

Grade 8 Resources

from



Mathematics Workshop

**“It’s not too late
– Quality lessons to help with exam review”**

March 2003

Prepared by

David Ritchie

Introduction

The materials contained in this package are designed to support review for exams.

The materials model the process of completing an item analysis of the Mathematics Progress Indicator Test and developing lessons to help the students learn the key concepts of the questions.

Using the materials

Step 1

Analyse your class results from Form 1 and Form 2 of the Mathematics Progress Indicator. Use **pages 3 and 4**.

Step 2

Develop lessons that address student misunderstandings.

This means developing reteaching lesson on mis-understood concepts not just going over more exam questions.

Sample lessons have been provided from **page 6 onwards**.

Developing student Exam Strategies

Remember to model exam strategies as you review for the exam. Get a copy of **[“Math Exam Strategies Overview”](#)**

PD Workshops related to these materials

The materials were presented to the District 8 Math Consortium Workshop.

Resources materials from this workshop for Grade 6, 7 and 8 are currently available for download from **www.mathsnet.vic.edu.au/nyc/**

Interpreting and Analyzing the Mathematics Progress Indicator Results

A Process

1. Review the success of your students by looking for the questions in which the students performed poorly.
2. Order these questions from poor performance to good performance
3. Analyse the math behind the question
4. Determine a solution or lesson strategy to help improve student performance.

Class:

Level: F

Form: 1

Ranking Poor to Good	Question No.	Math behind the question	Solution or lesson strategies
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

If necessary, add another page.

Interpreting and Analyzing the Mathematics Progress Indicator Results

A Process

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2. Order these questions from poor performance to good performance
3. Analyse the math behind the question
4. Determine a solution or lesson strategy to help improve student performance.

Class:

Level: F

Form: 2

Ranking Poor to Good	Question No.	Math behind the question	Solution or lesson strategies
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

If necessary, add another page.

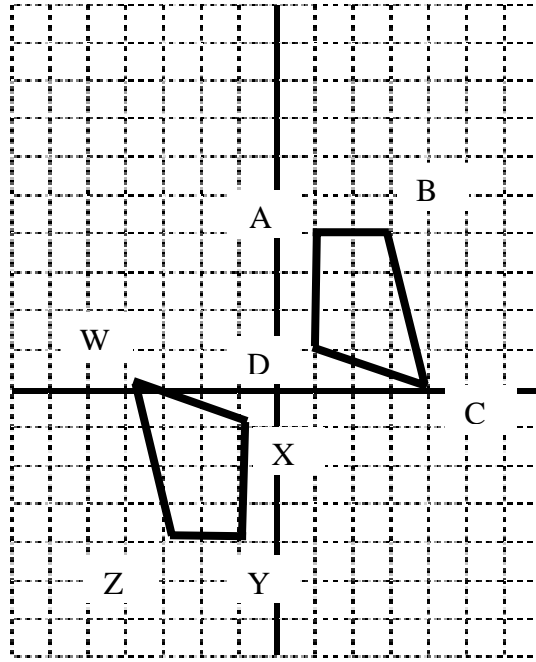
Sample Interpretation and Analysis of the Mathematics Progress Indicator Results - Level F, Form 1

Ranking	Level F Form 1 December 2002		
Poor to Good	Question No. less than 40%	Math behind the question	Solution or lesson strategies
1	37	capacity - cubic feet and gallons	Have they done it?
2	14	radius vs diameter	Many students mis-read the question
3	48	<i>linear function</i>	<i>Test strategy: test answers</i>
4	43	sum of angles in a polygon	Draw and construction
5	38	combinations	Have they done it?
6	44 *	algebra or non-algebra approach	
7	16	units of measurement	Table of information
8	34	average in reverse	
9	9	best estimate	Decimal propers, model estimation strategies
10	39 *	scale on map	Map Activities and estimation
11	47	probability	Have they done it?
12	29	fraction and graph interpretation	
13	2	of means multiply the fractions	Practice word problems
14	13	supplementary angles, angle sum of triangle	Have they done it?
15	41	Pythagoras, how much farther?	Have they done it? Reading the question
16	22	Median and mode	"Data about Us"
17	40	Rates	Draw diagram
18	25	Percent after finding the change	A 3 step question
19	32 *	transformations	Have they done it?
20	45	<i>inequality</i>	<i>Test strategy: test answers</i>

Geometry and Spatial Sense – Review 8-1-32

Question 32, Level F, Form 1

Study the figures on this coordinate grid.



Scale: 1 square = 1 unit

Which of these describes how figure ABCD has been moved to make figure WXYZ?

