MATHEMATICS ITEMS

Guide to the Content and Layout of This Book

The *Mathematics Items* book contains, in a ready-to-use form, the 82 mathematics assessment items that appeared in Book 3, *Mathematics Concepts and Mathematics Items*. Each item is presented on a separate page to facilitate photocopying.

The two books are designed to be used in tandem. The *Mathematics Items* book is designed to facilitate the construction of sets of items tailored to the purpose of the user–most likely a classroom teacher. Users can select items for their own purpose based on their reading of the *Mathematics Concepts and Mathematics Items* book, photocopy these and administer them to students. Student responses can be scored using the scoring instructions presented in the *Mathematics Concepts and Mathematics Items* book, and may be compared to the international benchmarks presented there.

To assist in the recording and scoring of items Scoring Worksheets can be generated by photocopying the master copy included in this book.

If there are 300 calories in 100 g of a certain food, how many calories are there in a 30 g portion of this food?

A. 90

B. 100

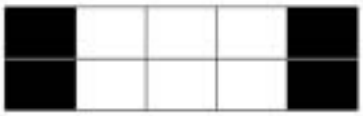
C. 900

D. 1000

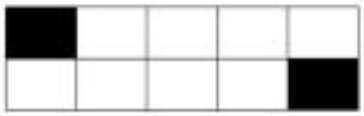
E. 9000

Which picture shows that $\frac{2}{5}$ is equivalent to $\frac{4}{10}$?

A.



B.



C.



D.



Which of these is the smallest number?

A. 0.625

B. 0.25

C. 0.375

D. 0.5

E. 0.125

Which of these fractions is smallest?

A. $\frac{1}{6}$

B. $\frac{2}{3}$

C. $\frac{1}{3}$

D. $\frac{1}{2}$



What is the best estimate of the number corresponding to P?

A. 1.1

B. 1.2

C. 1.4

D. 1.5

A runner ran 3000 m in exactly 8 minutes. What was his average speed in meters per second?

A. 3.75

B. 6.25

C. 16.0

D. 37.5

E. 62.5

Which of these numbers is between 0.07 and 0.08?

A. 0.00075

B. 0.0075

C. 0.075

D. 0.75

F12

What fraction of the circle is shaded?

A. Between 0 and $\frac{1}{4}$

B. Between $\frac{1}{4}$ and $\frac{1}{2}$

C. Between $\frac{1}{2}$ and $\frac{3}{4}$

D. Between $\frac{3}{4}$ and 1



Which shows $\frac{2}{3}$ of the square shaded?

A. 

B. 

C. 

D. 

E. 

The sum 691 + 208 is closest to the sum

A. 600 + 200

B. 700 + 200

C. 700 + 300

D. 900 + 200

Divide: $\frac{6}{55} \div \frac{3}{25}$ =

Answer: _____

Divide $0.003\overline{)15.45}$

A. 0.515

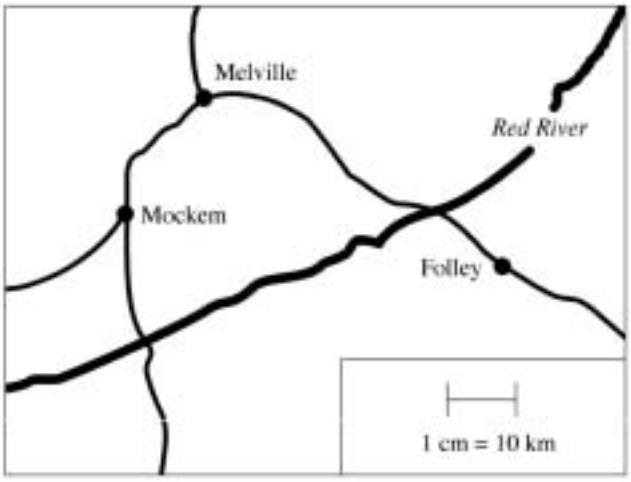
B. 5.15

C. 51.5

D. 515

E. 5150

On the map, 1 cm represents 10 km on the land.



On the land, about how far apart are the towns Melville and Folley?

A. 5 km

B. 30 km

C. 40 km

D. 50 km



The car is 3.5 m long. About how long is the building?

A. 18 m

B. 14 m

C. 10 m

D. 4 m

Which number is two hundred six and nine-tenths?

A. 206.09

B. 206.9

C. 206.910

D. 2006.9

What is the value of $\frac{4}{5} - \frac{1}{3} - \frac{1}{15}$?

A. $\frac{1}{5}$

B. $\frac{2}{5}$

C. $\frac{7}{15}$

D. $\frac{3}{4}$

E. $\frac{4}{5}$

A company produced 17,175 cars in 1996. For a report, this number was rounded to the nearest hundred. Which was the number of cars given in the report?

