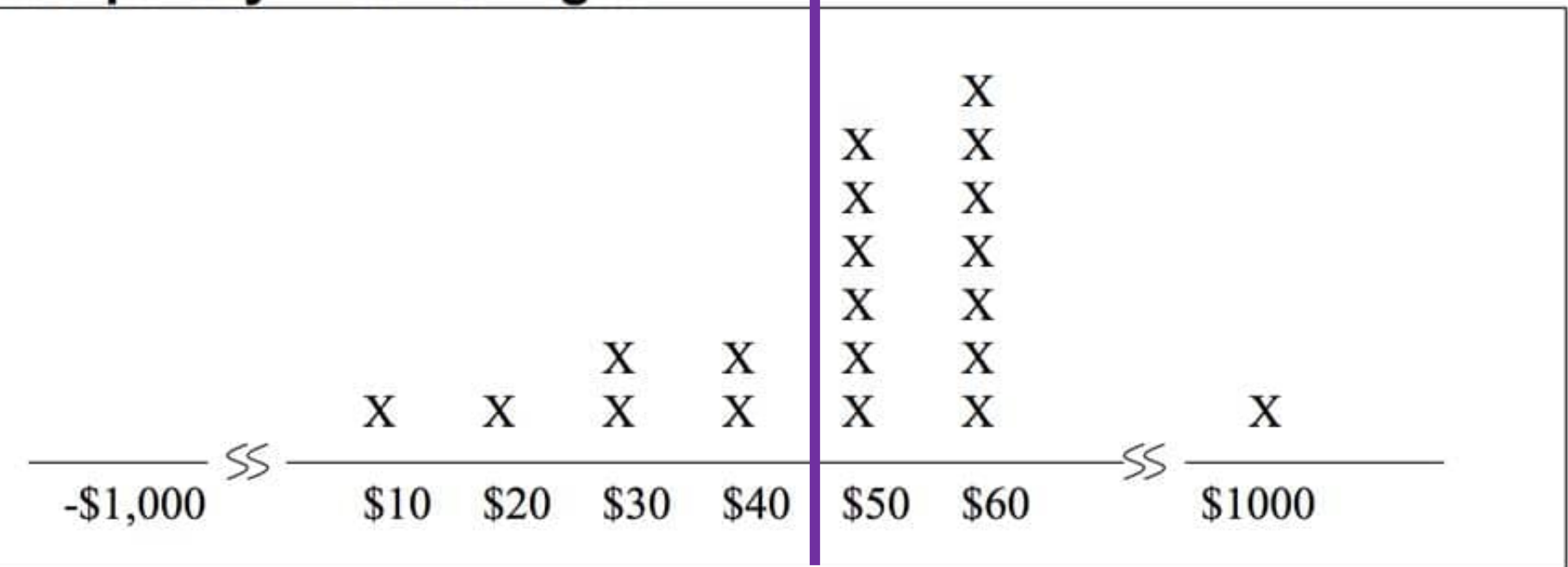
Decision Rule:
Reject the Null if
 $p\text{-value} \leq \alpha$

Frequency Plot for Bag A:



Reject the Null

Frequency Plot for Bag B:

