Name:

2021 Non Common Entrance
Third and Fourth Form Entry

Mathematics

Time Allowed: 60 minutes

Instructions
- **Calculators are NOT permitted**
- 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.
- You may work in pen or pencil.

Question 1

(a) Penny receives a £45 gift card.
She buys a phone case for £15.67, a book for £8.74 and a new charger for £19.95.
How much money is left on the gift card?

Answer ……………………………………………………….

(b) A box contains 27 pens.
How many pens are there in 34 of these boxes?

Answer …………………………….

(c) A box of cereal costs £3.70 per kilogram.
If the box contains 1.2 kilograms of cereal, how much will it cost?

Answer …………………………….

(d) Twelve identical 2 pence coins weigh 85.44 grams.
What does one 2 pence coin weigh?

Answer …………………………….

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

(a) $3 + 0 - (-1)$

Answer ……………………………

(b) -13×0

Answer ……………………………

(c) $6 - 1 \times 0$

Answer ……………………………

(d) $7 - 0 \div 7$

Answer ……………………………

(e) $-2 \times 4 + 6 \times (-3)$

Answer ……………………………

(f) $7 + 5 - 5 \div 5$

Answer ……………………………

(g) $2 - (2 + 2 \div 2)$

Answer ……………………………

(h) $48 \div 3 \div 4 \times 6$

Answer ……………………………

(i) $3 \div 6 - 7 \div 14$

Answer ……………………………

Question 3 Where possible, fully simplify the following algebraic expressions

(a) $5x - x$

Answer ……………………………

(b) $x + x$

Answer ……………………………

(c) $x + 3x - 4 - 2x + 8$

Answer ……………………………

(d) $4x \times x \times 12x$

Answer ……………………………

Question 4 Write down, in ascending order, all factors of the following numbers.

(a) 24

Answer ……………………………………

(b) 84

Answer ……………………………………

Question 5 Write down the prime factorisation of the following numbers

(a) 84

Answer ……………………………………

(b) 245

Answer ……………………………………

Question 6 Calculate the following:

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

Answer ……………………………

(b) $\frac{4}{7} - \frac{3}{14}$

Answer ……………………………

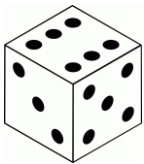(c) $\frac{3}{8} \div \frac{4}{5}$

Answer ……………………………

(d) $\frac{20}{27} \times \frac{9}{16}$

Answer ……………………………

Question 7

Regular six-sided dice have faces numbered 1 to 6, with opposite faces adding to 7.

James has twenty-seven regular six-sided dice, and he forms them into a $3 \times 3 \times 3$ cube.
What is the largest possible sum of the visible faces?

Answer ……………………………

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

(a) $7x - 12 = 37$

Answer .………………….…

(b) $\frac{x}{4} - 2 = \frac{3}{4}$

Answer .………………….…

(c) $3 + \frac{3x-2}{5} = 8$

Answer .………………….…

(d) $4x - 7 = 11 - 5x$

Answer .………………….…

(e) $5(6x - 13) = 55$

Answer ………………………

(f) $2x - \dfrac{3}{5} = \dfrac{1}{2}x + \dfrac{1}{6}$

Answer ………………………

Question 9

If $a = 3$, $b = -2$ and $c = -5$, find the value of the following expressions

(a) abc

Answer ………………………

(b) ab^2

Answer ………………………

(c) $4a - 3b - 2c$

Answer ………………………

Question 10

You should solve the following questions by defining an unknown, forming an equation and solving it using an algebraic method.

(a)   Five times a number is twenty less than nine times the number.
Find the number.

The number is ………………

(b)   Jane thought of a number. She added twelve and then divided by seven.
The result was the same as when multiplying the original number by three and then adding one.
What number did Jane think of?

Jane's number was ………………

Question 11

James has a three-digit code for a padlock. He knows that the code starts with a 2 but he has forgotten the rest. He also knows that all three digits are different, are in ascending order, and that their mean is a whole number.

List all the possible codes which could work.