

Exponents Investigation

SOLUTIONS

MPM1D

Jensen

One day Sammy decided to try a new place for lunch. He went to a new restaurant called Barney's Burgers. He loved the food so much that when he got back to school he told two of his friends. Suppose that this trend continues and every day each new customer tells two new friends at school about Barney's Burgers. How many new customers will Barney get each day?

a) Copy and complete the chart using your knowledge of exponents

| Day | New Customers | Expanded Form | Power |
|-----|---------------|--------------------------------|-------|
| 1 | 2 | 2 | 2^1 |
| 2 | 4 | 2×2 | 2^2 |
| 3 | 8 | $2 \times 2 \times 2$ | 2^3 |
| 4 | 16 | $2 \times 2 \times 2 \times 2$ | 2^4 |

b) Use this model to determine how many new customers Barney should expect on Day 7. Show your work.

$$\begin{aligned} \text{Customers on Day 7} &= 2^7 \\ &= 128 \end{aligned}$$

Barney should expect 128 new customers on day 7.

c) Use this model to determine how many new customers Barney should expect on Day 14. Is this answer realistic? Why or why not?

$$\begin{aligned} \text{New Customers on day 14} &= 2^{14} \\ &= 16384 \end{aligned}$$

If the trend continued, he should expect 16384 new customers on day 14.

d) Suppose that each new customer told three friends instead of two, and that this trend continued

i) How many new customer should Barney expect after 2 days?

$$\begin{aligned} \text{New Customers} &= 3^2 \\ &= 9 \end{aligned}$$

Barney should expect 9 new customers after 2 days.

ii) How many new customer should Barney expect after 4 days?

Barney should expect
81 new customers
after 4 days.

$$\begin{aligned} \text{New Customers} &= 3^4 \\ &= 81 \end{aligned}$$