

Probability Distribution

The Pie Shop



The Problem

The Fresh Oven Bakery knows that the number of pies it can sell varies from day to day. The owner believes that on 50% of the days she sells 100 pies. On another 25% of the days she sells 150 pies, and she sells 200 pies on the remaining 25% of the days. To make sure she has enough product, the owner bakes 200 pies each day at a cost of \$1.50 each. Assume any pies that go unsold are thrown out at the end of the day. If she sells the pies for \$4 each, find the **probability distribution for her daily profit.**

What Do We Know?

- We know that each day she has the expense of making 200 pies at \$1.50 each. So her daily expenses are $(200)(1.50) = 300$ dollars.
- She sells each pie for \$4.00 meaning she profits \$2.50 from each pie.
- On 50% of the days she sells 100 pies. If she sells each pie for \$4.00 we have $(100)(4.00) = \$400$. BUT $\$400 - \$300 = \$100$ profit. Hence 50% of the time she makes \$100 profit.
- On 25% of the days she sells 150 pies. Again, each pie sells for \$4.00 and so $150(4.00) = \$600$. Minus her expense of \$300, $\$600 - \$300 = \$300$ profit.
- Lastly, on 25% of the days she sells 200 pies, so again $200(4.00) = \$800$. So her profit is $\$800 - \$300 = \$500$ profit.

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- Hence the probability distribution of her profit is:

Profit	P(profit)
\$100	.5
\$300	.25
\$500	.25

