Mathematics

100 Mini Exams

for Selective Schools Entrance & Scholarships

Learn by Doing

by
John Smith

SAMPLE

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FIVE SENSES
PUBLICATION

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Introduction

I have written these questions with two examinations in mind:

i) Entrance examinations for Selective Schools

ii) Scholarship examinations for Independent Schools

As a bonus, the students who work through these papers provide themselves with a excellent basis for work in High School.

Format of the book

Even though the Selective Schools Exam contains 40 questions and Scholarship exams may contain any number of questions, I have restricted the number of questions in each paper here to 12. This has been done at the request of teachers and parents who find the smaller number is more flexible and less intimidating.

I have graded the papers and have given each an asterisk coding:

* indicates a paper containing ideas in basic arithmetic and mathematics

** indicates a paper with more attention paid to applying the basic ideas

*** indicates a paper using the basic ideas in more advanced situations.

Also, the level of difficulty in each of the 3 types increases. Hence you would expect the questions in Paper 46* to be more difficult than those in Paper 13*.

As a guide, any Scholarship exam paper will contain questions from each type of paper, and a student should complete *all* types of papers in preparation.

Answers to all questions appear in the back of the book, together with hints or worked solutions for many questions.

Tips and hints appear in boxes at regular intervals. They contain information which must be known. They will not appear in a real exam.

Strategy

I would advise beginning with Paper 1 and working through all the papers sequentially, rather than doing all the one asterisk papers first.

It is important that each completed paper be marked as soon as possible. And as always, incorrect solutions must be corrected and written up for later study. Ideally the student should start the papers in Year 5. As proficiency increases, papers should be done more frequently - 2 per week rather than 1 per week for example.

SAMPLE

Paper 1*

1 Find the sum of 0.05, $\frac{1}{2}$ and 2.5

A 3.5 B 3.05 C 8 D 2.55

2 Evaluate $1.2 \div 3$

A 4.0 B 0.04 C 0.4 D 0.004

3 Express 240mL as a percentage of 1L

A 240% B 24%

C 2.4% D 0.24%

Remember: To change a fraction to a percentage, multiply by $\frac{100}{1}$

4 What is the value of the 3 in the number 497.31

A 3 hundredths B 3 tenths C 3 units D 3 tens

5 Consider the number 7273. What is the difference in the *values* of the two 7's?

A 630 B 6930 C 6300 D 6993

6 What number must be placed in the box? $45\% = \frac{63}{\square}$

A 100 B 112 C 140 D 115

7 It takes $4\frac{1}{2}$ seconds for an electric saw to cut through a log of wood. How many seconds would it take for the saw to cut the wood into 4 equal pieces?

A 9 B $13\frac{1}{2}$ C 18 D 12

8 What measurement is shown on the weighing scale below?



A 2.57t B 2570kg C 2.7kg D 2.7t

9 A student must evaluate the expression $3 + 12 \div 4 \times 5 \div 2$. What calculation must the student perform first?

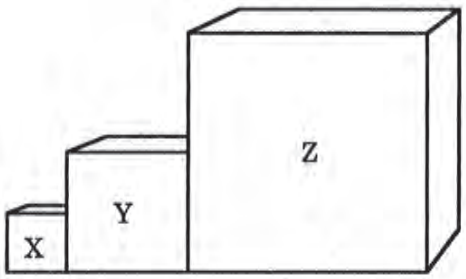
A $3 + 12$ B $12 \div 4$ C 4×5 D $5 \div 2$

10 Which of the following simplifies to give the largest number?

A $7.2 + 0.4$ B $7.2 \div 0.4$ C $7.2 - 0.4$ D 7.2×0.4

11-12

11 Three cubes X, Y and Z are shown in the diagram. The lengths of the sides of cube Y are twice those of cube X and the lengths of the sides of cube Z are twice those of cube Y. If the volume of cube X is $27cm^3$, find the volume of cube Z in cm^3.



A 144 B 216

C 1728 D 288

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12 If the surface area of cube Z is $384cm^2$, find the surface area of cube X in cm^2.

A 48 B 24 C 16 D 96

Paper 2**

1 $4^2 + 4^2 + 4^2 =$

A 32 B 64 C 144 D 48

2 The sum of 12 and 9 is multiplied by the product of 7 and 2. The answer is:

A 294 B 972 C 342 D 882

3 We were buying cutlery for the kitchen. Four of the forks that we liked could be bought for $46.24. We needed 9 of them.
The nine would cost:

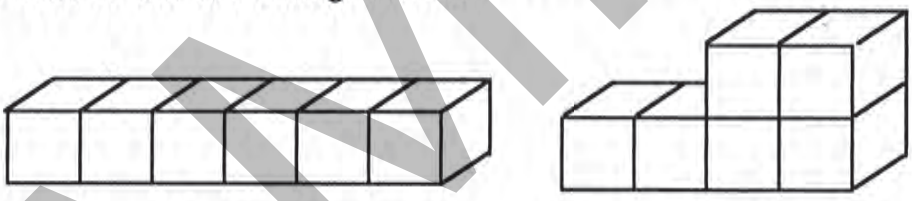
A $104.04 B $20.55
C $208.08 D None of these

Remember:
The Unitary Method says:
Find the cost of *one* of them first!

