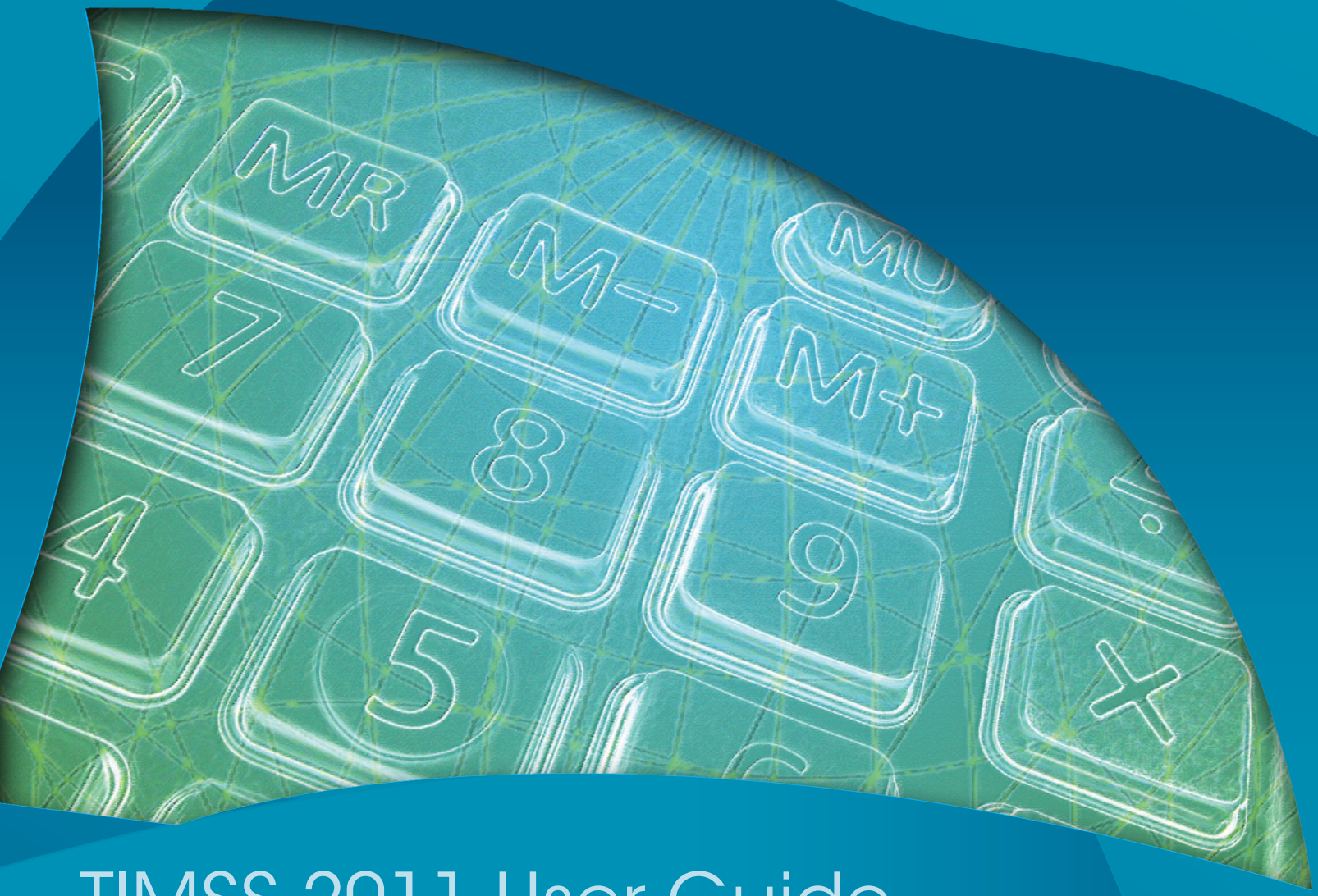
TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

TIMSS

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College



TIMSS 2011 User Guide for the International Database

Released Items

Mathematics – Eighth Grade

Which of these is the BEST estimate of $\frac{7.21 \times 3.86}{10.09}$?