F	It was rotated 180° around the origin
G	It was reflected across the y-axis.
H	It was translated 5 units to the left and 5 units down.
J	It was reflected across the x-axis.

The Fundamental Concept

Rotate means turn

Reflect means flip

Translate means slide

Practice Questions

See the following pages, “Transformation Triangles 1 to 4”

There is a blank page for creating new questions.

Remember to also explore transforming quadrilaterals and polygons.

Follow-up task

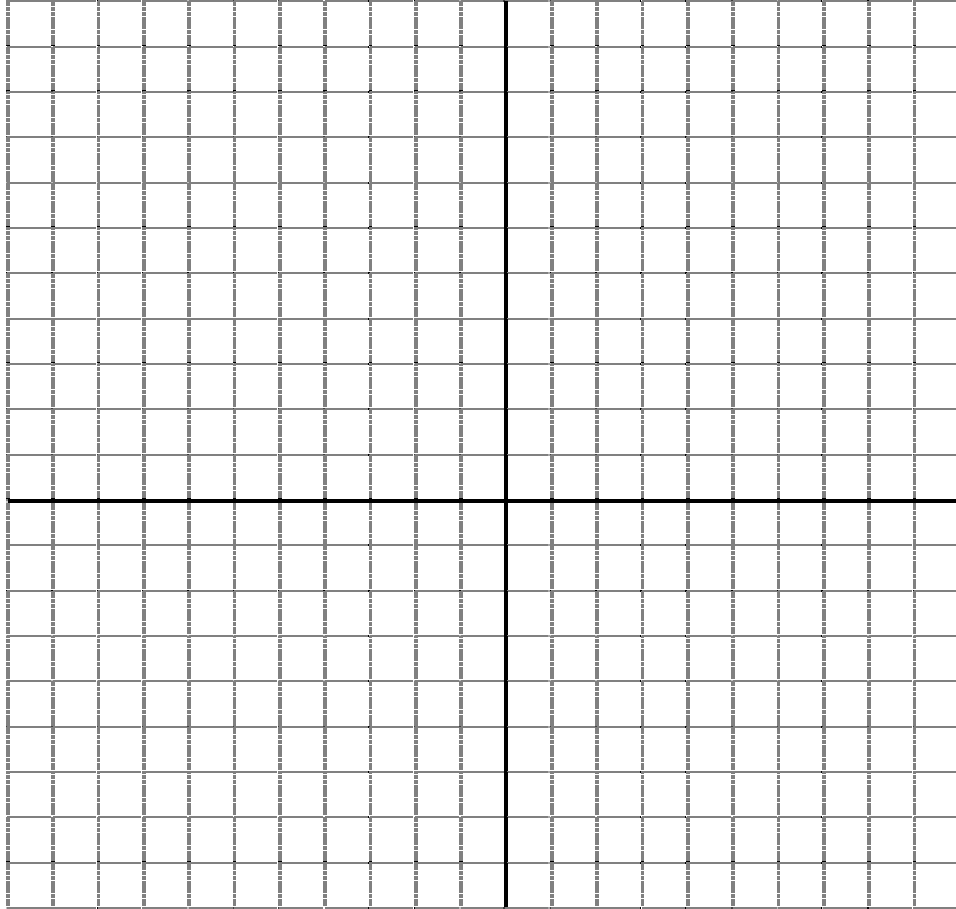
1. Write your own question like the one above
2. Explain what you are doing. (next to or under your working)

Name:

Date:

Transformations – Triangles 1

1. On the graph below, plot and connect the points A(2,2), B(3,9) and C(6,4).



2. Translate (shift) the new triangle down 11 units.
What are the positions of the new points?

$$A'(\quad, \quad), B'(\quad, \quad), C'(\quad, \quad)$$

3. Translate (shift) the new triangle left 8 units.
What are the positions of the new points?

$$A''(\quad, \quad), B''(\quad, \quad), C''(\quad, \quad)$$

4. Translate (shift) the new triangle up 11 units
What are the positions of the new points?

$$A'''(\quad, \quad), B'''(\quad, \quad), C'''(\quad, \quad)$$

What transformation is needed to get the triangle back to its original position?

