



Conquesta 2017

(International Multiple Choice Primary School Olympiads – Est. 1998)
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Mathematics 1 – Grade 7

Welcome to your Conquesta Olympiad. When you have decided which of the answers is correct, scratch out the letter in the matching square on your answer sheet using **ONLY a black or blue ballpoint or black khoki pen.** (Do not use pencils, crayons, pencil crayons, highlighters, tippex or glue.) If the answer to question 4 is c, then scratch out the letter c in the square containing c next to the number 4 (see example 1 below). If you've made a mistake and b should have been the answer, neatly cross out the mistake and then scratch out b (see example 2 below).

Example 1:-

4.	a	b	c	d
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Example 2:-

4.	a	b	c	d
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Useful tip:- When you have number sentences using different operations, apply the rule of **BODMAS**, which is the order of operations:- Firstly, calculate whatever is in **Brackets**, then **Other** (of, square roots, power of, etc), then **Division** and **Multiplication** (from left to right as they rank equally), and lastly, **Addition** and **Subtraction** (also from left to right).

Shapes

- The Greek names for our different sided flat **2D shapes** are: 4 sided = quadrilateral, eg. a rhombus which has 4 equal length sides, or a trapezium which has two parallel sides, 5 sided = pentagon, 6 = hexagon, 7 = heptagon, 8 = octagon, 9 = nonagon, 10 = decagon, 11 = hendecagon, 12 sided shape = dodecagon.
- When they become prisms (**3D shapes**), they have **two extra faces**. The shape at each end of a **prism** determines its name. Eg., if it has a six sided shape at each end, it would be called a hexagonal prism, but it has 8 faces or sides:- 2 hexagonal sides & 6 quadrilateral sides.
- A **tetrahedron** is a triangular based pyramid.
- A **cuboid** is made up of 2 squares and 4 rectangles
- A **face** is a flat side of a 3D shape. The **vertices** are the points or corners. The **edges** run between the vertices.
- A **net** is a pattern that you can cut and fold to make a model of a 3D shape. If you unfold a 3D shape, the shape that is formed is a net.

Did you know?

- 8^4 means 8 to the power of 4, or 8 multiplied by itself 4 times. Eg., $8^4 = 8 \times 8 \times 8 \times 8 = 4\ 096$. $(0,3)^2 = 0,3 \times 0,3 = 0,09$. Another example is $[(2^3)]^2$. So, in the inner brackets, we must multiply $2 \times 2 \times 2 = 8$. Then, the outer brackets to the power of 2, means we must multiply the value of the inner brackets (8) by itself: $8 \times 8 = 64$.
- 10 mm = 1 cm; 100 cm = 1 m; 1 000 mm = 1 m; 1 000 m = 1 km.
- The **mean** of a list of numbers is the average (the total value of all the numbers divided by how many numbers there are).
- The **median** is the middle number in a list of numbers which have been sorted into order from smallest to biggest.
- The **mode** is the most popular number or thing.
- The **range** is the difference between highest and lowest value in a list of numbers.

1. Calculate:-

$$(0,12)^2 = \dots? \dots$$

- (a) 14,4 (b) 1,44 (c) 0,0144 (d) 0,144

2. Calculate the value of 'a':-

$$6 + 24 \div 6 = \frac{24}{3} \div \frac{a}{5}$$

- (a) 5 (b) 4 (c) 7 (d) 3

The first five terms of a sequence have been listed below.

9, 12, 21, 33, 54,,, ...?...

