The Mathematical Association

Primary Mathematics Challenge Bonus Paper

5 February 2014

Name ..... Class .....

Please do **not** start to answer questions until you are told to do so. When you do turn over the page you will have 45 minutes for the challenge.

You must do all the work on your own. You should use rough paper for your working out.

Write down A B C D or E in the space for each answer. When you have finished, **use a B or an HB pencil** to copy your answers onto the OMR sheet, which will be sent in for marking.

You will get one mark for each correct answer.

Practice Questions

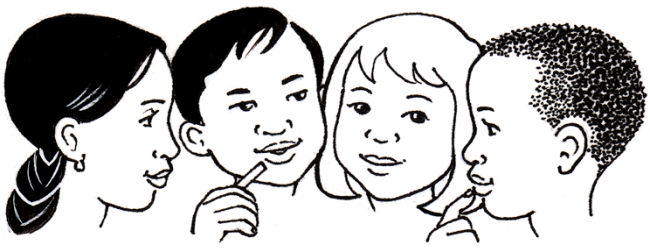
P1 How many pairs of parallel faces are there on a cube?

A 1 B 2 C 3 D 4 E 5

P2 February 2014 has 28 days. Which of the following calculations is true?

A $2 \times 0 \times 14 = 28$ B $2 + 0 \times 14 = 28$ C $(2 + 0) \times 14 = 28$

D $2 + 0 + 14 = 28$ E $2 \times 0 + 14 = 28$



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1 Pavel thinks of a prime number greater than 10. Which of the following cannot be the units digit of this prime number?

A 1 B 3 C 5 D 7 E 9

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2 Two positive numbers have a product of 90 and a difference of 9. What is their sum?

A 19 B 21 C 23 D 25 E 33

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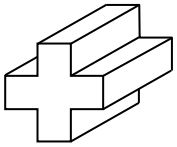
3 This shape has been cut from a 3 × 3 × 3 cm cube. Four pieces, each 1 × 1 × 3 cm, have been removed. What is the volume of the shape?



A 9 cm^3 B 12 cm^3 C 15 cm^3 D 23 cm^3 E 24 cm^3

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4 A car travelling at 30 mph does 48 miles to the gallon and has half a gallon of petrol left. How many miles will it be before the car runs out of petrol?

A 8 B 12 C 16 D 20 E 24

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5 My school has 23 teachers. At today's staff meeting 3 teachers are missing, and a quarter of those present are asleep. Out of those that are present and awake, 20% are texting. The rest are listening to the Head. How many are listening to the Head?

A 12 B 13 C 14 D 15 E 0

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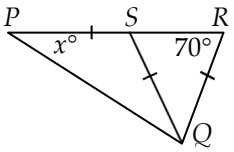
6 What is the size of the angle marked $x°$ in this diagram? (The lengths PS, SQ and RQ are all equal.)



A 21° B 28° C 35° D 42° E 45°

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7 Alice pours 10 litres of treacle into 25 identical teapots for the Hatter, and fills each of them. How much treacle is in each teapot?

A 25 ml B 40 ml C 250 ml D 400 ml E 500 ml

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8 Dhiran has forgotten the last of the four digits of the code for his bicycle lock. He knows that the first three digits are 451 and that the code number is a multiple of 3, but is not a multiple of 5 or of 9. What is the last digit?

A 1 B 2 C 3 D 5 E 8

4 5 1 …

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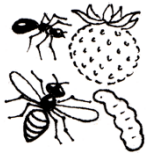
9 Jenny Juice was picking strawberries in a field. When she dropped a bowl of strawberries on the ground, one third of them were eaten by wasps, one quarter by ants and one sixth by a maggot. What fraction of the strawberries was left?



A one third B one quarter C one fifth D one sixth E one twelfth

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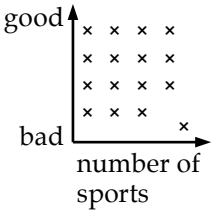
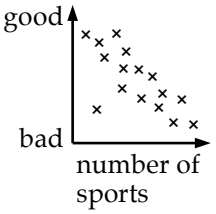
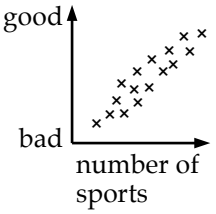
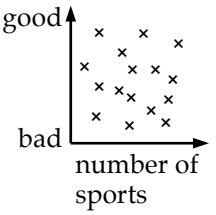
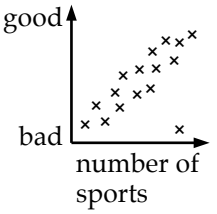
10 Polly found that the more sports that children played the more likely they were to be good at football. However, she found one child was an exception. Which of the following scatter graphs represents her results best?