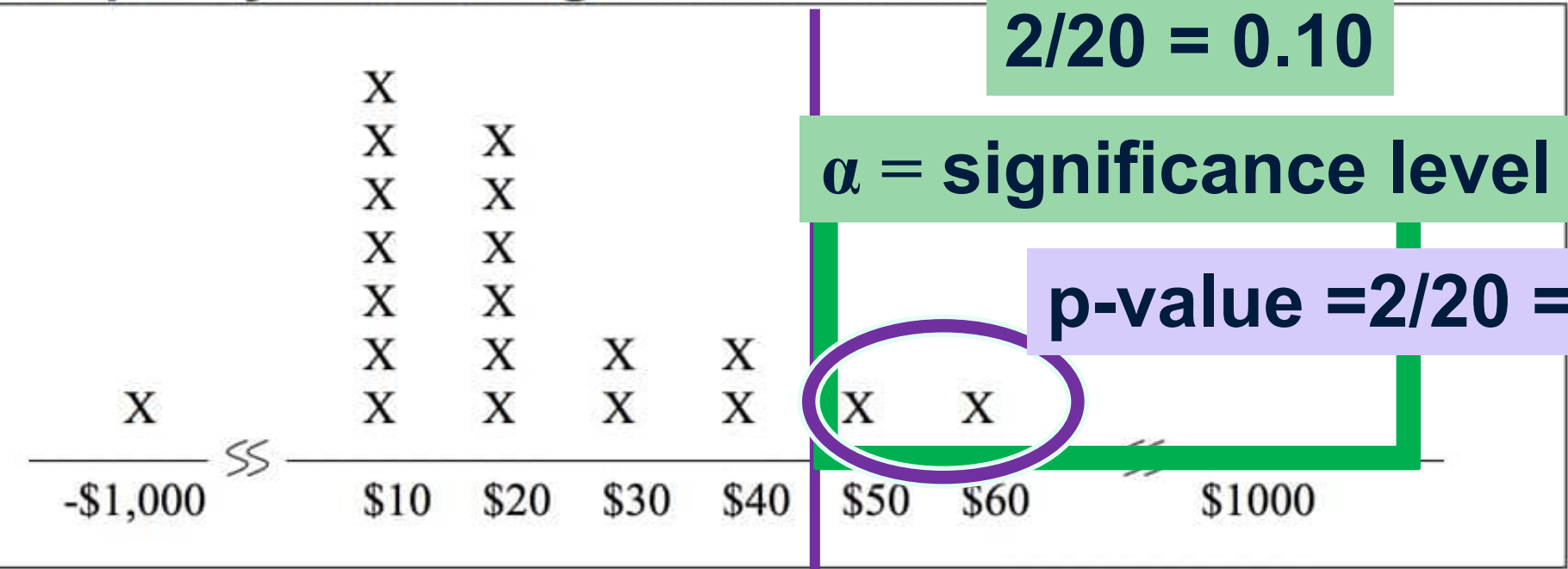


Null:
Shown bag is **Bag A**

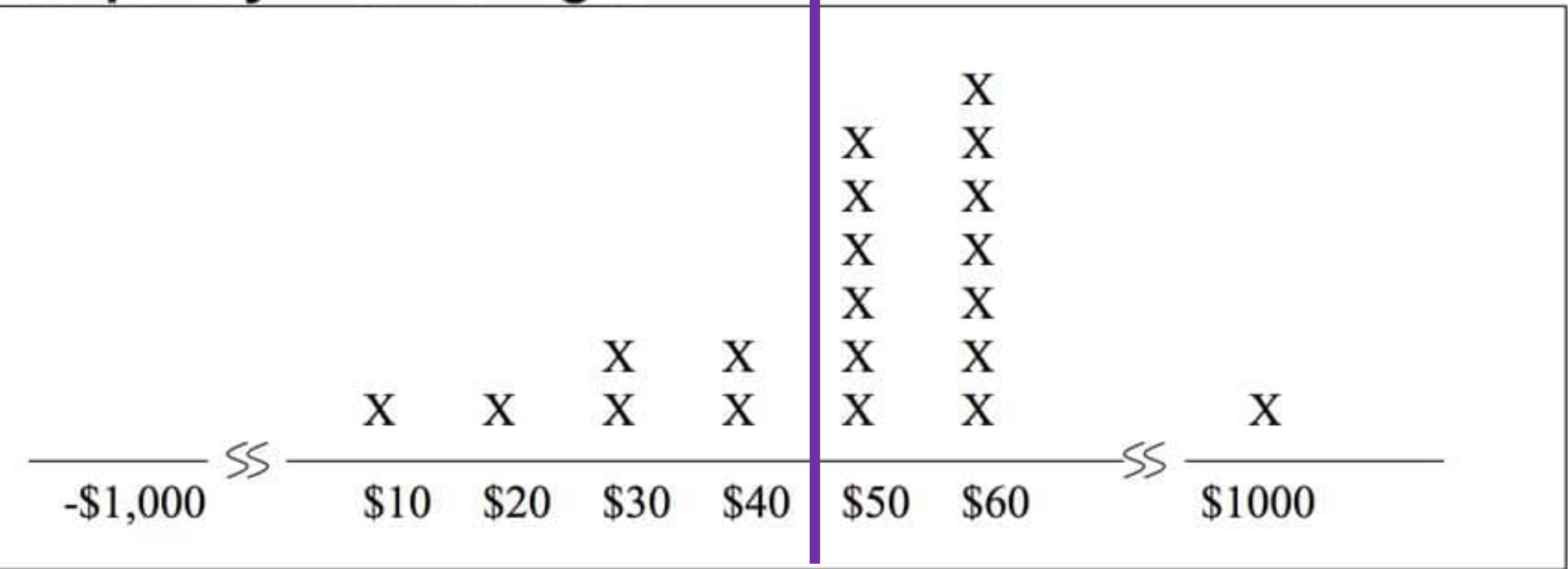
Alternative:
Shown bag is **Bag B**

Decision Rule:
Reject the Null if
 $p\text{-value} \leq \alpha$

Frequency Plot for Bag A:



Frequency Plot for Bag B:

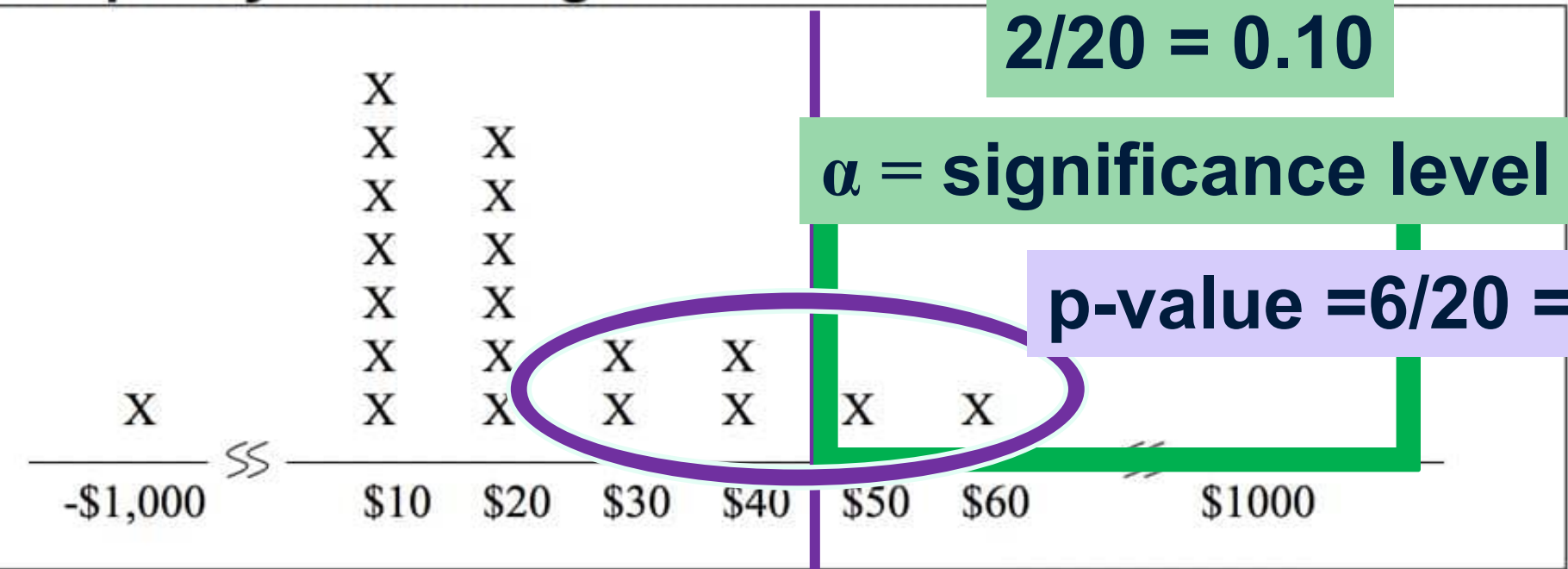


Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

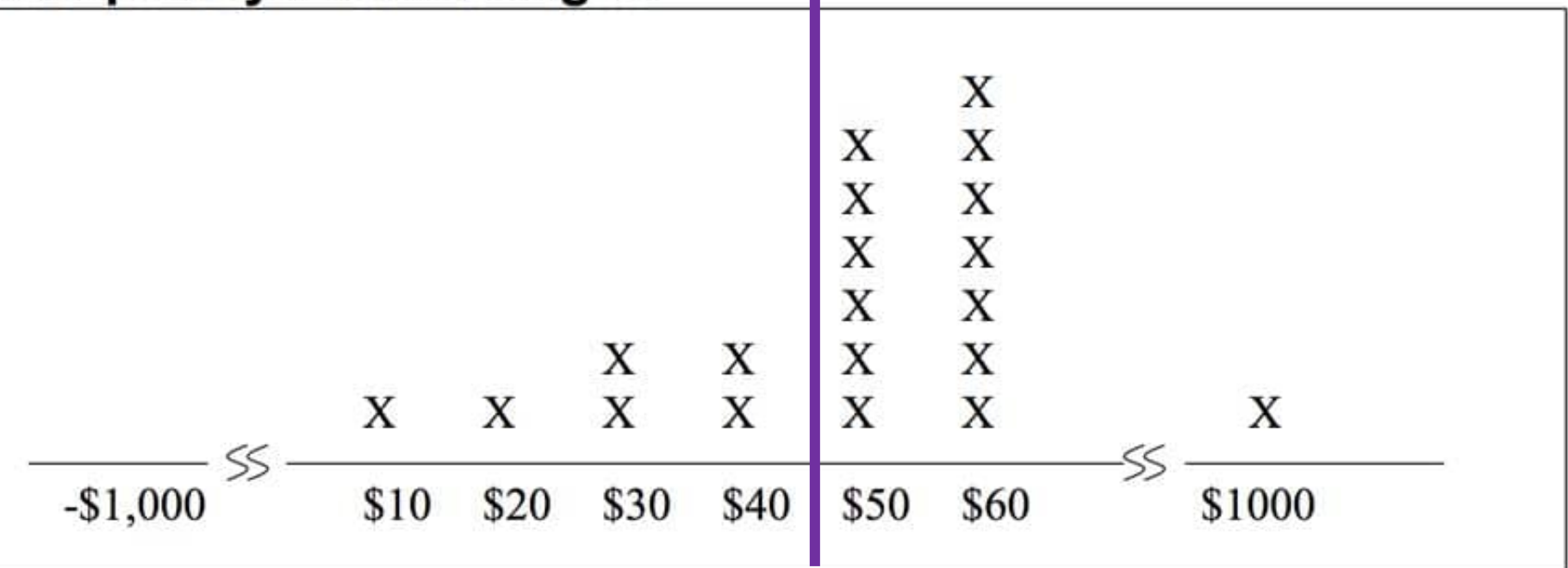
Decision Rule:
Reject the Null if
 $p\text{-value} \leq \alpha$

Frequency Plot for Bag A:



Reject the Null

Frequency Plot for Bag B:



Null:
Shown bag is **Bag A**

Alternative:
Shown bag is **Bag B**

Decision Rule:
Reject the Null if
 $p\text{-value} \leq \alpha$

Hypothesis Testing

- Stating Hypotheses
- Selecting a Significance Level
- Using data to make our decision (via p-value)

More details about making inferences ahead!