



OUNDLE
School

EXAMINATION PAPER
13+ Academic Scholarship 2023
Mathematics
Paper 1

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.
- You may work in pen or pencil.

Question 1

In a fishing competition an angler called Bob catches 5 fish, weighing:

1.75 kg, 1.4 kg, 0.98 kg, 3.6 kg, 2.7 kg

(a) What is the difference in weight between the biggest and smallest fish?

Answer

(b) What is the total weight of the five fish?

Answer

(c) Using your answer to (b), calculate the mean weight of the fish.

Answer

(d) The winner of the “heaviest fish” prize, Paul, caught a fish 2.8 times the weight of Bob’s heaviest catch. How heavy was the winning fish?

Answer

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

(a) $4 + 6 \times 9 - 7$

Answer

(b) $20 + 2 \times (10 - 3 \times 2)$

Answer

(c) $4 \times 3^2 - (2 - 1)$

Answer

(d) $8 + 7 - 4 + 3$

Answer

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

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

Answer

(b) $\frac{5}{12} - \frac{5}{16}$

Answer

(c) $\frac{3}{22} \times \frac{14}{15}$

Answer

(d) $\frac{7}{9} \div \frac{16}{21}$

Answer

Question 4

- (a) Write 105 as a product of its prime factors

Answer

- (b) List all of the factors of 105, in ascending order

Answer

Question 5

- (a) An event organiser is preparing for a conference. Each attendee will receive a pen and a pad of paper. Pens come in packs of 20 and pads of paper come in packs of 12. The organiser is able to order exactly the right number of packs of each, with no pens or pads left over. What is the smallest possible number of attendees?

Answer

- (b) A chocolatier has some left over chocolates which they decide to split into “bargain bags”. There are 24 dark chocolates, 32 milk chocolates and 16 white chocolates. Each bag must have identical contents, and all the chocolates must be used. What is the greatest number of “bargain bags” the chocolatier can make in this way?

Answer

Question 6

If $a = 5$, $b = -4$ and $c = 2$, find the value of the following expressions

(a) $a - bc$

Answer

(b) $\frac{ab^2}{c}$

Answer

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

Answer

Question 7 Fully simplify the following algebraic expressions

(a) $5a - 3b - a - 9b$

Answer

(b) $4x - 2x - 6 + x + 15$

Answer

(c) $4xy - 7x + 2y + 3x$

Answer

(d) $(2x)^2 \times 3xy$

Answer

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

(a) $6x - 5 = 13$

Answer

(b) $\frac{2}{3}x - 4 = 10$

Answer

(c) $5(2x - 7) = 15$

Answer

(d) $7x - 8 = 12 - 3x$

Answer

(e) $\frac{2x+3}{4} = 2$

Answer

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

Answer

Question 9

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

- (a) I think of a number, add eighteen, then double the result; I now have 32.
What was the number I thought of?

Equation

Solution

- (b) Ross, George and Trudie combine their savings to buy a toy costing £50. Ross contributes £5 more than Trudie, and George contributes three times more than Ross.
How much did George contribute?

Equation

Solution

Question 10

Stan and Olivia bake 28 pies for market day; Stan bakes 8 more pies than Olivia.

- a) What is the ratio of the number of pies Stan bakes to the number of pies Olivia bakes?

Answer

The next week Stan and Olivia bake pies for market day again. Stan bakes 8 more pies than Olivia again, but this time the ratio of the number of pies Stan bakes to the number of pies Olivia bakes is 3:2.

- b) How many pies did they bake in total?

Answer

Question 11

Saul buys a guitar for £350, and later sells it to Gilbert for a 10% profit. Gilbert then sells the guitar to someone else and makes £11.20 more profit than Saul.

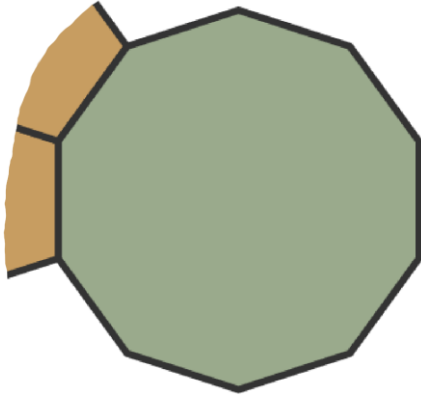
What percentage profit did Gilbert make on the guitar?

Answer

Question 12

A design for a sunflower is made using tiles; one, a decagon (forming the centre), surrounded by ten identical regular polygons (forming the petals). The diagram below shows part of the design. Calculate the number of sides of each of the “petals”.

(answers without supporting working will receive few/no marks)



Answer