4 The sum of two numbers is 30 and their difference is 8. Their product will be:

A 240 B 209 C 480 D None of these

5 A student has 6 cubes each of side 1cm. The student arranges them in two different ways as shown in the diagram. What would be the difference in the surface area of the two configurations?



A 26 B 24 C 0 D 2

6 A box has a rectangular base measuring 8m by 6m. What must its height be if its volume is $72m^3$?

A 2m B 2.5m C 3m D 1.5m

7 Write the numeral for five thousand and fifty one and three hundredths

A 5051.03 B 551.03 C 5051.3 D 50051.03

8 A tank is $\frac{3}{5}$ full of rainwater. It would take another 24L of water to fill it. How many litres of water would the tank hold altogether?

A 30 B 60 C 38.4 D 33.6

9 On emptying his money box, Tati found thirteen 5c coins, eight 20c coins, twelve 50c coins and six 2 dollar coins. How much more would he need to make up $30?

A $20.25 B $8.25 C $9.75 D $8.07

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10 Many numbers can be formed by rearranging the digits of the number 4289. For example, you could have 8294, 4982 and so on. How many of these numbers start with 2?

A 6 B 12 C 16 D 24

11 A taxi is allowed to take 5 passengers. How many trips would one cab have to make in order to take 46 passengers from the airport to town?

A 9 B $9\frac{1}{5}$ C 8 D 10

12 16 bunches of bananas are bought at the markets for $72. How many bunches could be bought with $81

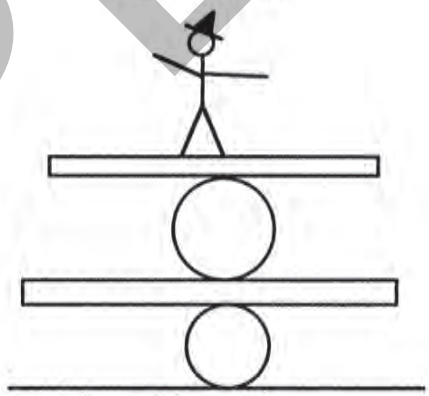
A 18 B 16.5 C 20 D 19

Paper 3***

1 All the three hundred and fifty students at our school brought $4.60 each for the excursion. The total amount collected was:

A 1632 B $1723 C 1832 D $1610

2 A clown at the circus balances on a plank of wood on top of a cannon ball on top of another plank of wood which is on top of another cannon ball. One plank of wood is 4cm thick and the other is 6cm thick. The radius of one cannon ball is 24cm and the radius of the other is 31cm. How many centimetres is the clown off the ground?



A 120 B 96

C 89 D 65

3 Change 25m/s to km/h

A 100 B 25 C 90 D 60

4 What number must be placed in the boxes so that the number sentence is true? $3 \times (\square - 1) + 2 \times \square = 32$

A 3 B 5 C 8 D None of these

5 In the car we timed ourselves. It took us 12minutes to cover 15km. At this rate, how long would it take to travel 135km?

A 56min B 1h 2min C 1h 48min D 1h 24min

6 Abby is going to get large house numbers for everyone who lives in her street. She has to buy metal digits from the hardware store. If there are 100 houses in the street and the number of the first house is 1, how many of the digit 6 will she need to buy?

A 17 B 20 C 19 D 18

7 I spent $\frac{1}{2}$ my money on paper and $\frac{1}{3}$ of what remained on pens. That left me with $12. I must have started shopping with:

A $14 B $72 C $36

D There is not enough information to tell

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8 How many lots of $1000 are there in $1 000 000?

A 10 B 100 C 1000 D 10 000

9 We loaded $33\frac{1}{3}$ % of the boxes. That left 48 boxes. How many boxes were there originally?

A 48 B 72 C 144 D 16

10 A triangle with exactly two equal angles is called:

A scalene B isosceles C equilateral D right angled

11 When a number is divided by 2, 3, 4 or 5 the remainder is always 1. The smallest number with these properties is squared. The result would be:

A 961 B 3721 C 14641

D There is not enough information to tell

12 What is the most likely number needed to continue the series?

12, 25, 40, 57, 76, ☐

A 98 B 97 C 100 D 99

Paper 4*

1 The heights in metres of four trees are recorded below. Which is the tallest?

A $2\frac{1}{4}$ B 2.26 C 2.3 D 2.02

2 Which of the following words would read normally if you held the page upside down and reflected the words in a mirror?

A ATOYOTA B CHOICE

C LEVEL D COYOTE

3-4

3 As a logo on our brand of T-shirts, we decided to have two stripes, like this:



Each stripe could be coloured by 5 different colours but we didn't want both stripes to be the same colour. How many different logos could we make?

