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School

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**EXAMINATION PAPER**  
**Non Common Entrance 2022**

**Mathematics**

**Time allowed: 1 hour**

**Name:** \_\_\_\_\_

**Instructions**

- Calculators are **NOT** allowed.
- Write **ALL** your working and answers on this paper. Show enough working on each question to make it clear how you reached your answer.
- Do not spend too long working on any particular question. Do not worry if you do not manage to complete every question. It is far better to have completed a small number of questions well than to have only begun lots of questions.
- You may work in pen or pencil.

**Question 1**

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A gold prospector finds three gold nuggets weighing 1.54g, 0.87g, and 1.704g.

(a) What is the total weight of the three nuggets?

Answer .....

(b) What is the difference in weight between the biggest and smallest nuggets?

Answer .....

(c) If gold sells for £43 per gram, how much is the smallest nugget worth?

Answer .....

(d) An ounce is approximately 28 grams. Convert the weight of the 1.54g nugget into ounces.

Answer .....

**Question 2** Work out the following, obeying the correct order of operations.

(a)  $3 + 5 \times 8 - 6$

Answer .....

(b)  $10 - (20 - 8) \div 2$

Answer .....

(c)  $24 \div (16 - 4 \times 2)$

Answer .....

(d)  $100 - 80 - (60 - 40)$

Answer .....

**Question 3** Calculate the following. Your answers should be fully simplified and written as a mixed number where appropriate.

(a)  $2\frac{1}{5} + 1\frac{3}{4}$

Answer .....

(b)  $4\frac{2}{7} - 2\frac{5}{14}$

Answer .....

(c)  $2\frac{2}{9} \times 4\frac{1}{5}$

Answer .....

(d)  $1\frac{3}{8} \div 4\frac{2}{5}$

Answer .....

**Question 4**

(a) Write down the prime factorisation of 60.

Answer .....

(b) List all of the factors of 60, in ascending order.

Answer .....

**Question 5**

(a) Hotdogs come in packs of 10 and buns come in packs of 6; each bun holds one hotdog. What is the smallest number of packs of each you would need to buy if you didn't want any left-over hotdogs or buns?

Packs of hotdogs.....

Packs of buns.....

(b) A group of 20 boys and 24 girls are going to be split into even teams. Each team must contain the same number of boys and girls. What is the maximum number of teams which can be made in this way?

Answer .....

**Question 6**

If  $a = 4$ ,  $b = 3$  and  $c = -5$ , find the value of the following expressions.

(a)  $a + bc$

Answer .....

(b)  $ab^2$

Answer .....

(c)  $2(a + b) - 2c$

Answer .....

**Question 7** Fully simplify the following algebraic expressions.

(a)  $4a + 2b - a + 6b$

Answer .....

(b)  $2x + 4x + 6 - x - 12$

Answer .....

(c)  $3x^2 + 2x + y - 4x$

Answer .....

(d)  $7x \times 2xy$

Answer .....

**Question 8** Solve the following equations, leaving your answers as improper fractions where necessary.

(a)  $5x - 8 = 27$

Answer .....

(b)  $\frac{3x}{5} + 4 = 6$

Answer .....

(c)  $4(3x - 5) = 10$

Answer .....

(d)  $8 - 2x = 10x - 4$

Answer .....

(e)  $15 - 4x = 1$

Answer .....

(f)  $3x + \frac{1}{5} = \frac{1}{2}x - 3$

Answer .....

**Question 9**

For the following questions you must form and solve an equation.

- (a) I think of a number, subtract seven, then treble the result; I now have 27.  
What was the number I thought of?

Equation .....

Solution .....

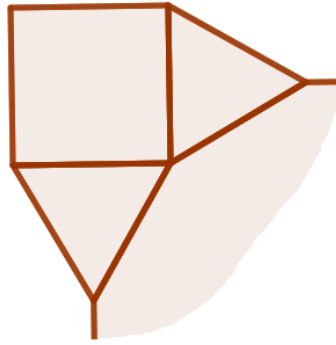
- (b) John has twice as many marbles as Kelly. Beth has five fewer marbles than Kelly. Between the three of them they have a total of 27 marbles.  
How many marbles does John have?

Equation .....

Solution .....

**Question 10**

A square, two equilateral triangles, and one other regular polygon are placed together as shown in the *incomplete* diagram below.



(a) What is the interior angle of an equilateral triangle?

Answer .....

(b) Calculate the interior angle of the incomplete regular polygon. You should give an angle reason to justify your answer.

Answer .....

(c) Calculate the number of sides that the incomplete regular polygon has.

Answer .....

**Question 11**

Godfrey has a four-digit combination lock which uses the digits 1-9. He writes down some clues in case he forgets what the correct combination is:

- the mean of the digits is 4.75.
- the range of the digits is 8.
- two of the digits are prime numbers.
- if the digits are put in ascending order,  $a < b < c < d$ , then the correct order is  $a, c, b, d$ .

Find Godfrey's combination.

Answer .....