

Calculator Paper

- 1a) Expand and simplify

$$3(4x - 1) - 5(x - 3)$$

(2 Marks)

- b) Fully factorise

$$15x^3y - 35x^5y^2$$

(2 Marks)

- 2) Marjorie invests £5800 in a bank account for 4 years.
The account gives her 2.3% compound interest per annum.
How much interest does she earn over the 4 year period?

(3 Marks)

- 3) Circle the value in standard form

$$14 \times 10^7$$

$$4.5 \times 10^{-3}$$

$$8 + 10^4$$

$$5 \times 20^7$$

(1 Mark)

- 4) Circle all the correct statements:

$$x^3 \times x^2 = x^6$$

$$(2a^5)^3 = 2a^{15}$$

$$\frac{t \times 5t^4}{t^2} = 5t^3$$

$$x^0 = 0$$

$$a^0 = 1$$

$$\frac{1}{2x^3} = 2x^{-3}$$

(2 Marks)

- 5) From 1970 until today there has been a 68% decrease in the number of rhinos in the world.

The WWF (World Wildlife Fund) believes there to be 26,600 rhinos in the world now.

How many were there in 1970?

(3 Marks)

- 6) Write “expression”, “equation”, “formula” or “identity” next to the following to categorise them:

$$6(x - 3) = 6x - 18$$

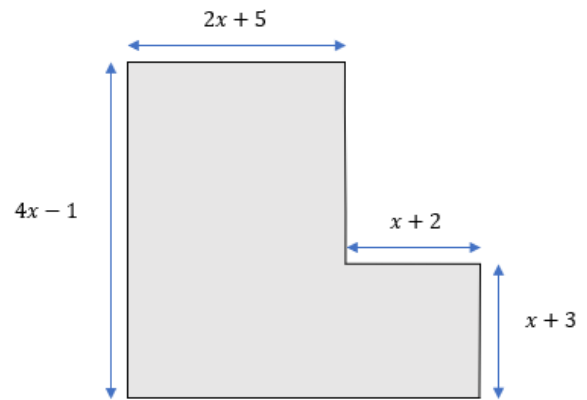
$$7x^2 - 3x$$

$$3x - 1 = 7$$

(3 Marks)

- 7) Dr Dekanski’s patio is in the following shape:

Find an expression for the area of her patio. Simplify your answer fully:



(5 Marks)

- 8) Every time Fawkes the Phoenix is reborn, he loses 20% of his mass.
What is the overall percentage change in his mass if he is reborn three times?

(3 Marks)

- 9) Prove algebraically that $0.\dot{3}1\dot{5} = \frac{52}{165}$

(4 Marks)

10) $a^b = \frac{1}{8}$

Find the value of a^{-3b}

(2 Marks)

Non-calculator Paper

- 1a) Write 90 as a product of prime factors in index form

(2 Marks)

b) $75 = 3 \times 5^2$

Find the LCM of 75 and 90

(2 Marks)

- 2) Circle the calculation that will reduce 80 by 24%

$$80 \times 0.24$$

$$80 \times 0.76$$

$$80 \times 1.24$$

$$80 \div 1.24$$

$$80 \div 24$$

$$80 - 24$$

(1 Mark)

- 3) Bob uses the following formula to work out the cost, in £, C , for a job that lasts t hours:

$$C = 60 + 35t$$

- a) Write down Bob's callout fee (the fee that he charges before he does any work)

(1 Mark)

- b) How much does Bob charge for a job lasting 4.5 hours?

(2 Marks)

- 4) Calculate $(4 \times 10^{11}) - (9 \times 10^{10})$, give your answer in standard form

(3 Marks)

- 5) Insert brackets to make the following calculation correct:

$$100 - 3 + 4^2 = 51$$

(1 Mark)

- 6) Expand and simplify:

$$(x - 2)(x + 4)(2x + 7)$$

(4 Marks)

- 7) Place the following numbers in order from smallest to largest:

$$0.4\dot{3} \quad \frac{9}{20} \quad \frac{3}{7} \quad 42\% \quad \frac{2}{5}$$

Show any working that helped you make your choice

(3 Marks)

- 8) Yeast cells are $8 \times 10^{-6}m$ wide

- a) 40 yeast cells are placed next to each other in a straight line. How long is the line?

Give your answer in metres, in standard form

(3 Marks)

- b) The shortest distance between Ripon and Harrogate is 16km.

How many yeast cells would need to be placed in a straight line to stretch from Ripon to Harrogate?

(3 Marks)

- 9) F. Ord goes to the petrol station when his tank of petrol is a quarter full. He puts 30 litres of petrol into his car. The tank is now two-thirds full. How much petrol does the tank hold when it is completely full?

(4 Marks)

Answers – calculator paper

- 1) a) $7x + 12$ b) $5x^3y(3 - 7x^2y)$
2) £552.29
3) 4.5×10^{-3}
4) $\frac{t \times 5t^4}{t^2} = 5t^3$ and $a^0 = 1$
5) 83125
6) Identity, Expression, Equation
7) $9x^2 + 23x + 1$
8) 48.8% decrease
9) proof, check with your teacher if you are not sure
10) 512

Answers – non calculator paper

- 1) (a) $2 \times 3^2 \times 5$ b) 450
2) 80×0.76
3) a) £60 b) £217.50
4) 3.1×10^{11}
5) $100 - (3+4)^2 = 51$
6) $2x^3 + 11x^2 - 2x - 56$
7) $\frac{2}{5}, 42\%, \frac{3}{7}, 0.4\dot{3}, \frac{9}{20}$
8) a) $3.2 \times 10^{-4} \text{m}$ b) 2×10^9
9) 72 litres