A


B


C


D


E


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11 The angles of a triangle are in the ratio 1 : 2 : 3. What type of triangle is it?

A isosceles but not right-angled B scalene but not right-angled
C right-angled isosceles D equilateral E right-angled and scalene

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12 Lara is a ladybird which weighs 0.02 g.
Clara is a cormorant which weighs 2.02 kg.
How many times heavier than Lara is Clara?

A 101 010 B 101 000 C 10 101 D 1010 E 101

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13 When a pot of plum jam is two-thirds full, it weighs 400 g. When it is only one-third full it weighs 250 g. How much does a full pot of plum jam weigh?

A 100 g B 500 g C 550 g D 600 g E 750 g

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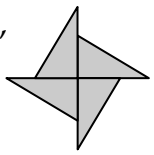
14 The diagram shows four triangles, each with sides of lengths 3 cm, 4 cm and 5 cm. What is the length of the perimeter of this shape?



A 12 cm B 20 cm C 24 cm D 28 cm E 48 cm

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15 Abigail, Belinda, Clarice, Deirdre and Ekaterina are friends who always eat school dinners together. They decide that each school day they will line up in a different order. There are 5 days in every school week. How long can they do this before they have to repeat an order they have used before?

A 1 week B 5 weeks C just over 11 weeks D 24 weeks E over 100 weeks

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16 One of Hickory Dickory's clocks always shows the correct time, and the other loses a minute every ten minutes. If Hickory starts them both at 6 pm, both showing the correct time, what time will the slower clock show when the correct one chimes at 1 am?

A 11.42 pm B 11.50 pm C 12.10 am D 12.18 am E 12.53 am

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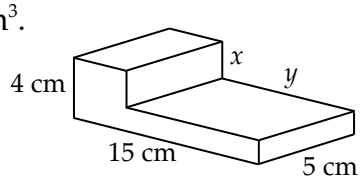
17 The volume of the shape in the diagram is 120 cm^3.
What could the lengths of x and y be, in cm?



A 1 and 36 B 2 and 18 C 3 and 12
D 4 and 9 E 6 and 6

18 What is the difference between the largest single-digit prime number and the smallest three-digit prime number?

A 94 B 95 C 96 D 97 E 98

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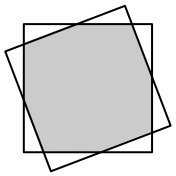
19 The octagon shown shaded here is formed from two identical overlapping squares. Each square has sides of length 8 cm and the area of each triangle is 2 cm^2.
What is the area of the octagon?



A 8 cm^2 B 16 cm^2 C 32 cm^2 D 56 cm^2 E 62 cm^2

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20 You probably already know that $2014 = 2 \times 19 \times 53$.
How many factors does 2014 have, other than 1 and 2014 itself?

A 2 B 4 C 5 D 6 E 8

---

21 Anita Room is going to do some tidying.
She can tidy 2 big rooms in the same time as it takes to tidy 3 small rooms.
She can tidy 1 big room and 3 small rooms in 90 minutes.
How long does it take her to tidy 3 big rooms and 6 small rooms?

A 3 hours 30 minutes B 4 hours C 4 hours 30 minutes
D 5 hours E 5 hours 30 minutes

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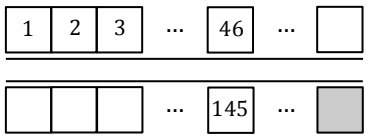
22 You are given that $p = 3$, $q = 2$ and $p^3 \times q^2 \times r = 432$. What is the value of r?

A 2 B 3 C 4 D 6 E 8

---

23 All the houses on Parell Alley are identical and equally spaced. They are numbered 1, 2, 3, … along one side and then back down the other side (so that the highest numbered house is opposite house number 1). Two houses, number 46 and number 145, are directly opposite each other.
What is the number of the house shaded at the end of the street?



A 95 B 96 C 97 D 98 E 99

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24 Milly, her little sister Tilly, their mother Jilly and their grandmother Lily have ages that are different cube numbers. Lily is not yet 100.
How old was Lily when Milly was born?

A 19 B 40 C 48 D 56 E 64

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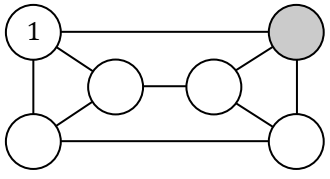
25 The five blank circles in the diagram must be filled with the numbers 2, 3, 4, 5 and 6 so that the difference between any two numbers connected by a line is always greater than 1. Which number has to go into the shaded circle?



A 3 B 4 C 5 D 6 E it is impossible to say for certain