3. Assuming this sequence continues, what would the 8th number or term in the sequence be?

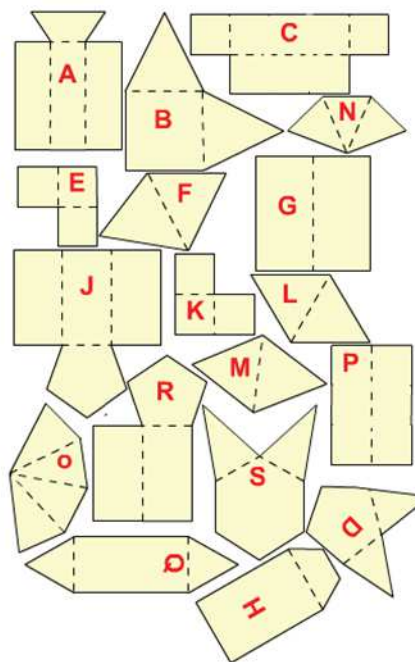
- (a) 194 (b) 247 (c) 186 (d) 228

4. What is the total value of A + B + C + D – (E + F)?

	2	5	4	B	9	D
F	6	3	4	C	6	
		E	8	3	9	7
+		7	0	5	4	8
	9	3	A	8	3	7

- (a) 12 (b) 14
 (c) 15 (d) 17

Use the image below for questions 5 + 6:



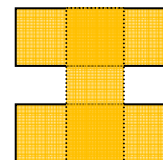
5. Which two shapes would you pair together to create the net of a Tetrahedron?

- (a) M and F (b) B and L
 (c) D and N (d) R and G

6. What 3D shape would you create when you put net shapes A and H together?

- (a) Triangular Prism. (b) Rhomboid Prism.
 (c) Cuboid. (d) Trapezoidal Prism.

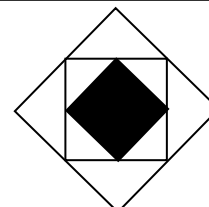
Sarah overlapped three rectangles to make a new shape, as shown. Each rectangle was 6 cm x 14 cm.



7. What is the perimeter of the new I shape?

- (a) 72 cm (b) 85 cm (c) 68 cm (d) 91 cm

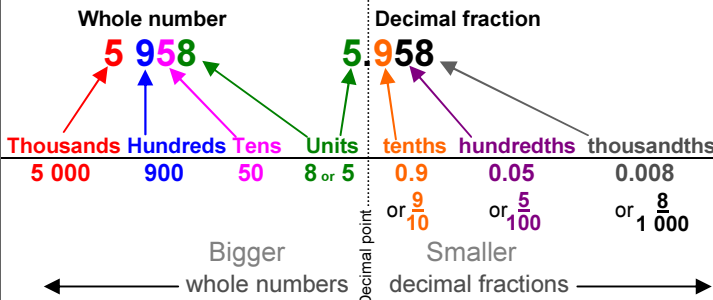
The image on the right is made up of squares. The midpoints of different sized squares are joined.



8. What decimal fraction of the largest square has been shaded?

- (a) 0,2 (b) 0,25 (c) 0,3 (d) 0,35

Scale of Place Values



- Whole numbers are to the left of the decimal point.
- As the place values of whole numbers move to the left, their values increase.
- M = Millions; HTh = Hundred Thousands; TTh = Ten Thousands; Th = Thousands; H = Hundreds; T = Tens; U = Units.
- Decimal fractions are to the right of the decimal point.
- As the place values of decimal fractions move to the right, their values get smaller.
- t = tenths
- h = hundredths
- th = thousandths

Euler calculated this pattern for all 3D shapes:-
 The number of faces + the number of vertices
 – (minus) the number of edges = ...?....
 This works out to the same number for all 3D shapes!

9. Use the above information and the cube to calculate this number.

(a) 2 (b) 4 (c) 6 (d) 8

10. If a = 3, then solve this problem:-
 $[(a^2)]^2$

(a) 12 (b) 36 (c) 49 (d) 81

Look at the figure of a net on the right:-

11. When we fold this net into a cube, which number would be on the opposite side of 6?

(a) 5 (b) 4 (c) 3 (d) 1

Look at the triangles below.

(Not drawn to scale.)

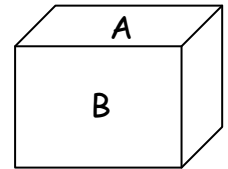
12. How many times will triangle A fit into triangle B?

