Example of Powers of 10

Steps: 1- Multiply the **basic facts**.
2-count the zeros and add on to the product of the basic fact.

Explain how knowing \( 8 \times 4 = 32 \) helps you find \( 80 \times 40 \)? Justify your answer. (2 Points)

\[ \text{Explain:} \]
\[ 8 \times 4 \text{ is the basic fact which has a product of 32. Then I count the zeros and add 2 zeros on to the basic fact. The product is 3200.} \]

\[ \text{Justify:} \]
\[ I \text{ know this because 80 and 40 are powers of 10.} \]

1. Explain how knowing \( 9 \times 8 = 72 \) helps you find \( 90 \times 800 \)? Justify your answer. (2 Points)

\[ \text{Explain:} \]
\[ 9 \times 8 \text{ is the basic fact which has a product of 72 and then I count the zeros and add on 3 zeros to the basic fact to get a product of 72,000.} \]

\[ \text{Justify:} \]
\[ I \text{ know this because 90 and 800 are powers of 10.} \]

**Exponents** - a number that is multiplied by itself a certain number of times.

**Exponential Form** - \( 4^3 \)

**Expanded Form** - \( 4 \times 4 \times 4 \)

**Standard Form (answer)** - 64

2. Which shows the meaning of \( 5^6 \)?
   (A.) \( 5 \times 6 \)
   (B.) \( 5 \times 5 \times 5 \times 5 \times 5 \times 5 \)
   (C.) \( 6 \times 6 \times 6 \times 6 \times 6 \)
   (D.) \( 5 + 5 + 5 + 5 + 5 + 5 \)
3. Select True or False for each equation.

(A.) \(30 \times 10^2 = 3,000\) **True**
(B.) \(30 \times 10^5 = 3,000,000\) **False**
(C.) \(30 \times 10^1 = 300\) **True**
(D.) \(30 \times 10^0 = 1\) **True**

**Multiplication Properties**

- **Commutative Properties:** The order of factors can be changed, but the product stays the same. Ex: \(2 \times 3 = 3 \times 2\)

- **Associative Property:** You can change the grouping of the factors. The product stays the same. Ex: \((2 \times 5) \times 3 = 2 \times (3 \times 5)\)

- **Identity Property:** When you multiply any number by 1, the product is that number. Ex: \(23,487 \times 1 = 23,487\)

- **Zero Property:** When any number is multiplied with zero, the product is 0. Ex: \(98,756,432 \times 0 = 0\)

4. Which expression shows the associative property?
(A.) \(7 \times 2 = 2 \times 7\)
(B.) \(377,639 \times 1 = 1\)
(C.) \(61,852 \times 0 = 0\)
(D.) \(3 \times (4 \times 6) = 4 \times (6 \times 3)\)

5. Ally's photo album has 7 sections. Each section has 18 pages. Each page has 6 pictures. To find the total number of pictures in the album, Shelly needs to multiply 7 x 18 x 6.

Which other expression represents the total number of pictures in the album?
(A.) \((7 \times 18) + (7 \times 6)\)
(B.) \((7 \times 18) + 6\)
(C.) \(7 + 6 + (18 + 6)\)
(D.) \(6 \times 7 \times 18\)
Distributive Property
- Distributive property helps you break numbers apart so they are easier to multiply.

Ex: 3 x 333

6. Dave said that he used the Distributive Property to solve 5 x 555. Is his answer shown below correct? Justify your answer. (2 Points)

Dave's Work:
\[
5 \times 555 = 5 \times (500 + 50 + 5) = \\
(5 \times 500) + (5 \times 50) + (5 \times 5) = \\
2,500 + 250 + 25 = 2,775
\]

Justify:
Dave's distributive property is correct. I used an array model to check Dave's work. It is correct.