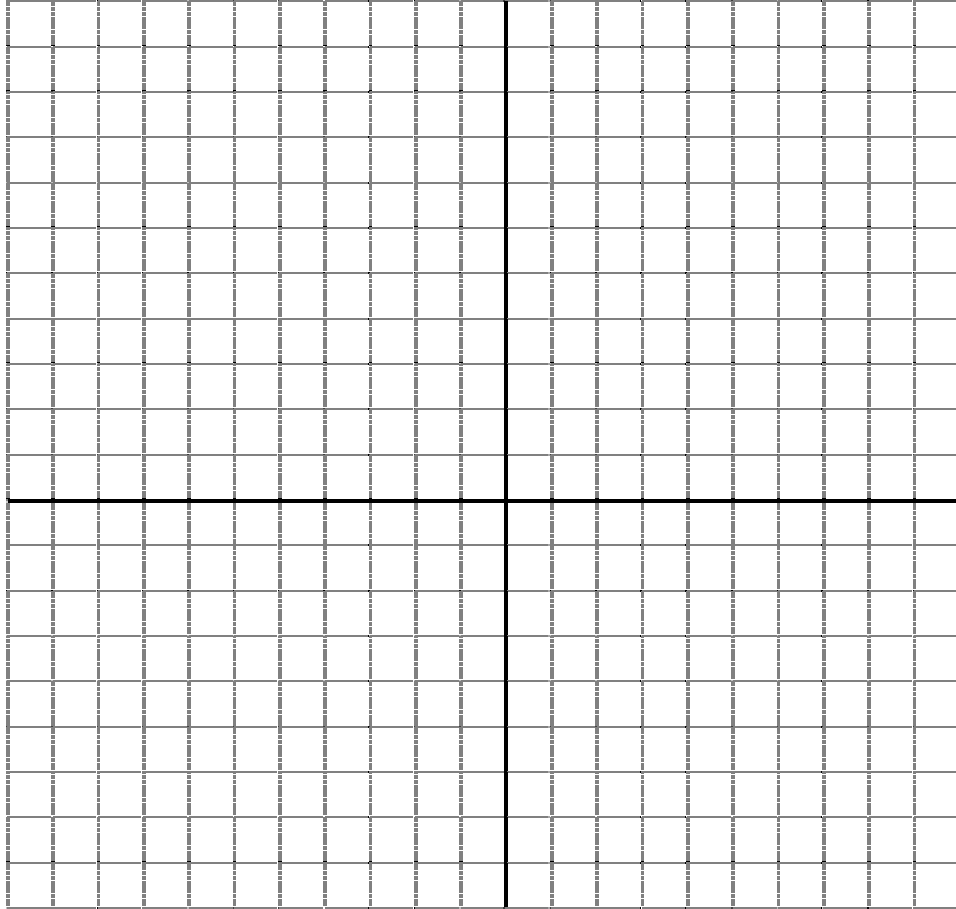
Follow-up activity: Design a similar question sheet.

Name:

Date:

Transformations – Triangles 2

1. On the graph below, plot and connect the points A(2,2), B(3,9) and C(6,4).



2. Reflect (flip) the triangle about the y-axis. What are the positions of the points?

$A'(\quad, \quad)$, $B'(\quad, \quad)$, $C'(\quad, \quad)$

3. Next, Reflect (flip) the triangle about the x-axis. What are the positions of the new points?

$A''(\quad, \quad)$, $B''(\quad, \quad)$, $C''(\quad, \quad)$

4. Now, Reflect (flip) Reflect (flip) the triangle about the y-axis about the y-axis. What are the positions of the new points?

$A'''(\quad, \quad)$, $B'''(\quad, \quad)$, $C'''(\quad, \quad)$

What transformation do you have to do to get the triangle back to its original position?

