



## LOGARITHM

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### Activity 1

You are given a piece of paper. Fold the paper into two parts equally for each time. Write down your findings in the table.

Number of folding	Number of parts	Multiplication form	Exponential form								
1	2	2	$2^1$								
2	2	$2 \times 2$	$2^2$								
3	2	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> </tr> </table>		×		×		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 10px; height: 10px;"></td> </tr> </table>		×	
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4	2	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> </tr> </table>		×		×		×			
	×		×		×						
5											
6											
7											

## Worksheet 2

Now, you are given a piece of paper. Fold the paper into three parts equally for each time. Write down your findings in the table.

Number of folding	Number of parts	Multiplication form	Exponential form								
1	3	3	$3^1$								
2	3	$3 \times 3$	$3^{\square}$								
3	3	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> </tr> </table>		×		×		<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> </tr> </table>		×	
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4	3	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 10px; text-align: center;">×</td> <td style="width: 20px; height: 20px;"></td> </tr> </table>		×		×		×			
	×		×		×						
5											
6											
7											

### Conclusion

$$\underbrace{a \times a \times \dots \times a}_n = \begin{array}{|c|} \hline \square \\ \hline \end{array} \begin{array}{|c|} \hline \square \\ \hline \end{array}$$

### Activity 3

Expressed exponential numbers expressed in logarithms ( $a^b = c$ ), write your opinion in the following table:

Exponential form	Logarithm form
$2^3 = 8$	${}^2\log 8 = 3$
$4^2 = 16$	${}^4\log 16 = 2$
	${}^5\log 125 = 3$
$7^3 = 343$	
	${}^2\log 64 = 6$
$11^2 = 121$	
	${}^4\log 256 = 4$

Make  
your own  
idea

Your group conclusion

$$a^b = c \longleftrightarrow \square \log \square$$

## Activity 6

- Use Calculator fx-991 ID Plus to solve the problem and follow the steps to use as follows:

Klik "hidup"  $4 \ x^{\circ} \ 4 \ = \ AC \ 5 \ x^{\circ} \ 4 \ =$

$$4^4 = 256$$

$$5^4 = \dots$$

- Presented repeating multiplication as follows:

Klik :  $4 \ \times \ 4 \ \times \ 4 \ \times \ 4 \ =$

$AC \ 5 \ \times \ 5 \ \times \ 5 \ \times \ 5 \ =$

$$4 \times 4 \times 4 \times 4 = 256$$

$$5 \times 5 \times 5 \times 5 = \dots$$

From activity 1 and 2 you can check the truth by using Casio calculator fx-991 ID Plus as follows:

Klik :  $MODE \ \downarrow \ 2 \ 4 \ \times \ 4 \ \times \ 4 \ \times \ 4 \ \text{ALPHA} \ \text{CALC} \ x^{\circ} \ 4 \ \rightarrow \ 4 \ =$

- What about the activity of converting exponents into logarithms?

Given:  $a = 4$ ,  $b = 4$ ,  $c = 256$  with the format  $ab = c$  ( $a = \text{base}$ , you can do the exploration using Casio fx-991 ID Plus calculator, as follows:

$$4^4 = 256$$

$$\log_4(256) = 4$$

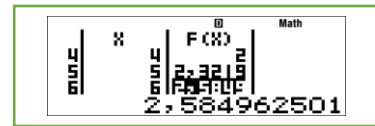
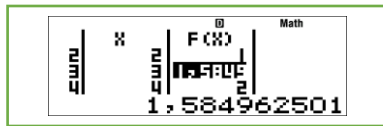
$$5^4 = \dots$$

$$\dots = \dots$$

Use your fx-991 ID Plus to make several other pairs of screens like these. Use a variety of bases. Use positive and negative powers. Record your results on paper and discuss them with your partner.

4. Most logarithms are not integers. In table mode (MODE 7) logarithm table can show many examples, as shown below. (In this case, mulai = 1, akhiri = 3 and langkah = 1)

$$f(X) = \log_2(X)$$



Explore this table by scrolling; changing the limits of the table to see other values. Larger numbers have larger logarithms. Explain why this is the case. Which numbers have logarithms that are whole numbers? Explain why.

Make some tables with logarithm to a different base. To check that your explanations still apply; check your observations with your partner. Discuss why, for all bases, logarithm of the base equals 1 and the logarithm of equals zero. Write your explanation here:

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## Activity 7

Write down your learning experience.

About exponential

About logarithm