Ⓐ $\frac{7\times3}{10}$

Ⓑ $\frac{7\times4}{10}$

Ⓒ $\frac{7\times3}{11}$

Ⓓ $\frac{7\times4}{11}$

M032166

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

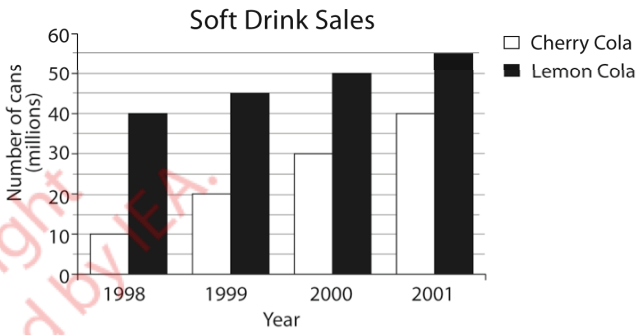
Knowing

Maximum Points

1

Key

B



The graph shows the sales of two types of soft drink over 4 years. If the sales trends continue for the next 10 years, determine the year in which the sales of Cherry Cola will be the same as the sales of Lemon Cola.

Ⓐ 2003

Ⓑ 2004

Ⓒ 2005

Ⓓ 2006

M032721

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Reasoning

Maximum Points

1

Key

B

Pat has red tiles and black tiles. Pat uses the tiles to make square shapes.

The 3 × 3 shape has 1 black tile and 8 red tiles.

The 4 × 4 shape has 4 black tiles and 12 red tiles.

The table below shows the number of tiles for the first three shapes Pat made. Pat continued making shapes using this pattern. Complete the table for the 6 × 6 and 7 × 7 shapes.

Shape	Number of Black Tiles	Number of Red Tiles	Total Number of Tiles
3 × 3	1	8	9
4 × 4	4	12	16
5 × 5	9	16	25
6 × 6	16		
7 × 7	25		

Questions for Red and Black Tiles continue.

M032757

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide

Use the patterns in the previous table to answer the following questions.

A. Pat made a shape with a **total** of 64 tiles, how many were black and how many were red?

Answer: _____ black tiles _____ red tiles

B. Pat made a shape that used 49 **black** tiles.
How many **red** tiles did Pat use in that shape?

Answer: _____ red tiles

C. Next, Pat made a shape using 44 of the **red** tiles. How many black tiles would Pat need to complete the black part of the shape?

Answer: _____ black tiles

M032760

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide

M032761

Pat wanted to add a line to the table showing how to find the number of tiles needed to make a square of any size. Use the patterns in the table on the opposite page to help you complete the line for shape $n \times n$ in the table below.

Shape	Number of Black Tiles	Number of Red Tiles	Total Number of Tiles
$n \times n$	$(n-2)^2$		

End of Red and Black Tiles section.

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

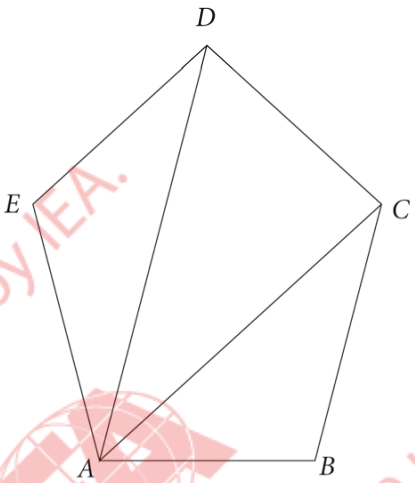
Reasoning

Maximum Points

2

Key

See scoring guide



What is the sum of all the interior angles of pentagon *ABCDE*?
Show your work.

Answer: _____

M032692

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide

M032626

Which of these shows how 36 can be expressed as a product of prime factors?

