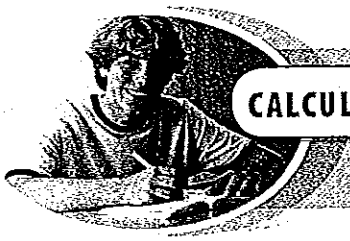


CALCULATOR ALLOWED | Advanced level questions | 25 min

Mini Test 24: Number

1 The value of $\frac{43.7 - 19.8}{\sqrt{183 + 79}}$ is closest to

A 1.5 B 42.5 C 79.1 D 121.2

2 There are 70 boys and 80 girls at a particular pre-school. $\frac{3}{5}$ of the boys and $\frac{3}{4}$ of the girls will start primary school next year. What percentage of the pre-schoolers will start primary school? ☐ %

3 Which is **not** equal to $4\frac{3}{5}$?

A $\frac{23}{5}$ B 4.6 C $4\frac{9}{25}$ D 460%

4 There were 35 pink and white marshmallows in a packet. The ratio of pink to white was 2 to 5. Emma ate 1 pink and 4 white marshmallows. What is the new ratio of pink to white marshmallows?

A 1 to 1 B 2 to 5 C 3 to 7 D 1 to 2

5 Which is **not** a factor of 1001?

A 7 B 11 C 13 D 17

6 $2^4 \times 5^2 =$

A 7^8 B 10^6 C 10^8 D 20^2

7 In a football season:

- Joe kicked 7 goals from 12 attempts
- Harry kicked 8 goals from 15 attempts
- Tom kicked 12 goals from 19 attempts
- Rick kicked 15 goals from 26 attempts.

Who had the best percentage success rate?

A Joe B Harry C Tom D Rick

8 What is the smallest number that is a multiple of both 12 and 15? ☐

9 Last year, Luke's total income was $60 000. This year his income has increased by 5%. Luke must pay 30% of his income in tax. How much tax must Luke pay this year? $ ☐

10 Over the last four years the value of a necklace has increased by 40%. The value of the necklace is now $4200. What was the value four years ago?

A $1050 B $1680 C $2520 D $3000

11 Which number is prime?

A 111 B 113 C 117 D 119

12 Kate needed to find the answer to a question, but performed the wrong operations. She was supposed to add 63 and then divide by 1.5, but instead she divided by 63 and added 1.5. Kate's answer was 4.5. What should it have been? ☐

13 A recipe for shortbread uses these ingredients: 3 cups of flour, 1 tablespoon of cornflour, $2\frac{1}{2}$ tablespoons of sugar, 240 grams of butter. Elliott wants to make a large batch of shortbread. He uses $7\frac{1}{2}$ cups of flour. How many tablespoons of sugar should he use?

A $5\frac{1}{2}$ B $6\frac{1}{4}$ C 7 D 10

14 There were 120 people at a meeting. The ratio of men to women was 7 to 3. 24 more people joined the meeting. The ratio of men to women was then 11 to 5. How many women were among those 24? ☐

15 A company charges 3.15 cents per copy for printing leaflets. The price for printing 6244 leaflets was found by multiplying 3.15 by 6244 on a calculator. The display on the calculator read 19668.6. What is this cost, to the nearest cent?

A $196.69 B $1966.86
C $19 668.06 D $19 668.60

16 Two numbers multiply together to give 328 and add to give 49. What are the two numbers? ☐ and ☐

17 Write 3724 as a product of its prime factors. ☐

18 Three-fifths of all the members of a club were male. Two-fifths of all the male members were pensioners. What fraction of the members were male pensioners?

A $\frac{1}{5}$ B $\frac{6}{25}$ C $\frac{1}{10}$ D $\frac{2}{3}$

Answers and explanations on pages 120–122

1 A **2** 68% **3** C **4** C **5** D **6** D **7** C **8** 60
9 $18 900 **10** D **11** B **12** 168 **13** B **14** 9
15 A **16** 8 and 41 **17** $2 \times 2 \times 7 \times 7 \times 19$ **18** B

1 $$\frac{43.7 - 19.8}{\sqrt{183 + 79}} = \frac{23.9}{\sqrt{262}}$$
$$= 1.4765469...$$
$$= 1.5 \text{ (to 1 decimal place)}$$

2 Number of boys who start school
$= \frac{3}{5}$ of 70
$= 42$
Number of girls who start school
$= \frac{3}{4}$ of 80
$= 60$
Total starting school $= 42 + 60$
$= 102$
Total pre-schoolers $= 70 + 80$
$= 150$
Percentage starting school $= \frac{102}{150} \times 100\%$
$= 68\%$

3 Consider each option:
$\frac{23}{5} = 4\frac{3}{5}$
[5 divides into 23 four times with remainder 3]

$4.6 = 4\frac{6}{10}$
$= 4\frac{3}{5}$
$4\frac{9}{25}$ cannot be simplified.
$460\% = \frac{460}{100}$
$= 4\frac{60}{100}$
$= 4\frac{3}{5}$
The number that is not equal to $4\frac{3}{5}$ is $4\frac{9}{25}$.

