Exponent Word Problems Practice

1. A typical BC licence plate for a car has 3 letters and 3 numbers. For a truck, there are 4 numbers and 2 letters. Since both use 6 spots, is there a difference? If so, by how much?

2. A password is 8 characters long, not case sensitive, and only uses letters. How many passwords are there?

3. The same password, still 8 characters, needs to start with one special character (there are 8 options), and end with two numbers. Is it better or worse as a password? Why?

4. The same password now needs at least one capital but can be anywhere that there are letters. How strong is this password compared to the others?
Exponent Word Problems Practice

5. Which of the following are exponential growth? Which are not? Explain how you know.
   a. John has $2. Tomorrow, he will have $4, and the next day he will have $8, and $16
day after that.
   b. The number of chickens at the farm decreases by 100 every day.

6. Right now, 6 people know a juicy bit of gossip. Every hour, the number of people who are
told the secret triples.
   a. Create an equation with \( n \) as the hours
   b. How many people will hear the gossip in hour 5?

7. Which password design will be more secure?
   a. A 3-digit password with all the letters except O.
   b. A 5-digit password using all digits except 0.

8. 300 bacteria are placed in a petri dish. The bacteria quadruple every 12 hours.
   a. Create an equation using \( n \). What does \( n \) mean?
   b. Find the number of bacteria after 6 days.
   c. How many bacteria were there 12 hours ago? Explain your reasoning.
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1. A typical BC licence plate for a car has 3 letters and 3 numbers. For a truck, there are 4 numbers and 2 letters. Since both use 6 spots, is there a difference? If so, by how much?

   Car = 17,576,000   Truck = 6,760,000

2. A password is 8 characters long, not case sensitive, and only uses letters. How many passwords are there?

   \[26^8 = 208,827,064,576\]

3. The same password, still 8 characters, needs to start with one special character (there are 8 options), and end with two numbers. Is it better or worse as a password? Why?

   \[8 \cdot 10 \cdot 26^6 = 24,713,262,080\]

4. The same password now needs at least one capital but can be anywhere that there are letters. How strong is this password compared to the others?

   \[8 \cdot 10 \cdot 52^6 = 2,467,278,356,480\]
Exponent Word Problems Practice

5. Which of the following are exponential growth? Which are not? Explain how you know.
   a. John has $2. Tomorrow, he will have $4, and the next day he will have $8, and $16 day after that.
   b. The number of chickens at the farm decreases by 100 every day.

   a = yes
   b = no

6. Right now, 6 people know a juicy bit of gossip. Every hour, the number of people who are told the secret triples.
   c. Create an equation with \( n \) as the hours
   d. How many people will hear the gossip in hour 5?

   \[
   6 \cdot 3^n
   \]

   \[
   6 \cdot 3^5 = 1,458
   \]

7. Which password design will be more secure?
   a. A 3-digit password with all the letters except O.
   b. A 5-digit password using all digits except 0.

   a =
   \[
   25^3 = 15,625
   \]

   b =
   \[
   9^5 = 59,049
   \]

8. 300 bacteria are placed in a petri dish. The bacteria quadruple every 12 hours.
   a. Create an equation using \( n \). What does \( n \) mean?
   b. Find the number of bacteria after 6 days.
   c. How many bacteria were there 12 hours ago? Explain your reasoning.

   Possible Example:

   \[
   300 \cdot 3^n \quad \text{where } n = 12 \text{ hours increments}
   \]

   \[
   300 \cdot 3^{12} = 159,432,300
   \]

   \[
   53,144,100 \quad \text{explanations may vary}
   \]