11+ Entrance Exam (sample)

Mathematics - second

assessment (45 mins)

Instructions and Information

- You are **not** allowed a calculator

- Try as many questions as you can.
- Try the questions in the order given.
- If you get stuck, move on to the next question.
- You might not be able to finish all the questions before the end of the test.
- Do check your work if you have time at the end.

- You must show your working out
  Do not erase your working out as you may get marks for it.

- Some questions ask you to **explain** your answers.
  This means you should write a **short sentence** or two, not a long paragraph.

1)

Work out the number from the following clues:

    a. It is a whole number
    b. It is less than 100
    c. It is a square number
    d. It is one less than a multiple of 5.
    e. 16 is a factor of this number.

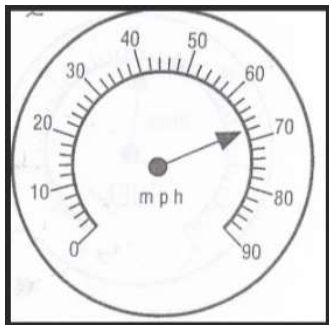Answer: ....

2) Here are some Maths questions with answers. Each answer has at least one mistake.

Identify the mistakes and write a short sentence to explain them.

*You do **not** need to work out the correct answer*

Example

Read the speedometer to see how fast the car is going.

The speed is 64 miles per hour.

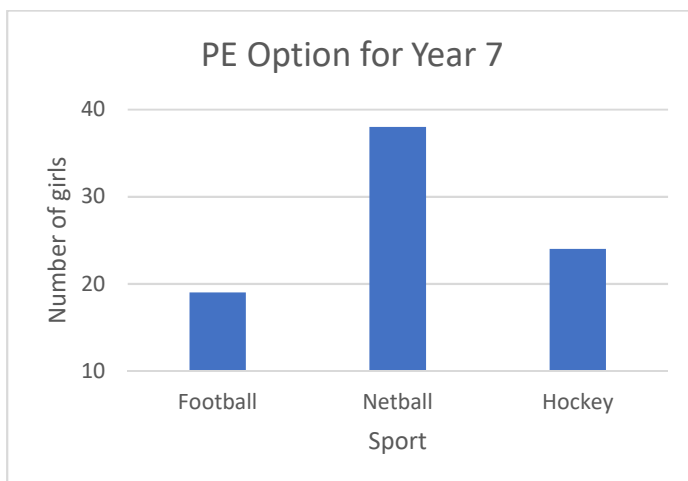She has counted 4 dashes from 60 and thinks they are worth 1mph each but they are all worth 2mph.

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a. Work out $2^3 + 7^2$

   $2^3 = 6$ and $7^2 = 14$ so the answer is 20.

b. 38 people picked Netball as their option for P.E.

   Use the graph to estimate how many picked Hockey.

PE Option for Year 7

The bar for hockey is half as tall as the bar for netball, so there must be about 19 people who picked hockey because $38 \div 2 = 19$.

c. The temperature in London is 3.4 °C and the temperature in Moscow is -2.1 °C.
How much warmer is it in London than it is in Moscow?

3.4 – 2.1 = 1.3   It is 1.3 degrees warmer in London.

d. Reflect the shape in the dashed mirror line

My answer ⟶
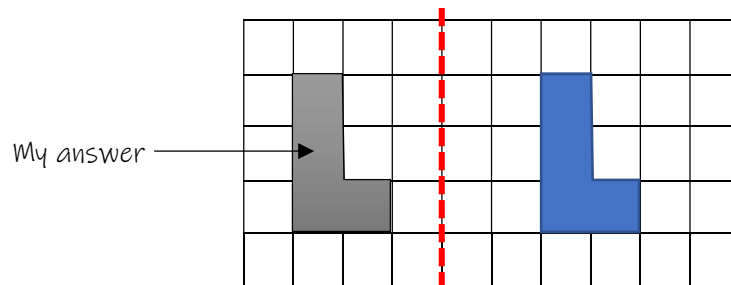
e. Find the value of $\frac{4}{5} + \frac{7}{10}$
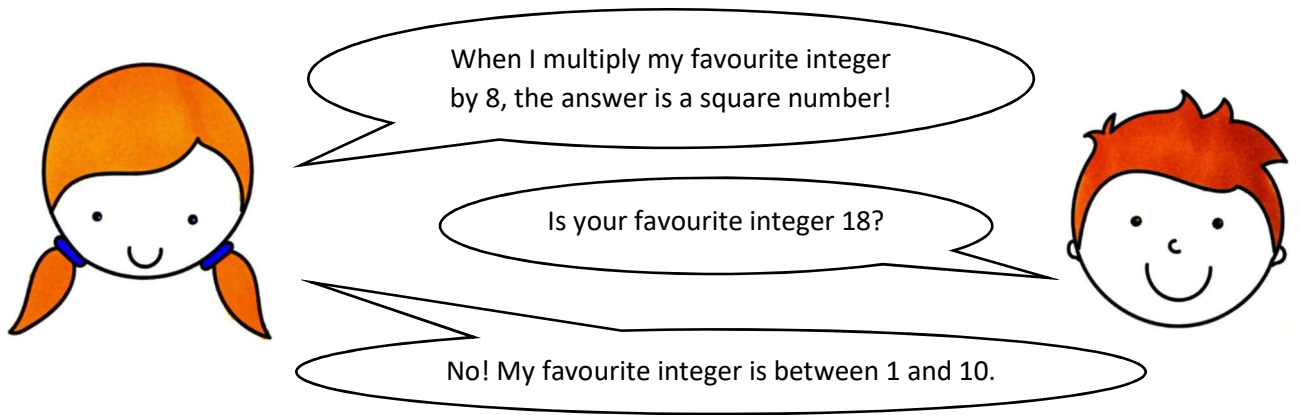
$$\frac{4}{5} + \frac{7}{10}$$

$$= \frac{8}{10} + \frac{7}{10}$$

$$= \frac{15}{20}$$

$$= \frac{3}{4}$$

3) Note: An **integer** is a **whole number**

Josie and Jim are talking about their favourite numbers.