(a) 7 (b) 8 (c) 9 (d) 10

13. Thomas earns R5 an hour working in a pet shop. If he gets a bonus of R25 this week, how many hours must he work to make at least R145?

(a) 29 (b) 37 (c) 24 (d) 125

Look at the figure on the right and its dimensions below.
 Length = 11 cm
 Breadth = 8 cm
 Height = 9 cm



14. Calculate the perimeter of the top surface face marked 'A'.

(a) 40 cm (b) 38 cm (c) 36 cm (d) 42 cm

15. A water container in the shape of a cube is 50 cm high. Calculate how many small rectangular containers with dimensions 2 cm x 1 cm x 2 cm can be filled from the cubic container.

(a) 31 250 (b) 20 000 (c) 28 000 (d) 12 000

Volume = length x breadth/width x height

16. Calculate:

$$5t + 0,06 + 4U + (3 \times 10^2) + (5 \times 10^4) + 1th + 9T + \frac{8}{25}$$

(a) 5 314,135 (b) 500 305,391
 (c) 50 394,881 (d) 5 354,8619

Hint: Write down the value of each one (change the fraction to a decimal), then add them up.

Find the values of each letter and then answer question 17.

17. Calculate:-

$$(B + D) - (A + C) = \dots? \dots$$

(a) 0,150 (b) 0,105 (c) 0,015 (d) 0,005

Look at the four sets of shaded squares on the grid below. This is a pattern sequence.

18. What number sequence was used to create this pattern sequence from left to right?

(a) $4n + 3$ (b) n^2 (c) $2n + 1$ (d) $3n + 4$

Did you know?
 An acute angle is less than 90°
 (acute triangle = all angles less than 90°)
 A right angle (eg., square) is exactly 90°
 (right angled triangle has one right angle)
 An obtuse angle is more than 90° but less than 180°
 A straight angle (line) is exactly 180°
 A reflex angle is more than 180° but less than 360°
 A full rotation / revolution (circle) is exactly 360°
 All the angles of a triangle add up to 180°

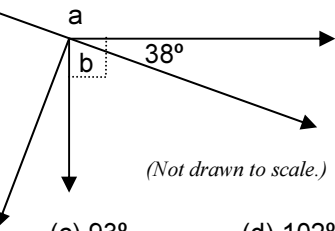
Diagram to remember

Acute, Obtuse and Reflex are in alphabetical order (from smallest to biggest).

Fractions and decimal numbers

- **Convert fractions to decimals** – simplify the fraction, divide the denominator into 100, then multiply the answer with the numerator – or find a number you can multiply by the bottom (denominator) of the fraction to make it 10, or 100, or 1 000, or any 1 followed by 0's. Multiply both top and bottom by that number. Write down just the top number, putting the decimal point in the correct space (one space from the right hand side for every zero in the bottom number).
- **Convert % to fraction** – Divide by 100: $412\% = \frac{412}{100}$ simplified $\frac{103}{25}$.
- **Convert a fraction to %** – Divide the top of the fraction by the bottom, then multiply the result by 100! (A percent is out of 100.)
- **Convert decimals to %** – simply multiply the decimal by 100.
- When **dividing decimals with decimals**, we must follow a few simple rules. We do NOT want to divide with a decimal. Therefore, we need to convert the divisor part of the equation into a whole number by multiplying it. Remember to multiply the dividend by the same amount. ($\text{Dividend} \div \text{divisor} = \text{quotient and remainder.}$)
- **To convert decimals to fractions**, write the decimal over 1. Multiply both top and bottom by 10 for every digit after the decimal point, if there are two digits after the decimal point, eg., 0,75, then multiply by 100 and it is $\frac{75}{100}$. Now simplify it to $\frac{3}{4}$. If there are three digits after the decimal point, multiply by 1 000, etc.
- **Comparing or adding fractions** – make the denominators the same.
- **To make denominators the same with common fractions**, the easiest way is to multiply both the top (numerator) and the bottom (denominator) of each fraction by the denominator of the other. This always works, but you will often need to simplify the fractions afterwards.
- **To make denominators the same with mixed numbers (eg. $3 \frac{1}{2}$)**, first alter the mixed number into an improper fraction by placing the sum of the denominator, whole number + numerator ($2+3+1=6$) over the numerator = $(\frac{6}{2})$.
- **To write a fraction in its simplest form (or simplify it)**, divide the numerator and the denominator by the same number until you can't divide them by the same number any more.