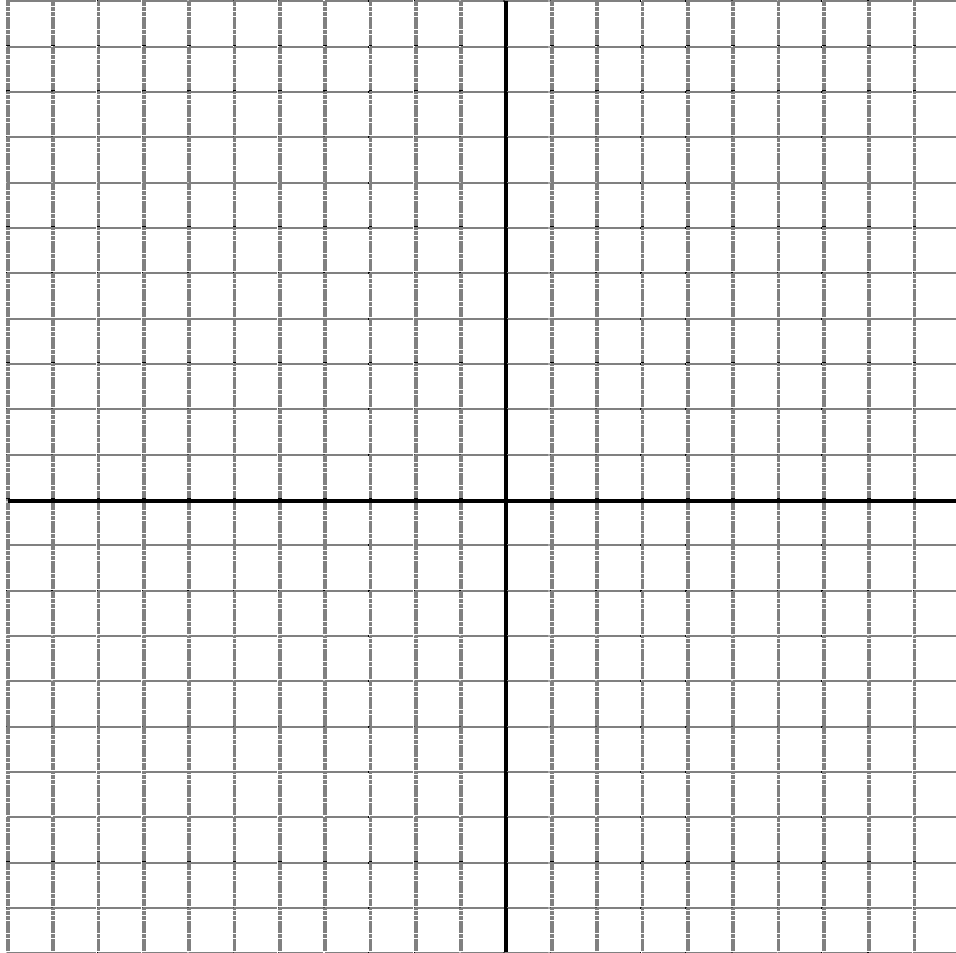
Follow-up activity: Design a similar question sheet.

Name:

Date:

Transformations – Triangles 3

1. On the graph below, plot and connect the points A(2,2), B(3,9) and C(6,4).



2. Rotate (turn) the triangle 90° clockwise about the origin (0, 0). What are the positions of the points?

$A'(\quad , \quad), B'(\quad , \quad), C'(\quad , \quad)$

What do you notice about the x and y values of the points?

3. Next, rotate (turn) the triangle 180° clockwise about the origin (0, 0). What are the positions of the points?

$A''(\quad , \quad), B''(\quad , \quad), C''(\quad , \quad)$

What do you notice about the x and y values of the points?

What transformation is needed to get the triangle back to its original position?

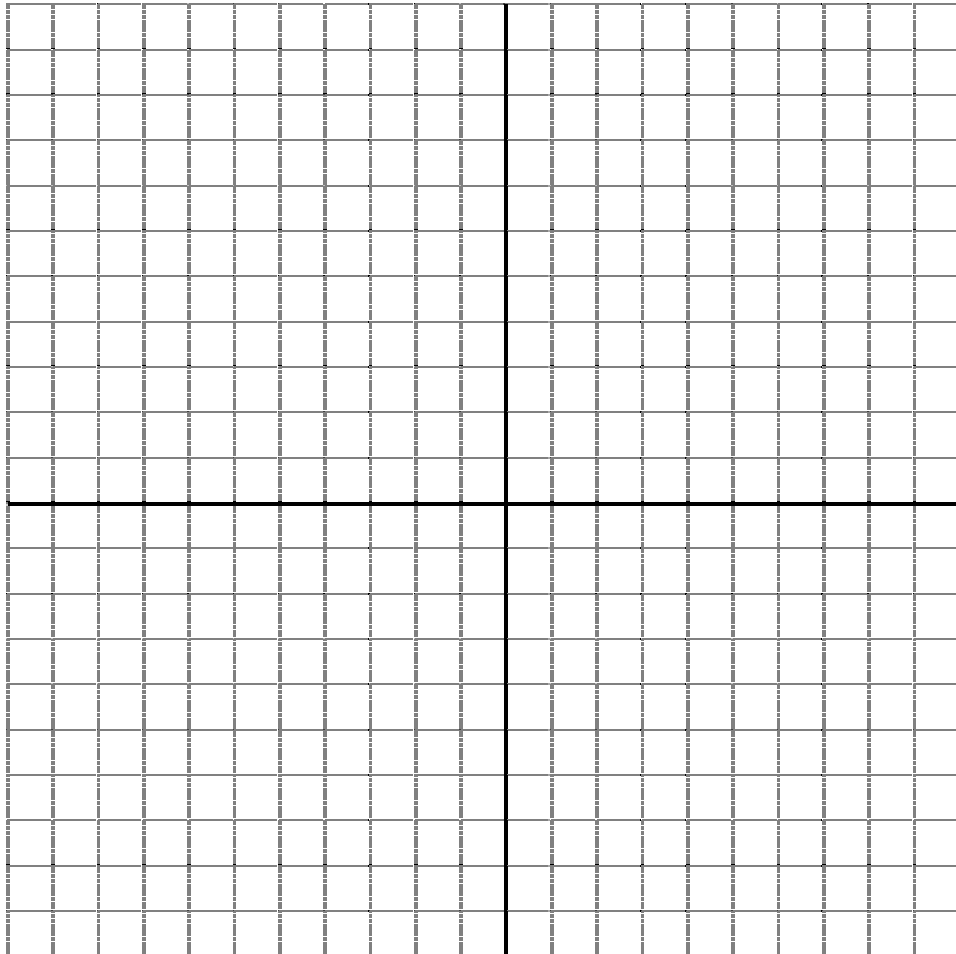
Follow-up activity: Design a similar question sheet.

