

DMT INSTITUTE

Developing Mathematical Thinking Institute (DMTI)



Professional
Development



Curricular
Resources



Assessment

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DMTI Varied Practice Worksheets

This PowerPoint or PDF displays the worksheets that have varied situations (context, visual, equations, and other mathematical models) for children to work on. By completing these worksheets, children increase their foundational skills in the topic, which will help them with these standards and future mathematical topics.

1. If using a journal, have children present the worksheet and complete all the problems.
2. Or print the 'Varied Practice Worksheet Slides' for them to work on. Then, you can return to the PowerPoint or PDF to look at the keys to check their work.

Grade 4 – Algebraic Reasoning 2

MODELS WITH EXPRESSIONS AND EQUATIONS

Grade 4: Algebraic Reasoning– Part 2


Materials Needed

Printed copies of the Algebraic Reasoning Part 2 varied practice sheet

Instructions

1. Look at each of the patterns.
2. Decide what you see that is changing and what is staying the same.
3. Fill in the missing parts of each pattern sequence. Sometimes you will need to write a missing expression or equation. In other situations you will need to draw a missing figure from the pattern. Some of the patterns have multiple missing parts.
4. Complete the two sentences frames that describe what you see in each pattern sequence that stays the same and what is changing.

Example:

Patterns	Sentence Frames
<p>Figure 1 Figure 2 Figure 3 Figure 4</p>  <p>1 x 1 1 x 2 1 x 4 1 x 8</p>	<p><i>Responses may vary.</i></p> <p><i>What stays the same in the pattern is that each new figure has the previous figure as part of it.</i></p> <p><i>What is changing in the pattern is that each new figure doubles the previous figure.</i></p>

Patterns				Sentence Frames	
A)	Figure 1	Figure 2	Figure 3	Figure 4	What stays the same in the pattern is
				$(1x1) + (1x2) + (1x4) + (\rule{1cm}{0.4pt})$	What is changing in the pattern is
	1×1	$(1x1) + (1x2)$	$(1x1) + (1x2) + (1x4)$		
B)	Figure 1	Figure 2	Figure 3	Figure 4	What stays the same in the pattern is
					What is changing in the pattern is
	$3 + (1 \times 2)$	$3 + (2 \times 2)$		$3 + (4 \times 2)$	
C)	Figure 1	Figure 2	Figure 3	Figure 4	What stays the same in the pattern is
<i>Write your own equations that describe the figures here.</i>					What is changing in the pattern is
D)	Figure 1	Figure 2	Figure 3	Figure 4	What stays the same in the pattern is
					What is changing in the pattern is
	$(3 \times 3) - (1 \times 1)$	$(4 \times 4) - (2 \times 2)$	$(5 \times 5) - (3 \times 3)$	$(6 \times 6) - (\rule{1cm}{0.4pt})$	





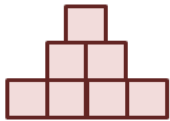




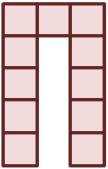


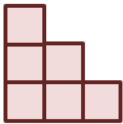
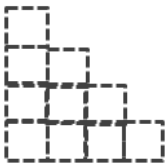
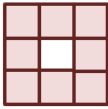
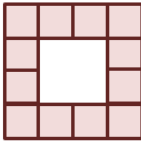
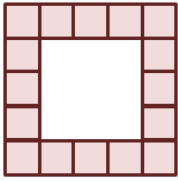
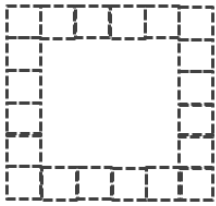
“The Developing Mathematical Thinking Institute (DMTI) is dedicated to enhancing students’ learning of mathematics by supporting educators in the implementation of research-based instructional strategies through high-quality professional development, curricular resources and assessments.”

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KEY

Responses may vary.

	Patterns	Sentence Frames
A)	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Figure 1</p>  <p>1×1</p> </div> <div style="text-align: center;"> <p>Figure 2</p>  <p>$(1 \times 1) + (1 \times 2)$</p> </div> <div style="text-align: center;"> <p>Figure 3</p>  <p>$(1 \times 1) + (1 \times 2) + (1 \times 4)$</p> </div> <div style="text-align: center;"> <p>Figure 4</p>  <p>$(1 \times 1) + (1 \times 2) + (1 \times 4) + (1 \times 8)$</p> </div> </div>	<p>What stays the same in the pattern is <i>there is always the previous figure in the new figure.</i></p> <p>What is changing in the pattern is <i>the part you add is always two times as what you added in the last figure.</i></p>
B)	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Figure 1</p>  <p>$3 + (1 \times 2)$</p> </div> <div style="text-align: center;"> <p>Figure 2</p>  <p>$3 + (2 \times 2)$</p> </div> <div style="text-align: center;"> <p>Figure 3</p>  <p>$3 + (3 \times 2)$</p> </div> <div style="text-align: center;"> <p>Figure 4</p>  <p>$3 + (4 \times 2)$</p> </div> </div>	<p>What stays the same in the pattern is <i>the three square units at the top of each figure.</i></p> <p>What is changing in the pattern is <i>the square units you add to the row of three increase by two for each new figure.</i></p>
C)	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Figure 1</p>  <p>1×1</p> </div> <div style="text-align: center;"> <p>Figure 2</p>  <p>$(2 \times 2) - 1$</p> </div> <div style="text-align: center;"> <p>Figure 3</p>  <p>$(3 \times 3) - 3$</p> </div> <div style="text-align: center;"> <p>Figure 4</p>  <p>$(4 \times 4) - 5$</p> </div> </div>	<p>What stays the same in the pattern is <i>each new figure has the previous figure as part of it.</i></p> <p>What is changing in the pattern is <i>the size of the sides of each square you can create is growing larger by one for each figure.</i></p>
D)	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Figure 1</p>  <p>$(3 \times 3) - (1 \times 1)$</p> </div> <div style="text-align: center;"> <p>Figure 2</p>  <p>$(4 \times 4) - (2 \times 2)$</p> </div> <div style="text-align: center;"> <p>Figure 3</p>  <p>$(5 \times 5) - (3 \times 3)$</p> </div> <div style="text-align: center;"> <p>Figure 4</p>  <p>$(6 \times 6) - (4 \times 4)$</p> </div> </div>	<p>What stays the same in the pattern is <i>that each figure can be created with a square with side dimensions that are always the size of the figure number + 2.</i></p> <p>What is changing in the pattern is <i>the size of the square units you subtract from the middle is the figure number multiplied by itself, which is also a square.</i></p>

Write your own equations that describe the figures here.