Ⓐ 6×6

Ⓑ 4×9

Ⓒ $4 \times 3 \times 3$

Ⓓ $2 \times 2 \times 3 \times 3$

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

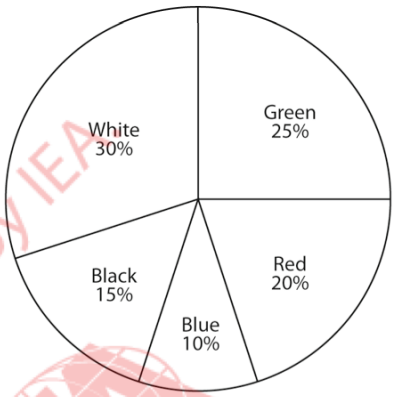
Knowing

Maximum Points

1

Key

D



The pie chart shows the percentage of caps for sale at a sporting goods store. If there are 200 caps, what is the total number of caps that are either white or green?

Ⓐ 55
Ⓑ 100
Ⓒ 110
Ⓓ 145

M032595

Content Domain

Number

Topic Area

Ratio, Proportion and Percent

Cognitive Domain

Applying

Maximum Points

1

Key

C

M032673

If t is a number between 6 and 9, then $t + 5$ is between what two numbers?

Ⓐ 1 and 4

Ⓑ 10 and 13

Ⓒ 11 and 14

Ⓓ 30 and 45

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Knowing

Maximum Points

1

Key

C

M052216

Which number is equal to $\frac{3}{5}$?

(A) 0.8
(B) 0.6
(C) 0.53
(D) 0.35

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

B

M052231

42.65 + 5.748 =

Answer: _____

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

M052061

Kim is packing eggs into boxes.

Each box holds 6 eggs.

She has 94 eggs.

What is the smallest number of boxes she needs to pack all the eggs?

Answer: _____ boxes

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

Which shows a correct method for finding $\frac{1}{3}-\frac{1}{4}$?

Ⓐ $\frac{1-1}{4-3}$

Ⓑ $\frac{1}{4-3}$

Ⓒ $\frac{3-4}{3\times 4}$

Ⓓ $\frac{4-3}{3\times 4}$

M052228

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Applying

Maximum Points

1

Key

D

M052214

Which of these number sentences is true?

Ⓐ $\frac{3}{10}$ of 50 = 50% of 3

Ⓑ 3% of 50 = 6% of 100

Ⓒ $50 \div 30 = 30 \div 50$

Ⓓ $\frac{3}{10} \times 50 = \frac{5}{10} \times 30$

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

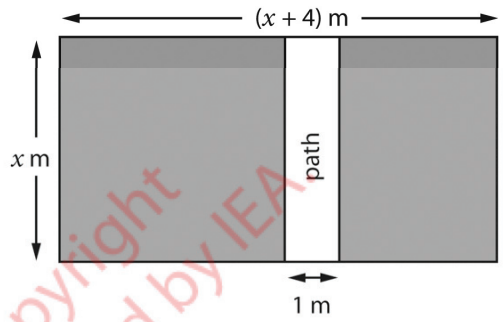
Knowing

Maximum Points

1

Key

D



This is a diagram of a rectangular garden.

The white area is a rectangular path that is 1 meter wide.

Which expression shows the area of the shaded portion of the garden in m^2?

Ⓐ $x^2 + 3x$

Ⓑ $x^2 + 4x$

Ⓒ $x^2 + 4x - 1$

Ⓓ $x^2 + 3x - 1$

M052173

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Applying

Maximum Points

1

Key

A

M052302

$$y = \frac{a+b}{c}$$

$a = 8$, $b = 6$, and $c = 2$

What is the value of y?

Ⓐ 7
Ⓑ 10
Ⓒ 11
Ⓓ 14

Content Domain

Algebra

Topic Area

Equations/ Formulas and Functions

Cognitive Domain

Knowing

Maximum Points

1

Key

A

A piece of wood was 40 cm long.