Name:

Date:

Transformations – Triangles 4

1. On the graph below, plot and connect the points A(2,2), B(3,9) and C(6,4).



2. Reflect (flip) the triangle about the y-axis. What are the positions of the points?

$$A'(\quad, \quad), B'(\quad, \quad), C'(\quad, \quad)$$

3. Next, translate (shift) the new triangle down 11 units. What are the positions of the new points?

$$A''(\quad, \quad), B''(\quad, \quad), C''(\quad, \quad)$$

4. Now, multiply all the x-coordinates by -1 . What are the positions of the new points?

$$A'''(\quad, \quad), B'''(\quad, \quad), C'''(\quad, \quad)$$

Is there another of describing the last transformation?

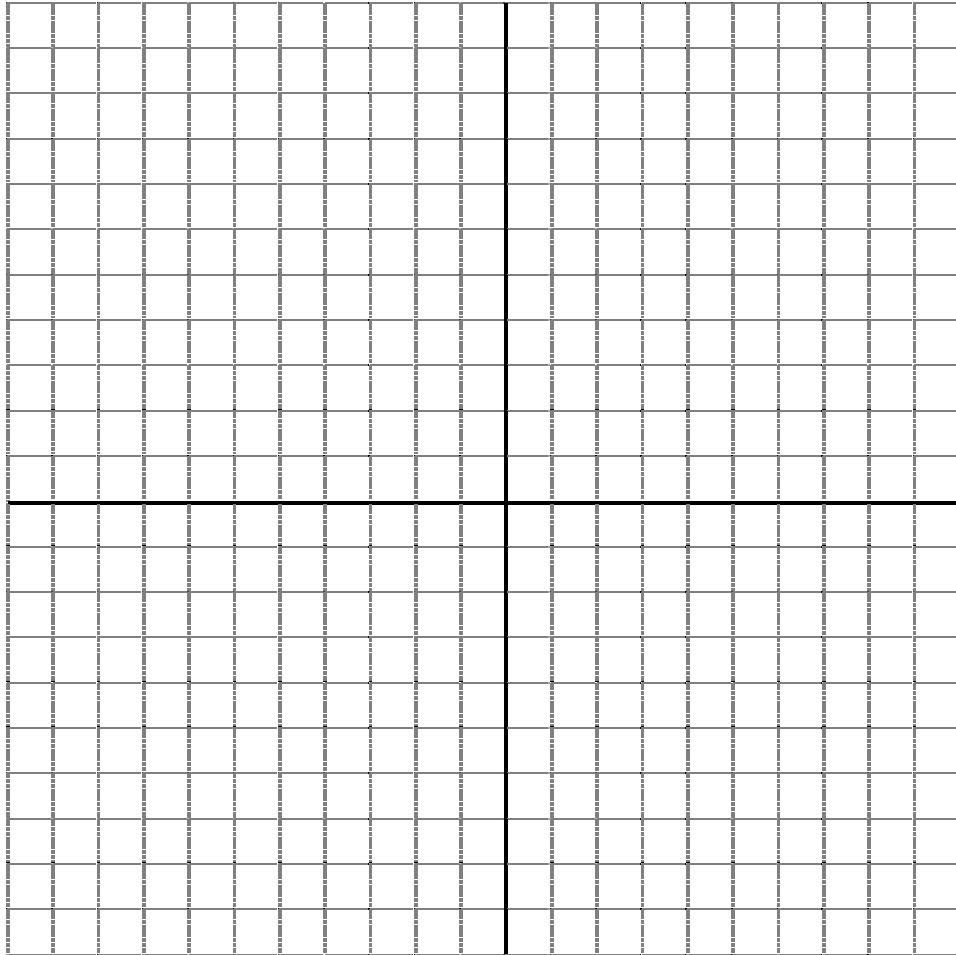
Follow-up activity: Design a similar question sheet.