4 At first there were 2 pink marshmallows for every 5 white ones.
So 2 out of every 7 marshmallows were pink.
Number of pink marshmallows $= \frac{2}{7} \times 35$
$= 10$
Number of white marshmallows $= 35 - 10$
$= 25$
After Emma ate 1 pink and 4 white marshmallows:
Number of pink marshmallows $= 9$
Number of white marshmallows $= 21$
New ratio $= 9$ to 21
$= 3$ to 7

5 Try each option:
$1001 \div 7 = 143$
$1001 \div 11 = 91$
$1001 \div 13 = 77$
$1001 \div 17 = 58.88235...$
So 17 is not a factor of 1001.

6 $2^4 \times 5^2 = 2 \times 2 \times 2 \times 2 \times 5 \times 5$
$= 4 \times 4 \times 5 \times 5$
$= 4 \times 5 \times 4 \times 5$
$= 20 \times 20$
$= 20^2$

7 Joe: $\frac{7}{12} \times 100\% = 58.3333...\%$
Harry: $\frac{8}{15} \times 100\% = 53.3333...\%$
Tom: $\frac{12}{19} \times 100\% = 63.1578...\%$
Rick: $\frac{15}{26} \times 100\% = 57.6923...\%$
The best success rate is 63.1578...%.
So Tom had the best success rate.

8 Multiples of 12 are 12, 24, 36, 48, 60, 72, ...
Multiples of 15 are 15, 30, 45, 60, 75, ...
The smallest number that is a multiple of both 12 and 15 is 60.

9 Increase in income $= 5\%$ of $60 000
$= \$3000$
New income $= \$60\,000 + \$3000$
$= \$63\,000$
Tax $= 30\%$ of $63 000
$= \$18\,900$

10 If original value was 100% the new value is 140%.
So 140% of the original value $= \$4200$
10% of the original value $= \$4200 \div 14$
$= \$300$
100% of the original value $= 10 \times \$300$
$= \$3000$

11 [To test whether a number is prime, you need to check the prime factors up to the square root of the number. Now $11^2 = 121$ so you only need to check the factors 2, 3, 5 and 7. (If 13 divided into one of the numbers, for example, it would need to do so less than 11 times.) None of the numbers are even, so none are divisible by 2. None end in 0 or 5 so none are divisible by 5.]
Try divisibility by 3:
$111 \div 3 = 37$
So 117 will also be divisible by 3 and 113 and 119 will not.
Try divisibility by 7:
$113 \div 7 = 16.142857...$
$119 \div 7 = 17$
The number that is prime is 113.

12 After Kate added 1.5 her answer was 4.5.

So before she added 1.5 it must have been $4.5 - 1.5$ or 3.

So after Kate divided by 63 her answer was 3.

Before she divided by 63 it must have been 63×3 or 189.

Now Kate should first have added 63.

$189 + 63 = 252$

Then she should have divided by 1.5.

$252 \div 1.5 = 168$

Kate's answer should have been 168.

13 The recipe uses 3 cups of flour and Elliott uses $7\frac{1}{2}$ cups.

$$\text{Number of times larger} = 7\frac{1}{2} \div 3$$
$$= 2\frac{1}{2}$$

So Elliott is making $2\frac{1}{2}$ times the recipe.

Now the recipe uses $2\frac{1}{2}$ tablespoons of sugar.

$$\text{Required amount} = 2\frac{1}{2} \times 2\frac{1}{2} \text{ tablespoons}$$
$$= 6\frac{1}{4} \text{ tablespoons}$$

14 The ratio of men to women was 7 to 3.

So 7 out of 10 people were men.

$$\text{Number of men} = \frac{7}{10} \text{ of } 120$$
$$= 84$$
$$\text{Number of women} = 120 - 84$$
$$= 36$$
$$\text{New number of people} = 120 + 24$$
$$= 144$$

New ratio of men to women is 11 to 5.

So there are 11 men for every 5 women.

So 5 out of 16 people are women.

$$\text{Number of women} = \frac{5}{16} \text{ of } 144$$
$$= 45$$
$$\text{Extra women} = 45 - 36$$
$$= 9$$

15 The answer 19668.6 is the charge in cents.

In dollars this amount is \$196.686 or \$196.69 to the nearest cent.

16 $328 \div 2 = 164$

But $2 + 164 = 166$ not 49

$328 \div 4 = 82$

But $4 + 82 = 86$ not 49

$328 \div 8 = 41$

$41 + 8 = 49$

So the numbers are 41 and 8.

17 [3724 is even so it is divisible by 2.]

$3724 \div 2 = 1862$

[1862 is even so it is also divisible by 2.]

$1862 \div 2 = 931$

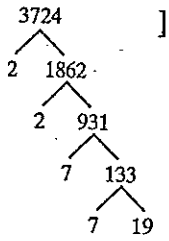
[$9 + 3 + 1 = 13$; 13 is not divisible by 3 so 931 is not divisible by 3. 931 does not end in 0 or 5 so it is not divisible by 5.]

$931 \div 7 = 133$

$133 \div 7 = 19$

So $3724 = 2 \times 2 \times 7 \times 7 \times 19$

[Or use a factor tree:]



18 $\frac{2}{5}$ of $\frac{3}{5}$ of the members are male pensioners.

$$\text{Fraction} = \frac{2}{5} \times \frac{3}{5}$$
$$= \frac{6}{25}$$