It was cut into 3 pieces.

The lengths in cm are

$2x - 5$

$x + 7$

$x + 6$

What is the length of the longest piece?

Answer: _____ cm

Show your work. If you use a calculator, you still must describe all the steps you used to obtain your answer.

M052002

Content Domain

Algebra

Topic Area

Equations/ Formulas and Functions

Cognitive Domain

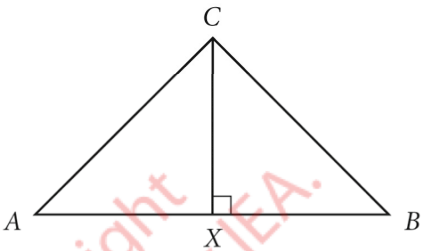
Applying

Maximum Points

2

Key

See scoring guide



In this triangle:

$AC = BC$

AB is twice as long as CX.

What is the size of angle B?

Answer: _____ °

M052362

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

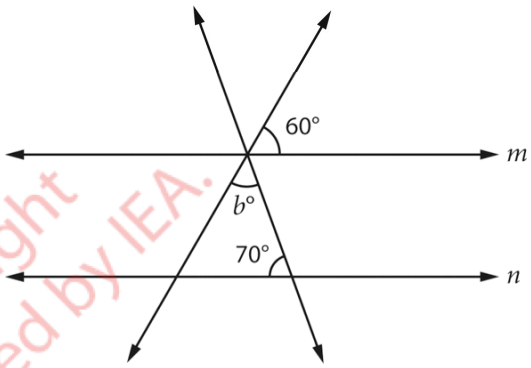
Reasoning

Maximum Points

1

Key

See scoring guide



Lines m and n are parallel.

What is the value of b?

Answer: _____

M052408

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

M052084

The perimeter of a square is 36 cm.

What is the area of this square?

Ⓐ 81 cm^2

Ⓑ 36 cm^2

Ⓒ 24 cm^2

Ⓓ 18 cm^2

Content Domain

Geometry

Topic Area

Geometric Measurement

Cognitive Domain

Applying

Maximum Points

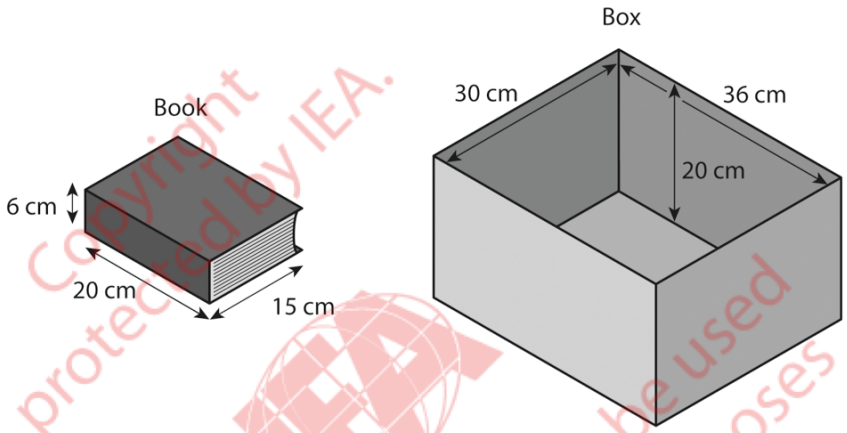
1

Key

A

Ryan is packing books into a rectangular box.

All the books are the same size.



What is the largest number of books that will fit inside the box?

Answer: _____

M052206

Content Domain

Geometry

Topic Area

Geometric Measurement

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

There are 10 marbles in a bag: 5 red, and 5 blue.

Sue draws a marble from the bag at random. The marble is red.

She puts the marble back into the bag.

What is the probability that the next marble she draws at random is red?