19. What is the difference between the value of angle 'a' and the value of angle 'b'?



- (a) 90° (b) 72° (c) 93° (d) 102°

20. 352% is equal to ...?...

- (a) $3\frac{13}{25}$ (b) $2\frac{1}{4}$ (c) $3\frac{2}{5}$ (d) $4\frac{3}{10}$

21. Which of these number sentences is correct?

(Follow the BODMAS rules.)

- (a) $2 + 2 \times 12 + \frac{4}{7}$ of $42 - 6 \div 3 = 32$
 (b) $2 + 2 \times 12 + (\frac{4}{7}$ of $42 - 6) \div 3 = 32$
 (c) $(2 + 2) \times 12 + \frac{4}{7}$ of $42 - 6 \div 3 = 32$
 (d) $2 + (2 \times 12 + \frac{4}{7}$ of $42 - 6) \div 3 = 32$

22. Calculate the length:-

$3,009 \text{ m} + 274 \text{ mm} + 67 \text{ cm} = \dots? \dots$

- (a) 3 953 mm (b) 3 350 mm
 (c) 9 736,4 mm (d) 6 419 mm

Hint: Make them all the same before adding.

23. Calculate:-

$2\frac{2}{7} \times 5\frac{1}{4} + 2\frac{1}{3} \times 4\frac{1}{2} = \dots? \dots$

- (a) $18\frac{3}{40}$ (b) $22\frac{1}{2}$ (c) $20\frac{4}{5}$ (d) $23\frac{3}{4}$

24. Calculate:-

$0,04 \div 0,0008 = \dots? \dots$

- (a) 50 (b) 24 (c) 500 (d) 2

25. 12 050 000 can be expressed as ...?...

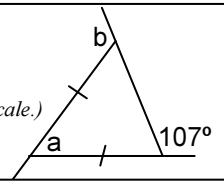
- (a) $1\ 205 \times 10^5$ (b) $1\ 205 \times 10^3$
 (c) $12,05 \times 10^6$ (d) $120,5 \times 10^7$

26. I spent 56% of my R200 pocket money. How much money do I have left?

- (a) R88 (b) R92 (c) R76 (d) R83

27. The difference between angle 'a' and angle 'b' is ...?...

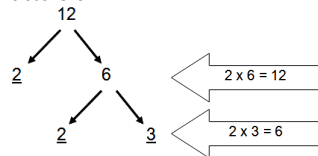
- (a) 58° (b) 84° (Not drawn to scale.)
 (c) 65° (d) 73°



28. Which of the following expressions will give you an answer of 24?

- (a) 8^3 (b) $12^2 - 12$ (c) $3^3 - 3$ (d) $4^4 + 8$

- A **prime number** has only 2 factors and can be divided by 1 and itself.
- The **prime factors** of a number are the prime numbers that can be multiplied to total that number. We normally use a 'Factor Tree' to work out the prime factors involved. Say, we want to find the prime factors of 12:-



As you can see, $2 \times 6 = 12$.
 2 is a prime number, but 6 is not a prime number.
 $2 \times 3 = 6$. 3 is a prime number.
 So we can express 12 as a product of its prime factors:
 $2 \times 2 \times 3 = 12$.

So the prime factors of 12 are 2, 2 and 3. The sum of these is 7.

29. Calculate the sum of the prime factors of 224.

- (a) 12 (b) 17 (c) 15 (d) 19

Joe needed to train for the next marathon which would take place in 2 years' time. He decided to train for the full 2 years leading up to the race. To date, Joe has trained for 15 months of the 2 years.