A. 17,000

B. 17,100

C. 17,200

D. 17,270

In which list of fractions are all of the fractions equivalent?

A. $\frac{1}{2}$, $\frac{2}{4}$, $\frac{4}{6}$

B. $\frac{2}{3}$, $\frac{4}{6}$, $\frac{8}{12}$

C. $\frac{2}{5}$, $\frac{4}{10}$, $\frac{8}{50}$

D. $\frac{3}{4}$, $\frac{4}{6}$, $\frac{6}{8}$

Penny had a bag of marbles. She gave one-third of them to Rebecca, and then one-fourth of the remaining marbles to John. Penny then had 24 marbles left in the bag. How many marbles were in the bag to start with?

A. 36

B. 48

C. 60

D. 96

A painter had 25 L of paint. He used 2.5 L of paint every hour. He finished the job in 5.5 hours. How much paint did he have left?

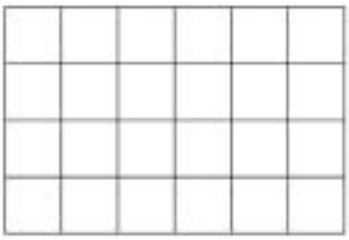
A. 10.25 L

B. 11.25 L

C. 12.75 L

D. 13.75 L

Shade in $\frac{3}{8}$ of the unit squares in the grid.



P13

There are 68 rows of cars in a parking lot. Each row has 92 cars. Which of these would give the closest estimate of the total number of cars in the parking lot?

A. 60 x 90 = 5400

B. 60 x 100 = 6000

C. 70 x 90 = 6300

D. 70 x 100 = 7000

Sound travels at approximately 330 meters per second. The sound of an explosion took 28 seconds to reach a person. Which of these is the closest estimate of how far away the person was from the explosion?

A. 12,000 m

B. 9,000 m

C. 8,000 m

D. 6,000 m

Robin and Jim took cherries from a basket. Robin took $\frac{1}{3}$ of the cherries and Jim took $\frac{1}{6}$ of the cherries. What fraction of the cherries remained in the basket?

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{6}$

D. $\frac{1}{18}$

Write 0.48 as a fraction reduced to its lowest terms.

Answer: _____

Subtract: 4.722 – 1.935 =

A. 2.787

B. 2.797

C. 2.887

D. 2.897

The total weight of a pile of 500 salt crystals is 6.5 g. What is the average weight of a salt crystal?

A. 0.0078 g

B. 0.013 g

C. 0.0325 g

D. 0.078 g

R13

Subtract: 7003
– 4078

A. 2035

B. 2925

C. 3005

D. 3925

Laura had $240. She spent $\frac{5}{8}$ of it. How much money did she have left?

Answer: _____

John sold 60 magazines and Mark sold 80 magazines. The magazines were all sold for the same price. The total amount of money received for the magazines was $700. How much money did Mark receive?

Answer: _____

A book publisher sent 140 copies of a certain book to a bookstore. The publisher packed the books in two types of boxes. One type of box held 8 copies of the book, and the other type of box held 12 copies of the book. The boxes were all full, and there were equal numbers of both types of boxes.

a) How many boxes holding 12 books were sent to the bookstore?

Answer: _____

b) What fraction of the books sent to the bookstore were packed in the smaller boxes?

Answer: _____

A sheet of paper is 0.012 cm thick. Of the following, which would be the height of a stack of 400 sheets of this paper?

A. 0.048 cm

B. 0.48 cm

C. 4.8 cm

D. 48 cm

The height of a boy was reported as 140 cm. The height had been rounded to the nearest 10 cm. What are two possibilities for the boy's actual height?

Answer: _____ cm and _____ cm

In making a garden fertilizer, a gardener mixes 2 kg of a nitrate, 3 kg of a phosphate, and 6 kg of potash. What is the ratio of nitrate to the total amount of fertilizer?

A. $\frac{11}{9}$

B. $\frac{2}{3}$

C. $\frac{2}{9}$

D. $\frac{2}{11}$

n is a number. When *n* is multiplied by 7, and 6 is then added, the result is 41. Which of these equations represents this relation?

A. $7n + 6 = 41$

B. $7n \pm 6 = 41$

C. $7n \times 6 = 41$

D. $7(n + 6) = 41$

If the ratio 7 to 13 is the same as the ratio x to 52, what is the value of x?

A. 7

B. 13

C. 28

D. 364

D10

The cost, C, of printing greeting cards consists of a fixed charge of 100 cents and a charge of 6 cents for each card printed. Which of these equations can be used to determine the cost of printing n cards?