Ⓐ $\frac{1}{2}$

Ⓑ $\frac{4}{10}$

Ⓒ $\frac{1}{5}$

Ⓓ $\frac{1}{10}$

M052429

Content Domain

Data and Chance

Topic Area

Chance

Cognitive Domain

Reasoning

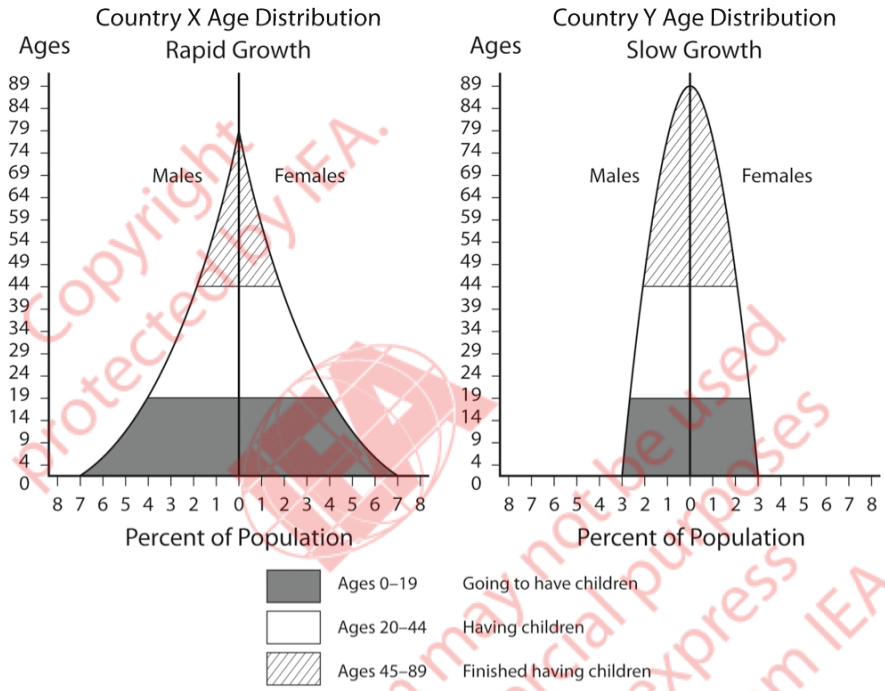
Maximum Points

1

Key

A

Comparison of Age Structure Between Country X and Country Y



The graphs for Country X and Country Y show the age structure of each country's population. The population is divided into three age groups from youngest to oldest. The graphs enable predictions about population growth.

A. Why could the age structure of Country X lead to more rapid population growth than the age structure of Country Y?

B. Why could Country Y expect to have a bigger problem taking care of its elderly population than Country X?

M052503

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

M042032

Which fraction is equivalent to 0.125?

Ⓐ $\frac{125}{100}$

Ⓑ $\frac{125}{1{,}000}$

Ⓒ $\frac{125}{10{,}000}$

Ⓓ $\frac{125}{100{,}000}$

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

B

M042031

The fractions $\frac{4}{14}$ and $\frac{\square}{21}$ are equivalent.

What is the value of $\square$?

Ⓐ 6
Ⓑ 7
Ⓒ 11
Ⓓ 14

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Applying

Maximum Points

1

Key

A

Here is a pattern:

$3 - 3 = 0$

$3 - 2 = 1$

$3 - 1 = 2$

$3 - 0 = 3$

What will the next line in the pattern be?

Answer: _____

M042186

Content Domain

Number

Topic Area

Integers

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

Peter, James, and Andrew each had 20 tries at throwing balls into a basket.

Complete the missing boxes below.

Name	Number of Successful Shots	Percentage of Successful Shots
Peter	10 out of 20	50 %
James	15 out of 20	☐
Andrew	☐ out of 20	80%

M042059

Content Domain

Number

Topic Area

Ratio, Proportion and Percent

Cognitive Domain

Knowing

Maximum Points

2

Key

See scoring guide

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

BOSTON
COLLEGE

ISBN: 978-1-889938-13-4

timss.bc.edu