30. What percentage of his training has Joe completed?

- (a) 60% (b) 62,5% (c) 71,3% (d) 59,9%

Show as a fraction, convert to a decimal number, then to a %.

Mike chose a number. He multiplies it by 7 and adds 37. His number is now equal to half of Sarah's number. 12 is the square root of Sarah's number.

31. What is Mike's number?

- (a) 11 (b) 7 (c) 5 (d) 3

32. Look at the fractions and add the smallest fraction to the largest.

$\frac{2}{5}$; $\frac{1}{2}$; $\frac{3}{7}$; $\frac{1}{8}$

- (a) $\frac{5}{8}$ (b) $\frac{4}{15}$ (c) $\frac{2}{3}$ (d) $1\frac{1}{7}$

33. Maggie achieved $\frac{28}{40}$ in her first exam and $\frac{18}{20}$ in her second exam.

What is her improvement as a percentage?

(Or what is the difference between the two as a percentage?)

- (a) 8% (b) 12% (c) 4% (d) 20%

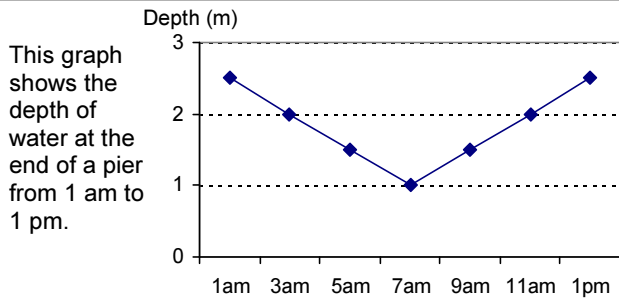
34. $a + b = 19$; $a \times c = 96$; $c - b = 1$

'a', 'b' and 'c' are whole numbers.

What is the value of 'a'?

- (a) 6 (b) 8 (c) 9 (d) 24

Hint: First find all factors of 96 and eliminate the ones that are too big.



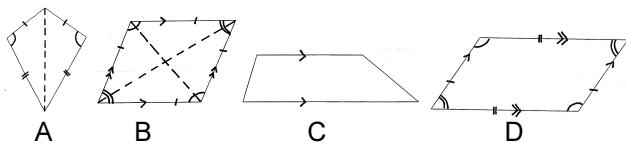
35. What is the median value of the given data?

- (a) 2 m (b) 2½ m (c) 1 m (d) 1½ m

36. Sam keeps rabbits and pigeons as pets. He says his pets have 78 feet and 27 heads between them. How many rabbits does he have?

- (a) 12 (b) 15 (c) 17 (d) 18

Use these four shapes for questions 37 + 38.



37. Which shape is a rhombus?

- (a) A (b) B (c) C (d) D

38. Which shape(s) does not have horizontal parallel lines?

- (a) only A (b) A and B (c) A, B and C (d) All.

Look at the table below for questions 39 + 40.

A	A quarter circle and a sector.
B	The perimeter of a circle.
C	The distance from the centre to any point on the circle.
D	A line that joins any two points on the circumference of a circle. It does not have to pass through the centre point.
E	A section of the circumference.

39. Which statement best describes a radius?

- (a) C (b) B (c) D (d) E

40. Statement D best describes

- (a) the diameter of a circle.
 (b) the tangent of a circle.
 (c) the chord of a circle.
 (d) the segment of a circle.

41. Which statement is incorrect ?

- (a) A diameter is always double the radius.
 (b) Two reflex angles could make up a revolution.
 (c) An instrument known as a protractor is used to measure the size of an angle.
 (d) An angle may only be measured in degrees.