Designer's Name:
Tester's Name:

Date:
Date:

Transformations

1. On the graph below, plot and connect the points



2.

3.

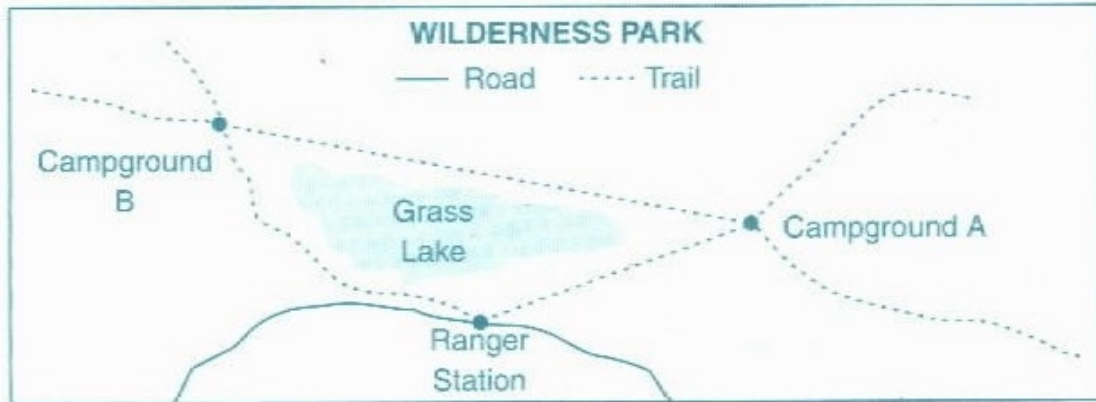
4.

Measurement – Review 8-1-39 – Teacher Notes

Question 39, Level F, Form 1

Use your centimeter ruler to help you solve this problem.

Look at this scale drawing of Wilderness Park. Campground A is exactly 10 kilometers from the ranger Station. How far is Campground A from Campground B?



F	less than 18 kilometers
G	between 18 and 20 kilometers
H	between 20 and 22 kilometers
J	more than 22 kilometers

Fundamental Concepts

Scale Drawing

Measuring in centimeters

An approximate might be good enough.

The Traditional and Alternative Approaches

Many teachers model a proportion approach.

This type of question could be done by measuring the 10 kilometers and marking off against A to B.

Similar Question

See the following pages, “How can we use scales on maps?”

Follow-up task

1. Write your own question like the one above
2. Explain what you are doing. (next to or under your working)

What we will do this lesson!

1. Do now: Applying ratio concepts to map scales.
2. Teacher to model and share strategies for example activity
 - Scales on Maps – USA
3. Student (in pairs) to complete 1 of the 5 activities
 - Scales on Maps: Australia
 - Scales on Maps: New York State
 - Scales on Maps: Ayers Rock
 - Scales on Maps: Antarctica
 - Scales on Maps – Northern Territory
 - Scales on Maps: United Kingdom

You must do questions 1 to 4 on the activity sheet.

Question 5 is to extend your thinking, but it is not compulsory to complete.

Scales on Maps – USA



Complete the following questions using the scale on the above map.

Show all working in your notebook.

1. Using a ruler measure the length of 300 miles on the scale.
2. Write the scale of the map in 3 ways.
3. Using the scale **estimate** the distance from:
 - a. New York to New Orleans
 - b. New York to Philadelphia
4. Using the scale, and the mathematical property of a proportion **calculate exactly** the distance from:
 - a. New York to San Francisco
 - b. Houston to Winnipeg

Extension Activity

5. Trace the required parts of the map, then using the scale, and the mathematical property of proportion calculate the
 - a. Area of the USA (use estimation by making it into rectangles)
 - b. Perimeter of the USA

Map downloaded from <http://www.lonelyplanet.com>

Scales on Maps – Australia



Complete the following questions using the scale on the above map.

Show all working in your notebook.

1. Using a ruler measure the length of 250 miles on the scale.
2. Write the scale of the map in 3 ways.
3. Using the scale **estimate** the distance from:
 - a. Melbourne to Sydney
 - b. Sydney to Ayers Rock
4. Using the scale, and the mathematical property of a proportion **calculate exactly** the distance from:
 - a. Sydney to Perth
 - b. Darwin to Adelaide

Extension Activity

5. Trace the required parts of the map, then using the scale and the mathematical property of proportion calculate the Area of the Australia (divide it into rectangles and triangles)

Map downloaded from <http://www.lonelyplanet.com>

Scales on Maps – New York State



Complete the following questions using the scale on the above map.

Show all working in your notebook.