A. $C = (100 + 6n)$ cents

B. $C = (106 + n)$ cents

C. $C = (6 + 100n)$ cents

D. $C = (106n)$ cents

E. $C = (600n)$ cents

F11

If 4 times a number is 48, what is $\frac{1}{3}$ of the number?

A. 4

B. 8

C. 12

D. 16

The table shows a relation between x and y.

x	2	3	4	5
y	7	10	13	16

Which of these equations expresses this relation?

A. $y = x + 5$

B. $y = x \pm 5$

C. $y = \frac{1}{3}(x \pm 1)$

D. $y = 3x + 1$

□ represents the number of magazines that Lina reads each week. Which of these represents the total number of magazines that Lina reads in 6 weeks?

A. $6 + \square$

B. $6 \times \square$

C. $\square + 6$

D. $(\square + \square) \times 6$

The table represents a relation between x and y.

What is the missing number in the table?

x	y
2	5
3	7
4	?
7	15

A. 9

B. 10

C. 11

D. 12

E. 13

In a sequence of starts and stops, an elevator travels from the first floor to the fifth floor and then to the second floor. From there, the elevator travels to the fourth floor and then to the third floor. If the floors are 3 m apart, how far has the elevator traveled?

A. 18 m

B. 27 m

C. 30 m

D. 45 m

The table represents a relation between x and y.

Which of the following equations could represent the same relation?

x	y
1	1
2	4
3	7
4	10

A. $y = 2x + 2$

B. $y = 2x - 1$

C. $y = 3x + 2$

D. $y = 3x + 1$

E. $y = 3x - 2$

The table shows some values of x and y, where x is proportional to y.

x	4	8	Q
y	9	P	45

What are the values of P and Q?

A. $P = 40$ and $Q = 13$

B. $P = 18$ and $Q = 17$

C. $P = 20$ and $Q = 18$

D. $P = 40$ and $Q = 18$

E. $P = 18$ and $Q = 20$

Find the value of x if $12x - 10 = 6x + 32$

Answer: _____

If $x = 3$, what is the value of $\frac{5x + 3}{4x - 3}$?

Answer: _____

Which of these expressions is equivalent to $n \times n \times n$ for all values of n?

A. $\frac{n}{3}$

B. $n + 3$

C. $3n$

D. n^3

For all numbers k,
$k + k + k + k + k$ can be written as

A. $k + 5$

B. $5k$

C. k^5

D. $5(k + 1)$

Which of the following is true when a, b, and c are different real numbers?

A. $a - b = b - a$

B. $a(b - c) = b(c - a)$

C. $b - c = c - b$

D. $ab = ba$

E. $ab - c = ac - b$

If k represents a negative number, which of these is a positive number?

A. k^2

B. k^3

C. $2k$

D. $\frac{k}{2}$

A club has 86 members, and there are 14 more girls than boys. How many boys and how many girls are members of the club?

Show your work.

The figures show four sets consisting of circles.

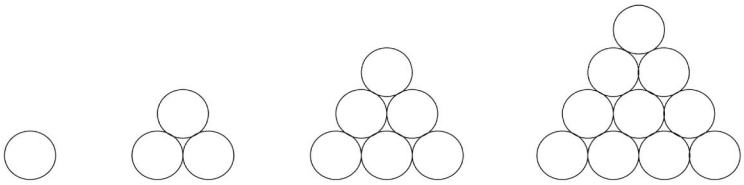


Figure 1 Figure 2 Figure 3 Figure 4

a) Complete the table below. First, fill in how many circles make up Figure 4. Then, find the number of circles that would be needed for the 5th figure if the sequence of figures is extended.

Figure	Number of circles
1	1
2	3
3	6
4	
5	

b) The sequence of figures is extended to the 7th figure. How many circles would be needed for Figure 7?

Answer: _____

c) The 50th figure in the sequence contains 1275 circles. Determine the number of circles in the 51st figure. Without drawing the 51st figure, explain or show how you arrived at your answer.

What units would be best to use to measure the weight (mass) of an egg?