42. What 3D shape is made up from 2 squares and 4 rectangles?

- (a) rhomboid
 (b) cuboid
 (c) hexagonal prism
 (d) cube

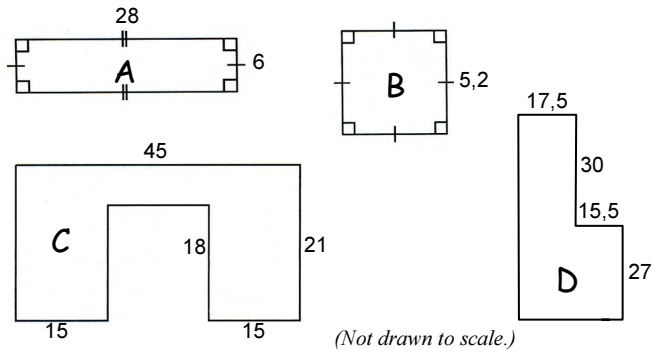


43. If $\frac{a}{b} = 6$; $\frac{b}{c} = \frac{1}{4}$; and $a + c = 30$,

then the value of b is ...?...

- (a) 3 (b) 18 (c) 12 (d) 10

Look at the images below for questions 44 + 45. All the measurements are in cm.



(Not drawn to scale.)

44. What is the difference in perimeter between shape C and shape D?

- (a) 31 (b) 24 (c) 15 (d) 12

45. What is the difference in area between shape A and shape B?

- (a) 186,02 cm² (b) 147,84 cm²
 (c) 140,96 cm² (d) 129,34 cm²

46. Tom travelled 1 925 km in 3,5 hours. How many km did he travel in 1 hour?

- (a) 635 km (b) 550 km (c) 502 km (d) 525 km

47. How many times in a 24 hour day do the minute and hour hands of a clock form a straight line?

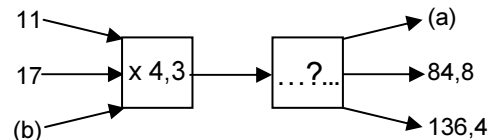
- (a) 6 (b) 48 (c) 12 (d) 24

A palindrome is a number that is the same when read from left to right or from right to left (*both forwards and backwards reads the same digits*). The year 1001 is a palindrome.

48. How many years after the year 1001 would the next palindrome have appeared?

- (a) 110 (b) 120 (c) 50 (d) 1001

Look at the flow diagram for questions 49 + 50.



49. What instruction replaces the question mark?

- (a) + 11,1 (b) + 11,7 (c) - 12,3 (d) + 11,5



50. Calculate the value of (a) and (b) and complete the calculation, $a - b = \dots? \dots$

- (a) 30 (b) 35 (c) 47 (d) 51

The End

Conquesta 2017

(International Multiple Choice Primary School Olympiads – Est. 1998)

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Mathematics 1 – Grade 7

Model Answers				
1.	a	b	c	d
2.	a	b	c	d
3.	a	b	c	d
4.	a	b	c	d
5.	a	b	c	d
6.	a	b	c	d
7.	a	b	c	d
8.	a	b	c	d
9.	a	b	c	d
10.	a	b	c	d
11.	a	b	c	d
12.	a	b	c	d
13.	a	b	c	d
14.	a	b	c	d
15.	a	b	c	d
16.	a	b	c	d
17.	a	b	c	d
18.	a	b	c	d
19.	a	b	c	d
20.	a	b	c	d
21.	a	b	c	d
22.	a	b	c	d
23.	a	b	c	d
24.	a	b	c	d
25.	a	b	c	d
26.	a	b	c	d
27.	a	b	c	d
28.	a	b	c	d
29.	a	b	c	d
30.	a	b	c	d
31.	a	b	c	d
32.	a	b	c	d
33.	a	b	c	d
34.	a	b	c	d
35.	a	b	c	d
36.	a	b	c	d
37.	a	b	c	d
38.	a	b	c	d
39.	a	b	c	d
40.	a	b	c	d
41.	a	b	c	d
42.	a	b	c	d
43.	a	b	c	d
44.	a	b	c	d
45.	a	b	c	d
46.	a	b	c	d
47.	a	b	c	d
48.	a	b	c	d
49.	a	b	c	d
50.	a	b	c	d