When I multiply my favourite integer by 8, the answer is a square number!

Is your favourite integer 18?

No! My favourite integer is between 1 and 10.

a. Is 8 x 18 a square number, like Jim said? *Show your working.*

b. What could Josie's favourite integer be? *Find all possible answers*

c. Are there any numbers between 0 and 1 that can be multiplied by 8 to get a square number? If so, what are they?

4) **Two adults and three children** are going to the cinema together.
They have a voucher for 50% off a family ticket, but they left it at home!

They have two options:

Option 1
Go to the cinema now
Pay **daytime** prices
No discount

Option 2
Go home and get the voucher
Pay **evening** prices
Use '50% off family ticket' voucher

Ticket	Daytime	Evening
Adult	£12.50	£14.90
Child	£6.20	£8.30
Baby	Free	Free
Family ticket (**2 adults and 2 children**)	£34	£42

Voucher

50% off a Family Ticket
(**2 adults and 2 children**).

This voucher can be used at any time.

Work out which option is cheaper, and by how much.

5)

What is the largest number of 15cm by 30cm by 20 cm shoe boxes that can fit in a 1m x 3m x 2m crate?

Be careful – you can't chop up the shoe boxes!

15cm 20cm 30cm

1 m 3 m 2 m
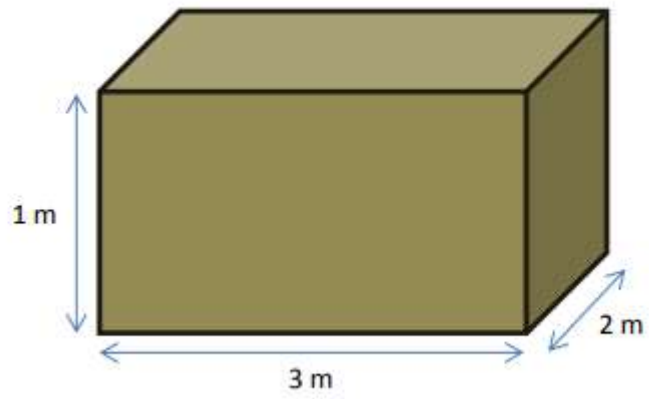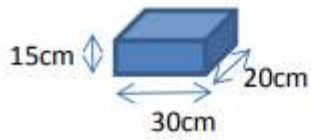
6)

Miss Lovelace writes the following pattern on the whiteboard:

$$6 \times 6 = 36$$
$$5 \times 7 = 35 = 36 - 1$$
$$4 \times 8 = 32 = 36 - 4$$
$$3 \times 9 = 27 = 36 - 9$$

a. Write down the next line of the pattern

.... x .... = ... = 36 − ....

Miss Lovelace says this works for other starting numbers as well and writes a second pattern

$$15 \times 15 = 225$$

$$14 \times 16 = 224 = 225 - 1$$

$$13 \times 17 = 221 = 225 - 4$$

b. Complete the following line of the pattern

9 x .... = ... = 225 − ....

c. You are told that $137^2 = 18769$
    Use this fact and the idea above to work out the value of 133 x 141.
    (Note: Do not multiply 133 by 141)

7)

Amy, Bella and Cara have twenty sweets altogether.

Amy says she has ten of the sweets.
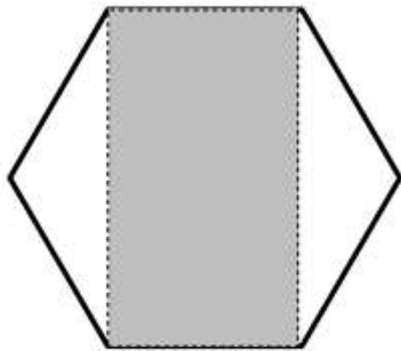Bella says that Cara has one more sweet than Amy.
Cara says that she has the most sweets

Exactly one of them is lying.

Who is lying? Explain briefly how you know.

8)

This diagram shows a regular hexagon.

What fraction of the hexagon is shaded?

9) Each of the shapes below represents a different number between 0 and 12.
   All of the calculations on the left are correct.
   ONE of the calculations on the right is INCORRECT.

   a. Work out what number each shape represents.
   b. Which calculation is incorrect? What should the answer be?

All correct   One incorrect calculation

A) [pink square] × [pink square] × [pink square] = [yellow semicircle]   G) [blue rectangle] × [blue rectangle] = [green star]

B) [pink square] × [orange ellipse] = [yellow semicircle]   H) [pink square] × [purple star] = [blue hexagon]

C) [blue rectangle] × [orange ellipse] = [red circle]   I) [blue rectangle] × [yellow diamond] = [blue rectangle]

D) [blue rectangle] × [pink square] = [green triangle]   J) [yellow diamond] × [blue hexagon] = [green star]

E) [green triangle] × [pink square] = [red circle]   K) [pink square] × [red inverted triangle] = [red inverted triangle]

F) [pink square] × [pink square] = [orange ellipse]   L) [red inverted triangle] × [yellow semicircle] = [red inverted triangle]