A. centimeters

B. milliliters

C. grams

D. kilograms

F10



Using a centimeter ruler like this one, you can measure accurately to the nearest

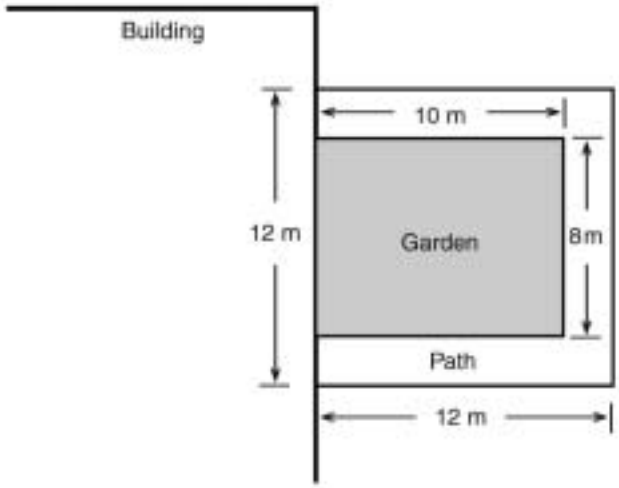
A. millimeter

B. half-millimeter

C. centimeter

D. half-centimeter

A rectangular garden that is next to a building has a path around the other three sides, as shown.



What is the area of the path?

A. 144 m^2

B. 64 m^2

C. 44 m^2

D. 16 m^2

Four girls measured the length of their paces. The chart shows their measurements.

Name	Length of Pace
Polly	80 cm
Maria	65 cm
Helen	75 cm
Susan	60 cm

Who would take the most paces in walking from one end of a hallway to the other?

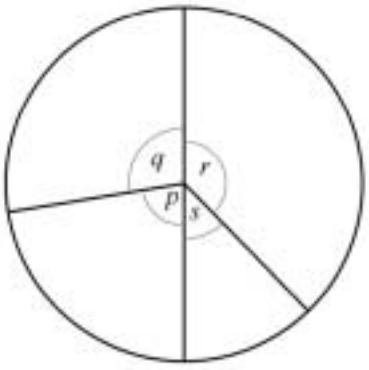
A. Polly

B. Maria

C. Helen

D. Susan

Which angle in the figure has a measure closest to 45°?



A. p

B. q

C. r

D. s

The rectangle below is twice as long as it is wide.



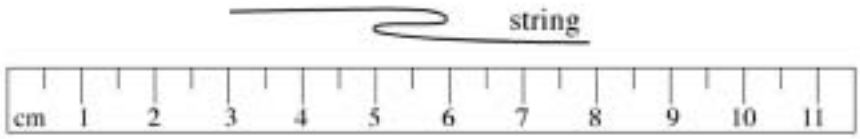
What is the ratio of the width of the rectangle to its perimeter?

A. $\frac{1}{2}$

B. $\frac{1}{3}$

C. $\frac{1}{4}$

D. $\frac{1}{6}$



If the string in the diagram is pulled straight, which of these is closest to its length?

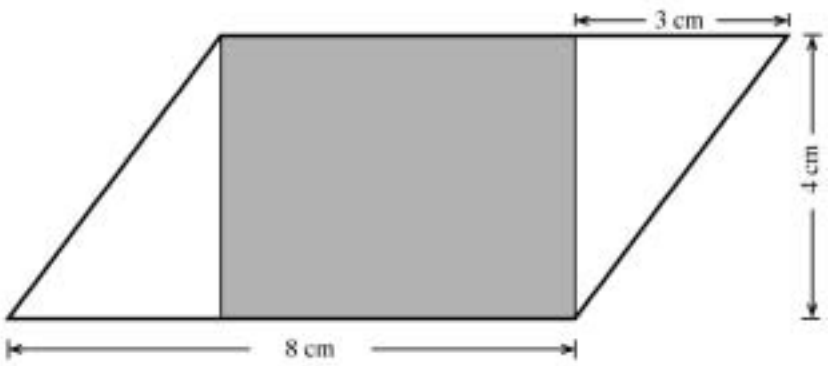
A. 5 cm

B. 6 cm

C. 7 cm

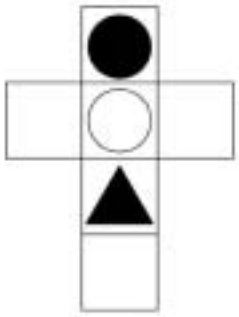
D. 8 cm

The figure shows a shaded rectangle inside a parallelogram.



What is the area of the shaded rectangle?

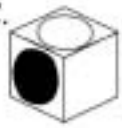
Answer: _____



Which of these cubes could be made by folding the figure above?

A. 

B. 

C. 

D. 

The line m is a line of symmetry for figure $ABCDE$.

