

Zero and Negative Exponents

1) Use your calculator to find each of the following values:

a. $2^0 =$ *b.* $3^0 =$ *c.* $5^0 =$ *d.* $23^0 =$

2) What seems to be the value for *any base to the zero power*?

3) Make a table of values for the following function? $f(x) = 5(2)^x$

| | | | | | | | |
|------|---|---|---|---|---|---|---|
| x | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| f(x) | | | | | | | |

4) Why does it make sense in the equation that 2^0 is 1?

$$f(x) = 5(2)^x \quad f(x) = 4(3)^x \quad f(x) = 3(5)^x \quad f(x) = 7(2.5)^x$$

- 1) Of the functions given above, which grows the fastest? Explain.
- 2) Of the functions given above, which graph would cross the y-axis at the highest value? Explain.
- 3) What differences would you see in the table of values for the two functions given below?

$$f(x) = 3(6)^x \quad f(x) = 6(3)^x$$

Suppose you are on a team studying the growth of bacteria in a laboratory experiment. At the start of your work shift(8 am) in the lab, **there are 64 bacteria** in one petri dish culture, and the population seems to be **doubling every hour**.

1) Write a rule that should predict the number of bacteria in the culture at a time x hours after the start of your work shift?

2) Complete the table below

| | | | | | | | |
|--------|----|----|----|---|---|---|---|
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $f(x)$ | | | | | | | |

3) What do the negative values in the table mean in the context of the problem?

Suppose you are on a team studying the growth of bacteria in a laboratory experiment. At the start of your work shift(8 am) in the lab, **there are 90 bacteria** in one petri dish culture, and the population seems to be **tripling every hour**.

1) Write a **function rule** and a **recursive rule** that should predict the number of bacteria in the culture at a time x hours after the start of your work shift?

2) Complete the table below

| | | | | | | | |
|--------|----|----|----|---|---|---|---|
| x | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $f(x)$ | | | | | | | |

3) What do the negative values in the table mean in the context of the problem?