1. Using a ruler measure the length of 40 miles on the scale.
2. Write the scale of the map in 3 ways.
3. Using the scale **estimate** the distance from:
 - a. New York to Montauk
 - b. New York to Jersey City
4. Using the scale, and the mathematical property of a proportion **calculate exactly** the distance from:
 - a. New York to Albany
 - b. New York to Niagara Falls

Extension Activity

5. Trace the required parts of the map, then using the scale, and the mathematical property of proportion calculate the
 - a. Area of Long Island (use estimation by making it a rectangle)
 - b. Perimeter of New York State

Map downloaded from <http://www.infoplease.com>

Patterns, Functions, Algebra – Review 8-1-44 – Teacher Notes

Question 44, Level F, Form 1

A total of 1,060 people attended two performances of the school play. At the first performance there were 120 more people than at the second performance. How many people attended the first performance?

F	470
G	590
H	650
J	940

Traditional and Alternative Approaches

Many teachers model an algebraic approach to this type of question. Many students given some coaching can develop good skills in doing “Guess and Check”
As a teacher you should model for the students how to organize their information in a table of values.

Here are 2 approaches

Approach 1 – split the people equally and then “Test and Review”

1 st perf	2 nd perf	Thoughts
530	530	Split evenly. 2 nd perf needs more
500	560	2 nd perf needs 60 more
440	620	Too much, now has 180 more, add 30, take 30
470	590	2 nd perf has 120 more, total is 1060

Approach 2 – take the excess of the total and divide the remaining people equally.

1 st perf	2 nd perf	Thoughts
	120 more at 2 nd perf	Total of 1060
		If hockey has 12 more than, each share 80 – 12 that is 68
		If 2 nd perf has 120 more, each share 1060 – 120 = 940
470	470	Each have half of 940
470	590	Total for each performance

Similar Questions

Continental Press Form 1, 2 and 3 of Mathematics Progress Indicator Levels D, E, F.

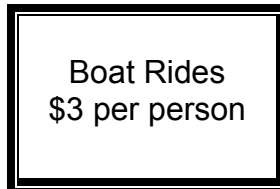
Follow-up task

1. Write your own question like the one above
2. Explain what you are doing. (next to or under your working)

Other Questions

Question 46, Level D, Form 2

Use this sign to answer the questions below.



The members of the bird-watching club took the boat to an island. They paid \$192 all together for the boat ride. If there are 6 more women than men in the group, how many women are there?

- | | |
|----------|----|
| F | 35 |
| G | 38 |
| H | 70 |
| J | 99 |

Question 35, Level E, Form 1

The field hockey team at a middle school has 12 more players than the softball team. The two teams have a total of 80 players. How many players are there on the softball team?

- | | |
|----------|----|
| A | 28 |
| B | 34 |
| C | 52 |
| D | 68 |

Question 15, Level E, Form 2

Mrs Snyder owns a car wash.

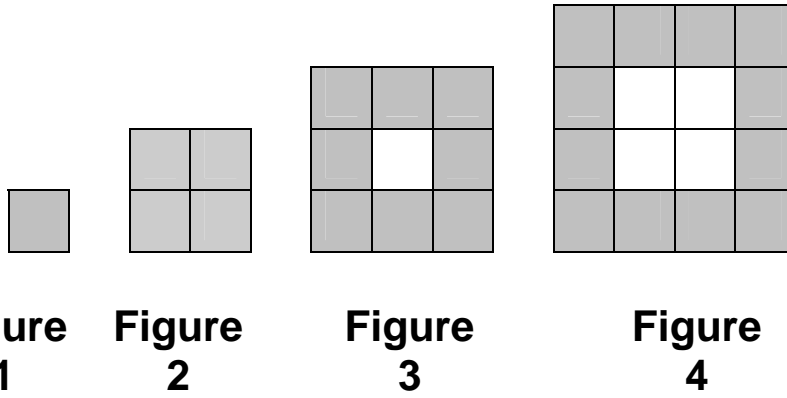
The car wash offers a choice of Regular Wash or Deluxe Wash. One day there was a total of 110 customers. The number of customers who chose Regular Wash was 24 more than the number who chose Deluxe Wash. How many customers chose Regular Wash that day?

- | | |
|----------|----|
| A | 67 |
| B | 71 |
| C | 79 |
| D | 86 |

Patterns, Function, Algebra – Review 8-2-20

Question 20, Level F, Form 2

Look at the pattern below.



If the pattern continues, how many shaded squares will there be in Figure 8?

F	24
G	28
H	36
J	56

The Trap

Counting the non-shaded squares.