The measure of angle BCD is

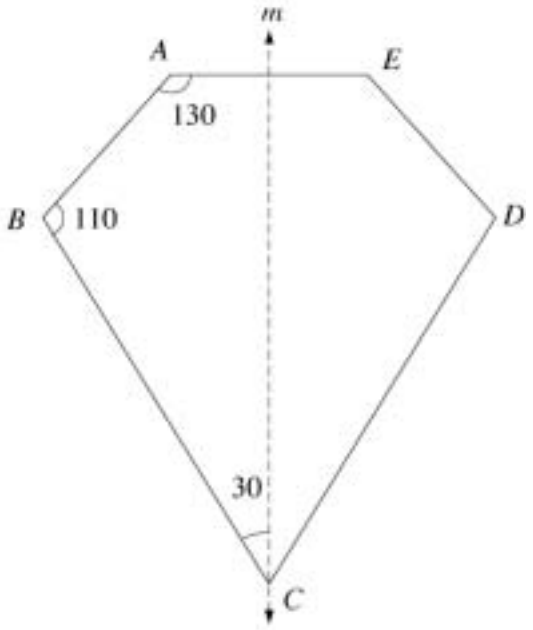
A. 30°

B. 50°

C. 60°

D. 70°

E. 110°



Of the following, which is NOT true for all rectangles?

A. The opposite sides are parallel.

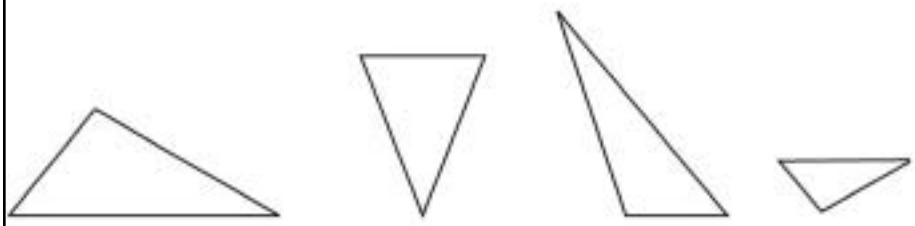
B. The opposite sides are equal.

C. All angles are right angles.

D. The diagonals are equal.

E. The diagonals are perpendicular.

Two of the triangles below are similar.



I II III IV

Which two triangles are similar?

A. I and II

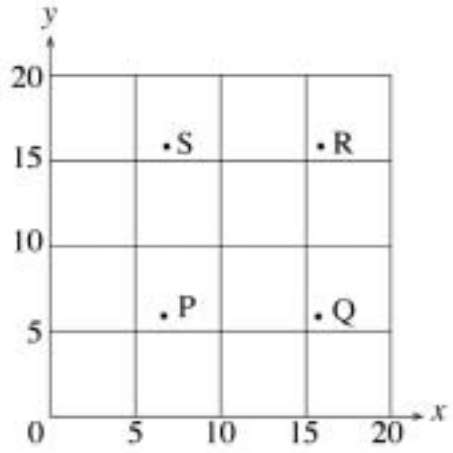
B. I and III

C. I and IV

D. II and IV

E. III and IV

Which point on the graph could have coordinates (7,16)?



A. Point P

B. Point Q

C. Point R

D. Point S

In a quadrilateral, each of two angles has a measure of 115°. If the measure of a third angle is 70°, what is the measure of the remaining angle?

A. 60°

B. 70°

C. 130°

D. 140°

E. None of the above

Point P (not shown) on the number line is 5 units from point N and 2 units from point M.



Where is point P located?

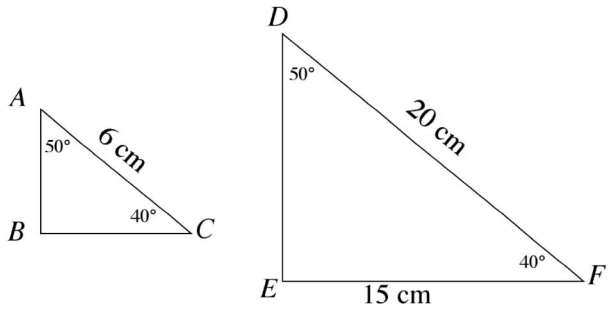
A. Between O and L

B. Between L and M

C. Between M and N

D. To the right of N

The figure represents two similar triangles. The triangles are not drawn to scale.



In the actual triangle *ABC*, what is the length of side *BC*?

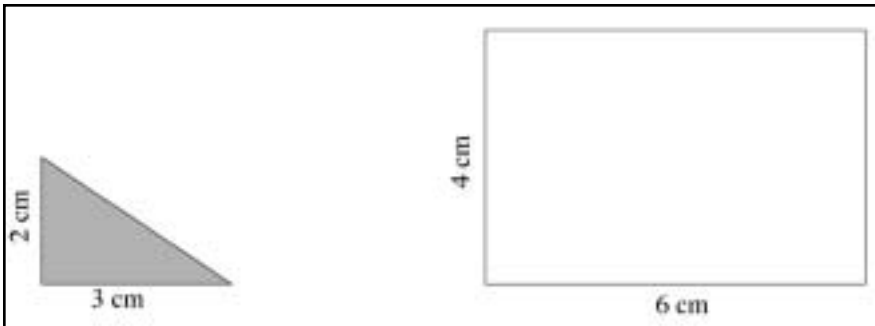
A. 3.5 cm

B. 4.5 cm

C. 5 cm

D. 5.5 cm

E. 8 cm



How many of the shaded right triangles shown above are needed to exactly cover the surface of the rectangle?