A 10 B 25 C 20 D 23

4 How many more logos could be made if we had 6 colours to choose from?

A 10 B 30 C 34 D 32

5 Simplify $4 \times 100 + 7 + \frac{3}{10} + \frac{4}{1000}$

A 407.304 B 470.304 C 407.34 D 407.034

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6 $6 + 3 \times 2 + 7 \times 4 =$

A 40 B 46 C 114 D 132

7 Find the highest common factor of the numbers 36, 42 and 72:

A 6 B 9 C 4 D 14

8 \$45 is three fifths of a certain number of dollars. That number must be:

A \$27 B \$60 C \$72 D \$75

9 56kg of wheat can be bought for \$12. How much would 2.8kg cost?

A \$6 B \$60 C \$48 D \$0.60

10 What fraction of the rectangle in the diagram has been shaded?



A $\frac{1}{3}$ B $\frac{2}{5}$ C $\frac{1}{2}$ D $\frac{7}{15}$

11 Find the square root of the sum of the squares of 5 and 12

A 17 B 13 C 169 D 60

12 45% means 27 parts out of:

A 100 B 40 C 50 D 60

Paper 5**

1 The average of 5 numbers is 16. A sixth number is added to the first five numbers. The average of the six numbers is 23. The sixth number must be

A 42 B 39 C 58 D 44

2 Sally jumped 4.4cm less than the record and Ellie jumped 2.7cm more than the record. By how many centimetres did Ellie beat Sally?

A 2.7 B 1.7 C 7.1 D 6.1

3 The place value of the 8 in the number 4123.85 is:

A Hundreds B Tens C Units D Tenths

4 Find the number of fifths in one and four fifths:

A $\frac{9}{25}$ B 9 C $\frac{1}{9}$ D None of these

5 A box is 12cm long, 15cm wide and 50cm deep. Its volume in litres must be

A 18 B 9 C 9000 D None of these

6 Which is the most likely missing number needed to complete the following pattern: 10, 13, ☐, 19, 22

A 14 B 15 C 16 D 18

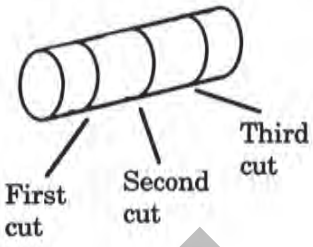
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SOLUTIONS

Paper 1

1 B 2 C 3 B
4 B 5 B 6 C
7 B If you draw a picture, questions like this are easier. You should *always* draw a diagram or picture!



8 D 9 B 10 B
11 C
12 B Use Trial and Error and record your trials in an organised list.
Try side of square X = 1. Then side of square Y = 2 and side of square Z = 4

	Cube X	Cube Y	Cube Z
Side	1	2	4
Surface area	6	24	96

A surface area of 96 is too small, so we increase the side of square X to 2

	Cube X	Cube Y	Cube Z
Side	2	4	8
Surface area	24	96	384

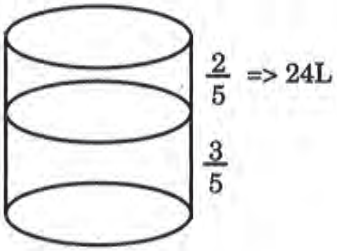
And this is the one we want.

Paper 2

1 D 2 A
3 A If 4 forks cost \$46.24, then 1 fork costs \$11.56.
Therefore 9 forks cost 9 x \$11.56 = \$104.04
Remember to *estimate* the answer before you start. If 4 forks cost \$46.24, then each fork would cost *about* \$12. Therefore 9 forks would cost *about* \$108. So our answer of \$104.04 looks as if it is correct.
4 B Make up a table to answer questions like this. Choose any two numbers which add to 30, and then find their difference:

First number	Second number	Difference	Comment
1	29	28	Difference is too large
10	20	10	Difference is too large
12	18	6	Difference is too small
11	19	8	Correct

5 D 6 D 7 A
8 B If $\frac{3}{5}$ is water then $\frac{2}{5}$ is empty.



Thus $\frac{2}{5}$ must be filled with 24L.

Therefore $\frac{1}{5}$ would need 12L.

There $\frac{5}{5}$ would need 5 x 12 = 60L

Or 2 fifths takes 24L
∴ 1 fifth takes 12L
∴ 5 fifths take 60L

9 C 10 A 11 D
12 A \$72 will buy 16 bunches
∴ \$1 will buy $\frac{16}{72}$ of a bunch
∴ \$81 will buy $81 \times \frac{16}{72} = 18$ bunches

Paper 3

1 D 2 A
3 C Use the Unitary Method: 25m in 1 second
=> 25 x 3600m in 3600 seconds
=> $\frac{25 \times 3600}{1000}$ km in 3600 seconds
=> 90km in 1 hour
4 D The correct answer is 7 5 C

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