

## How many are there? – Student work samples

Link to the assessment resource, *How many are there?* (NM1327)

These examples are generally listed from the most sophisticated to the least sophisticated. The mean ability of students using each strategy largely follows the stages of the number framework. Click on the link *Analysis of student responses* for data of the breakdown of how successful students were at obtaining a correct answer to each question.

### Fully multiplicative partitioning

(c) 5's into 75

$5 \times 10 = 50$ $5 \times 5 = 25$ $50 + 25 = 75$	<p>Answer <u>15</u></p>
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Place value partitioning

(a) 3's into 24

$24 \div 3 = 8$ $21 \div 3 = 7$	<p>Answer <u>8</u></p>
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Basic fact partitioning with a single compensation.

### Fully multiplicative doubling and halving

(a) 3's into 24

<p>3 lots of 3 is 9 2 lots of 9 is 18          plus six is 24</p>	<p>Answer <u>8</u></p>
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This combines doubling with a final compensation of 6 ( $= 3 \times 2$ )

**Mix of multiplicative and additive strategies**

(b) 8's into 40

$$8 \times 2 = 16 + 16 = 32 + 8 = 40$$

Answer 5

**Partitioning followed by repeated addition or skip counting**

(a) 3's into 24

~~$3 \times 7 = 24$~~

$$3 \times 5 = 15.$$

$$3 \times 6 = 18.$$

$$3 \times 7 = 21.$$

$$3 \times 8 = 24.$$

Answer 24.

(c) 5's into 75

$$5 \times 10 = 50.$$

$$5 \times 11 = 55.$$

$$5 \times 12 = 60.$$

$$5 \times 13 = 65.$$

$$5 \times 14 = 70.$$

$$5 + 15 = 75.$$

Answer 15.

Both these show using a basic fact followed by skip counting.

**Vertical division algorithm**

(a) 3's into 24

$$\begin{array}{r} 8 \\ 3 \overline{) 24} \\ \underline{24} \\ 0 \end{array}$$

Answer 8

(b) 8's into 40

$$\begin{array}{r} 5 \\ 8 \overline{) 40} \\ \underline{40} \\ 0 \end{array}$$

Answer 5

(c) 5's into 75

$\begin{array}{r} 15 \\ 5 \overline{) 75} \\ \underline{5} \phantom{0} \\ 25 \\ \underline{25} \\ 0 \end{array}$	Answer <u>15</u>
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**Repeated addition (evidence of tallying)**

(a) 3's into 24

$3 + 3 + 3 = 9, 3 + 3 = 12, 3 + 3 = 18, 3 + 3 = 24$   
1 2 3            4            5 6            7 8

Answer 8

This has evidence of tallying, making a correct answer more likely.

**Repeated addition (evidence of tallying)**

(a) 3's into 24

$3 + 3 + 3 = 9 + 3 + 3 + 3 + 3 + 3 = 24$   
 $3 \times 8 = 24$

Answer 8

This has no evidence of tallying, making a correct answer less likely.

**Skip counting (evidence of tallying)**

(a) 3's into 24

$\begin{array}{cccccccc} 3 & 6 & 9 & 12 & 15 & 18 & 21 & 24 \\ \hline 1 & 2 & 3 & 4 & 5 & 6 & 7 & \end{array}$	Answer <u>8</u>
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$3, 6, 9, 12, 15, 18, 21, 24$   
1 2 3 4 5 6 7 8

Answer 8

(c) 5's into 75

12  
~~|||||~~  
 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75.  
 Answer 15

These three examples have evidence of tallying, making a correct answer more likely.

**Skip counting (no evidence of tallying)**

(a) 3's into 24

3, 6, 9, 12, 15, 18, 21, 24  
 Answer 8

Skip count in 3's  
 Answer 8

**Skip counting – (only tally marks recorded)**

(a) 3's into 24

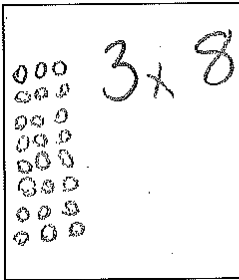
|||| |  
 Answer 8

(c) 5's into 75

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 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15  
 Answer 15

**Array diagrams**

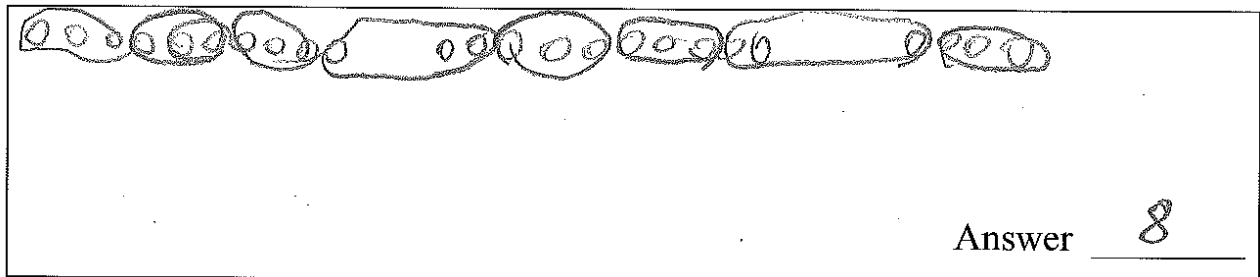
(a) 3's into 24



Answer 24

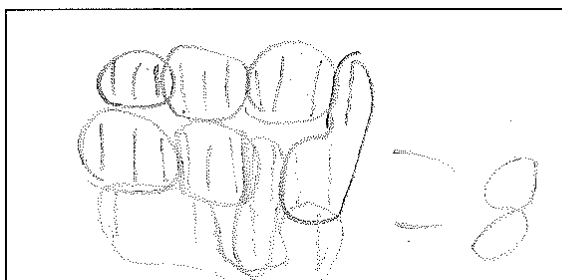
**Grouping diagrams**

(a) 3's into 24



Answer 8

Semi-structured groups – could reformat into a multiplication array.



Answer 8

Unstructured groups