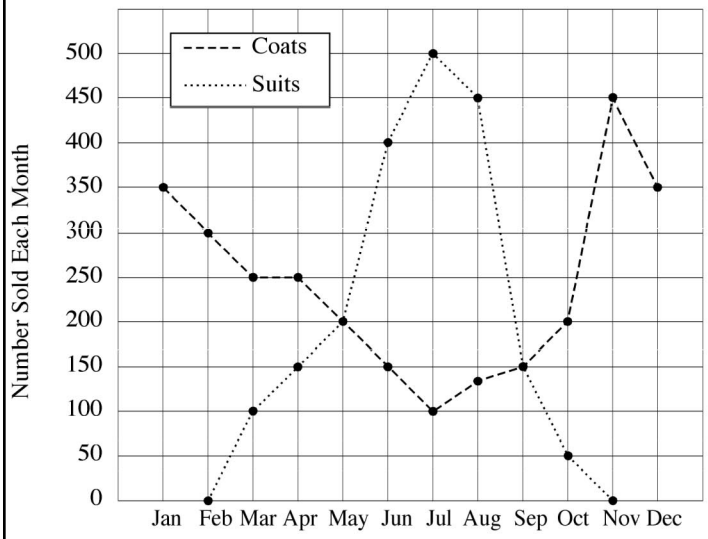
A. Four

B. Six

C. Eight

D. Ten

This graph shows the number of suits and coats sold each month.



According to the information in the graph, during which two-month period does the greatest increase in coat sales occur?

A. December - January

B. May - June

C. June - July

D. October - November

If a fair coin is tossed, the probability that it will land heads up is $\frac{1}{2}$.
In four successive tosses, a fair coin lands heads up each time.
What is likely to happen when the coin is tossed a fifth time?

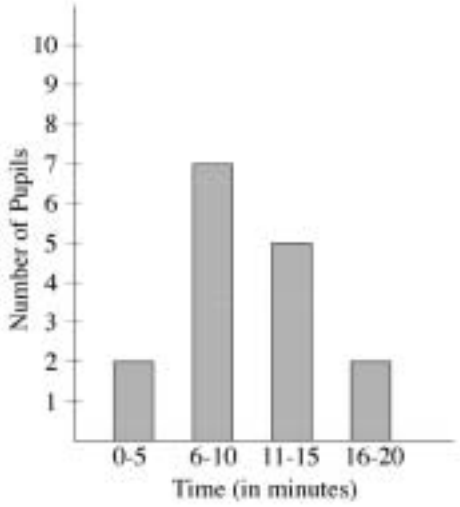
A. It is more likely to land tails up than heads up.

B. It is more likely to land heads up than tails up.

C. It is equally likely to land heads up or tails up.

D. More information is needed to answer the question.

The graph shows the time of travel by pupils from home to school.



How many pupils must travel for MORE than 10 minutes?

A. 2

B. 5

C. 7

D. 8

E. 15

From a batch of 3,000 light bulbs, 100 were selected at random and tested. If 5 of the light bulbs in the sample were found to be defective, about how many defective light bulbs would be expected in the entire batch?

A. 15

B. 60

C. 150

D. 300

E. 600

The table shows the number of houses on two streets of a town, Konini Street and Rimu Street.

Street	Number of Houses
Konini	30
Rimu	21

The pictograph below represents the number of houses in each street.

Konini St.	
Rimu St.	

How many houses does one  represent?

Answer: _____

The graph below shows the humidity in a room as recorded on a certain morning.



On the morning shown in the graph, how many times between 6 a.m. and 12 noon was the humidity exactly 20 percent?

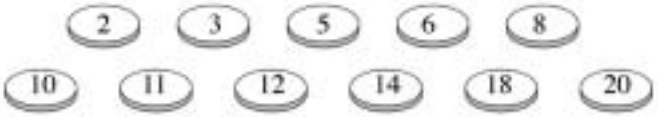
A. One

B. Two

C. Three

D. Four

The eleven chips shown below are placed in a bag and mixed.



Chelsea draws one chip from the bag without looking. What is the probability that Chelsea draws a chip with a number that is a multiple of three?