Possible approaches

1. Draw the next diagrams
2. Count the squares and continue the pattern

Further Practice

“Post and Rail Fencing 2” Investigation

“Post and Rail Fencing 2” Recording Sheet (for use with students that need help in organizing their notebooks)

Toothpick Problem from NYS Companion to the Core Curriculum

Follow-up task

1. Write your own question like the one above
2. Explain what you are doing. (next to or under your working)

POST and RAIL FENCING 2

MATERIALS: Twenty (20) sticks.

You have been contracted by a Fencing Company to find a way to calculate the number of posts and rails for any size fence.

Complete the following investigation by the process of

READ, MAKE, DRAW, RECORD, ORGANISE, GRAPH, INTERPRET, PREDICT, FORMULATE, TEST, EXPLAIN

1. READ this page, and then write a statement of the problem in your own words.
2. MAKE each of these post and rail fences
DRAW the diagrams.
RECORD the number of posts and rails under each diagram



1 post



2 post, 2 rails

3. Repeat the MAKE, DRAW, RECORD process for 3, 4 and 5 posts.
4. ORGANISE the data into a tables of values.

Number of Posts	1	2	3	4	5	
Number of Rails						

5. GRAPH the table of values.
 - Put the number of posts on the horizontal axis
 - Put the number of rails on the vertical axis.
6. INTERPRET the change in values in the table and graph.
Write sentences to describe the change in values in the table.
Write sentences to describe the change in values in the graph.
7. PREDICT how many rails for 10 posts.
8. FORMULATE and TEST a rule for the number of rails for any number of posts.
9. EXPLAIN your rule and give an example on how to use your rule, for example if there were 100 posts.

POST and RAIL FENCING 2

RECORDING SHEET

MATERIALS: Twenty (20) sticks.

You have been contracted by a Fencing Company to find a way to calculate the number of posts and rails for any size fence.

Complete the following investigation by the process of

**READ, MAKE, DRAW, RECORD, ORGANISE, GRAPH,
INTERPRET, PREDICT, FORMULATE, TEST, EXPLAIN**

1. MAKE each of these post and rail fences
DRAW the diagrams.
RECORD the number of posts and rails under each diagram



2. Repeat the MAKE, DRAW, RECORD process of 4 and 5 posts.

3. ORGANISE the data into a tables of values.

Number of Posts	1	2	3	4	5					
Number of Rails										

4. GRAPH the table of values. (see separate page)
 - Put the number of posts on the horizontal axis
 - Put the number of rails on the vertical axis.

5. INTERPRET the change in values in the table and graph.

Write sentences to describe the change in values in the table.

Write sentences to describe the change in values in the graph.

6. PREDICT how many rails for 10 posts.

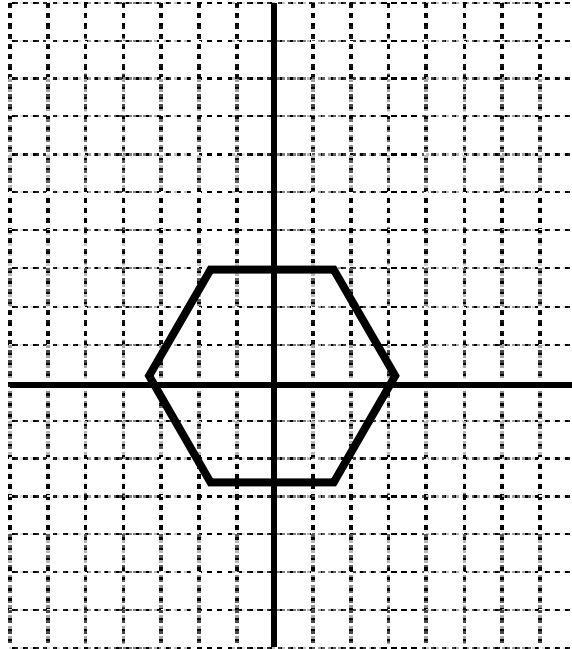
7. FORMULATE and TEST a rule for the number of rails for any number of posts.

8. EXPLAIN your rule and give an example on how to use your rule, for example if there were 100 posts.

Geometry and Spatial Review 8-2-32

Question 32, Level F, Form 2

The figure below shows a regular hexagon on a coordinate grid with its center at the origin.



Which of these transformations would change the position of the hexagon on the coordinate grid??

F	reflection in x-axis
G	reflection in y-axis
H	rotation 60° clockwise about the origin
J	rotation 90° clockwise about the origin

The Fundamental Concept

Rotate means turn

Reflect means flip

Translate means slide

Practice Questions

See the following pages, "Transformation Triangles 1 to 4"

There is a blank page for creating new questions.

Remember to also explore transforming quadrilaterals and polygons.

Follow-up task

1. Write your own question like the one above
2. Explain what you are doing. (next to or under your working)