Two-digit Multiplication:
Step 1 - Make sure place values are lined up.
Step 2 - Begin multiplying the bottom factor's ones place with the top factor's one place. (Don't forget to regroup)
Step 3 - Multiply the bottom factors ones place and the top factors tens place then add the regrouped number.
Step 4 - Use a 0 for a place holder under the ones product line.
Step 5 - Multiply the bottom factors ten place with the top factors ones place. (Don't forget to regroup)
Step 6 - Multiply the bottom factors tens place with top factors tens place and add the regrouped number.
Step 7 - Add the product line together
Enter your answer in the box.

34 \times 58 = \boxed{1972}

7. Enter your answer in the box.

25 \times 43 = \boxed{1,075}

8. Enter your answer in the box.

563 \times 1,645 = \boxed{926,135}

**Hint:** (There are 60 seconds in 1 minute.)

9. The Canadian side of Niagara Falls has a flow rate of 400,000 gallons per second. How many gallons of water flow over the Falls in 1 minute? Show your work. (4 points)

\[
\begin{align*}
400,000 \times 60 &= \boxed{24,000,000} \\
60 \times 400,000 &= \boxed{24,000,000} \\
24,000,000 &= \text{product}
\end{align*}
\]

In 1 minute, Niagara Falls has 24,000,000 gallons of water flow over the falls.
10. A bakery can bake 65 trays of pastries in the morning and 52 trays of pastries in the afternoon. If each tray holds 13 pies, how many pies can be baked in 1 day?

\[
\begin{align*}
(A.) & \quad 845 \text{ pastries} \\
(B.) & \quad 1,250 \text{ pastries} \\
(C.) & \quad 1,404 \text{ pastries} \\
(D.) & \quad 1,521 \text{ pastries}
\end{align*}
\]

\[
\begin{align*}
& \times \quad 65 \\
& \quad 18 \\
& \quad 195 \\
& + \quad 650 \\
& 845
\end{align*}
\]

11. Last month, a travel agency in New York City offered tickets for flights to Tokyo, Japan, and to Sydney, Australia. The cost of one round trip ticket to each city is shown on the map.

The travel agency sold $54,432 in tickets during this offer. Select tickets the agency could have sold.

Circle all that apply.

A. 42 tickets to Tokyo and 0 tickets to Sydney
B. 24 tickets to Tokyo and 9 tickets to Sydney
C. 35 tickets to Tokyo and 4 tickets to Sydney
D. 14 tickets to Tokyo and 14 tickets to Sydney

\[
\begin{align*}
& \times \quad 1,296 \\
& \quad 42 \\
& \quad 54,432
\end{align*}
\]

\[
\begin{align*}
& \times \quad 1,296 \\
& \quad 35 \\
& \quad 21,592 \\
& \times \quad 28 \\
& 54,432
\end{align*}
\]
12. One factor of a multiplication problem is 158. What could the other factor be if the product is between 1,000 and 1,500. List 2 possibilities. Explain how you found your solutions. (2 points)

\[
\begin{array}{c}
158 \\
\times \ 9 \\
\hline
1,000 \\
1,500
\end{array}
\]

13. Some college students had a goal of earning $20,000 last year for work. The amount of money each earned is shown. For each amount in the table, indicate with an “X” whether the total earnings met or did not meet the goal.

<table>
<thead>
<tr>
<th>Total Earnings</th>
<th>Met Goal</th>
<th>Did Not Meet Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>$378 per week for 52 weeks</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>$459 per week for 45 weeks</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>$468 per week for 48 weeks</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

\[
\begin{array}{c}
378 \\
\times \ 52 \\
\hline
19,656
\end{array}
\]

14. The table shows the cost of items that are used to furnish new school. The school is planning on remodeling 24 rooms. Find the estimated cost to complete the 24 rooms. (3 Points)

<table>
<thead>
<tr>
<th>Furniture</th>
<th>Estimated Price for 24 Rooms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher Desk</td>
<td>$165 \times 25 \approx $5,000</td>
</tr>
<tr>
<td>Table</td>
<td>$99 \times 25 \approx $2,500</td>
</tr>
<tr>
<td>Chair</td>
<td>$38 \times 25 \approx $1,000</td>
</tr>
</tbody>
</table>

\[
25 \times 40
\]