A. $\frac{1}{11}$

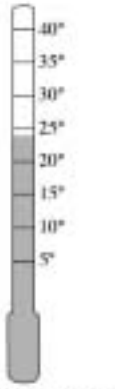
B. $\frac{1}{3}$

C. $\frac{4}{11}$

D. $\frac{4}{7}$

This table shows temperatures at various times on four days.

TEMPERATURE					
	6 a.m.	9 a.m.	Noon	3 p.m.	6 p.m.
Monday	15°	17°	24°	21°	16°
Tuesday	20°	16°	15°	10°	9°
Wednesday	8°	14°	16°	19°	15°
Thursday	8°	11°	19°	26°	20°



Thermometer

On which day and at what time was the temperature shown in the table the same as that shown on the thermometer?

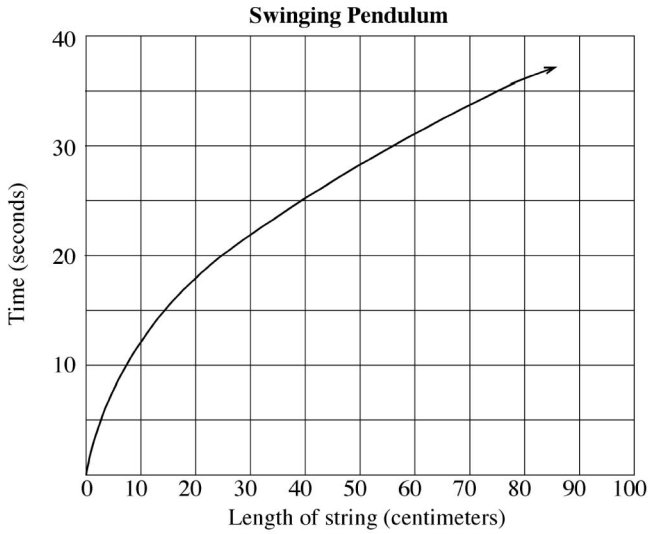
A. Monday, Noon

B. Tuesday, 6 a.m.

C. Wednesday, 3 p.m.

D. Thursday, 3 p.m.

The graph shows the time taken for a pendulum to swing backwards and forwards 20 times for different lengths of the string.



The length of a string is 90 cm. About how long would it take for the pendulum to swing backwards and forwards 20 times?

A. 35 seconds

B. 38 seconds

C. 42 seconds

D. 45 seconds

Chris plans to order 24 issues of a magazine. He reads the following advertisements for two magazines. *Ceds* are the units of currency in Chris' country.

Teen Life Magazine

24 issues
First four issues FREE
The rest
3 *ceds* each.

Teen News Magazine

24 issues
First six issues FREE
The rest
3.5 *ceds* each.

Which magazine is the least expensive for 24 issues? How much less expensive? Show your work.

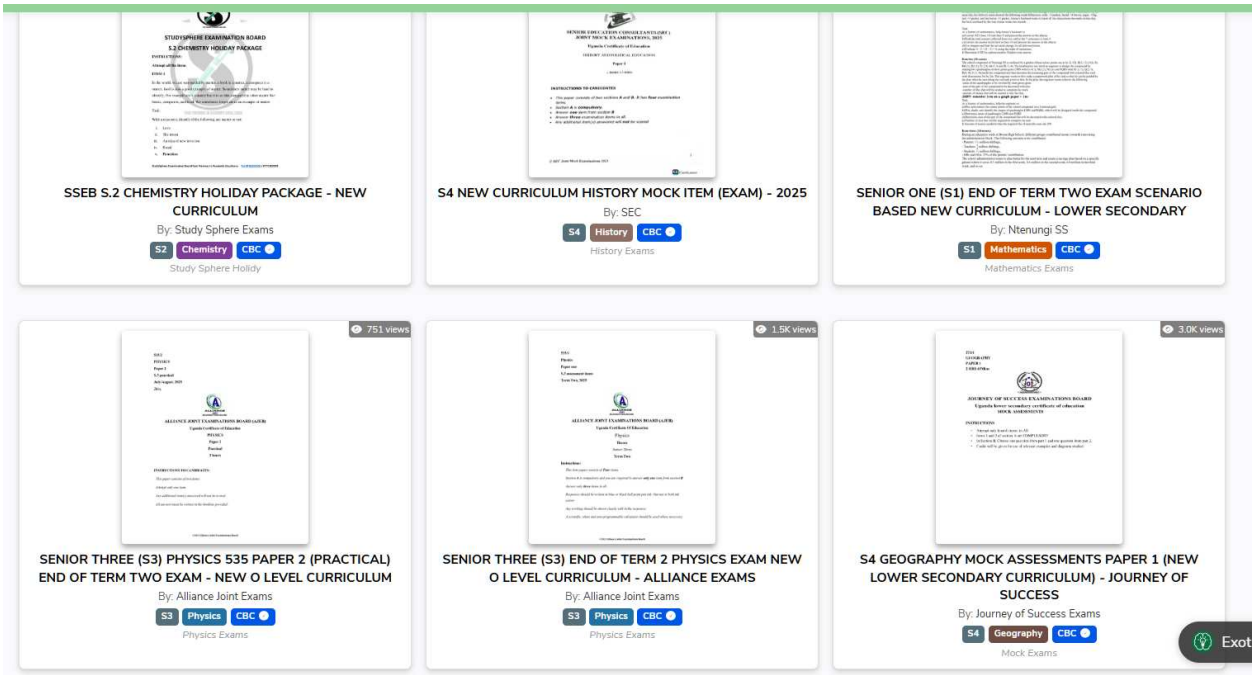
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Item Index

Cognitive Domain		Page
Fractions and Number Sense		
B08.	Calories in portion of for from ratio	1
B09.	Figure showing equivalent fractions	2
B10.	Smallest decimal fraction	3
D09.	Smallest simple fraction	4
D12.	Estimate of point P on a number line	5
F07.	Average speed from distance and time	6
F09.	Number between two decimal fractions	7
F12.	Fraction of a circle shaded	8
H08.	Figure showing fraction of shaded square	9
H09.	Sum closest to 691 + 208	10
J12.	Division of fractions	11
J14.	Division of decimals	12
J18.	Distance between towns from map	13
L09.	Length of building compared to car	14
L10.	Two hundred six and nine-tenths	15
L18.	Subtraction with three fractions	16
N11.	Number of cars from rounded value	17
N14.	List of equivalent fractions	18
N16.	Number of marbles in bag	19
N17.	Amount of paint left	20
N19.	Shade in 3/8 of squares in grid	21
P13.	Estimate of total cars in parking lot	22
P14.	Estimate of distance from explosion	23
P15.	Fraction of cherries in basket	24
P17.	Write decimal as fraction	25
R07.	Subtraction of decimals to 0.001	26
R08.	Average weight of salt crystals	27
R13.	Subtraction of 4-digit whole numbers	28
R14.	How much money left if spent 5/8	29
R15.	Money from total magazine sales	30
T02.	Number/fraction of 2 types of boxes	31
T04.	Height of stack of paper from thickness	32
V01.	Two possibilities for actual height	33
V03.	Ratio of nitrate to total fertilizer	34
Algebra		
B12.	Equation representing relationship	35
D08.	Value of x from equivalent ratios	36
D10.	Equation to determine cost of cards	37
F11.	Find 1/3 of number from relationship	38
H10.	Equation from x/y table	39
H12.	Symbolic linear equation of magazines	40
J17.	Missing number in table	41
L12.	Distance traveled by elevator	42
L14.	Correct equation based on x/y table	43

Cognitive Domain		Page
Algebra *(continued)*		
L15.	Values in proportionality table	44
L17.	Value of x in mathematical equation	45
N13.	Value of expression substituting x=3	46
P09.	Expression equivalent to n x n x n	47
P11.	Equivalent expression: k+k+k+k+k	48
R10.	Expression when a,b,c are real	49
R12.	Operations on negative number	50
T01.	Total club members: boys and girls	51
V04.	Sequence of figures with circles	52
Measurement		
D11.	Units to measure mass of egg	53
F10.	Measurement accuracy of ruler	54
J10.	Area of path around garden	55
L13.	Most paces to walk to end of hallway	56
N15.	Angle closest to 45 degrees	57
P08.	Ratio of width/perimeter in rectangle	58
P12.	Length of string pulled straight	59
T03.	Area of rectangle inside parallelogram	60
Geometry		
B11.	Cube from folded 2-dimensional net	61
D07.	Angles in symmetric polygon	62
J11.	NOT true for all rectangles	63
J15.	Two similar triangles	64
J16.	Point on graph from coordinates	65
L16.	Measure of angle in quadrilateral	66
N12.	Position of point on number line	67
P10.	Length of side from similar triangle	68
R11.	Right triangles to cover rectangle	69
Data Representation, Analysis and Probability		
B07.	Graph showing greatest increase	70
F08.	Likely result of fifth coin toss	71
H07.	Barchart histogram of travel time	72
H11.	Defective bulbs from random sample	73
J13.	Interpretation of pictograph of houses	74
L11.	Graph of humidity in room	75
N18.	Probability of drawing chip	76
P16.	Day/time in table at shown temperature	77
R09.	Time for pendulum to swing 20 times	78
V02.	Cheaper magazine subscription	79

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