Year 9 Entrance Exams

Maths

Specimen Paper 5

Instructions to candidates

Time allowed: 1 hour

1. Show all working - you may receive marks for correct working even if your final answer is wrong.

2. Answer as many questions as you can, in any order. You are not expected to finish the paper.

3. Do not spend too long on any one question - if you get stuck, move on to the next.

4. Answer and working should be written on the exam paper in the spaces provided.

5. Calculating aids are **NOT** permitted.

1. If the following numbers are arranged in increasing order of size, which one is in the middle?

   A 1.01   **B** 1.001   **C** 1.1   **D** 1.11   **E** 1.011

   Answer: _____

2. What is the difference between 50% of one million and 50% of one thousand?

   Answer: _____

3. Write 0.075 as a fraction in its lowest terms.

   Answer: _____

4. If a = 2, b = -3 and c = -5, find the value of:

   (a) a^2b

   Answer: (a) _____

   (b) $a^2 + b$

   Answer: (b) _____

   (c) 2abc

   Answer: (c) _____

   (d) $\dfrac{c^2 - b^2}{a}$

   Answer: (d) _____

5. Which of these fractions is the smallest?

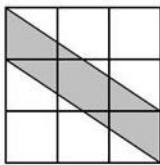**A** $\dfrac{2}{3}$ **B** $\dfrac{3}{5}$ **C** $\dfrac{4}{10}$ **D** $\dfrac{5}{8}$ **E** $\dfrac{5}{9}$
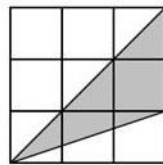
Answer: _____

6. Multiply 703 by 507
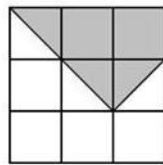
Answer: _____

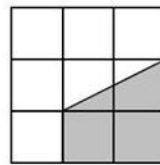7. Which of the following shaded regions has an area different from the other shaded regions?

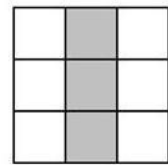A   B   C   D   E

Answer: _____

8. Solve the following equations:

(a) x - 2 = 7

Answer: (a) x = _____

(b) 2x + 1 = 13

Answer: (b) x = _____

(c) 8 - 3x = 3 + 2x

Answer: (c) x = _____

(d) $\dfrac{2x}{3} = \dfrac{3}{4}$

Answer: (d) x = _____

9. The number 0.0000785 when written in standard form is $A \times 10^N$. What are the values of the numbers A and N?

Answer: A = _____ N = _____

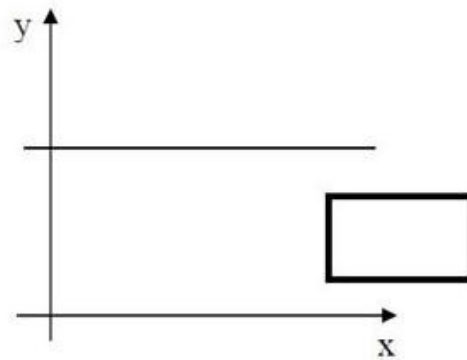10. Here are the equations of 4 straight lines:

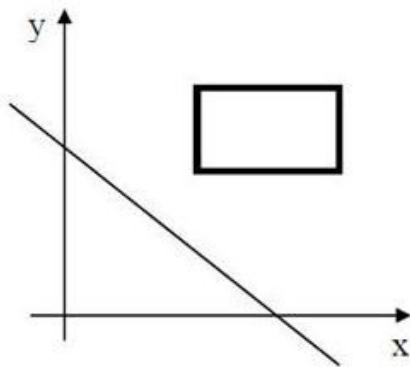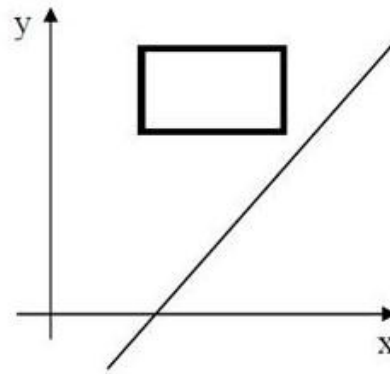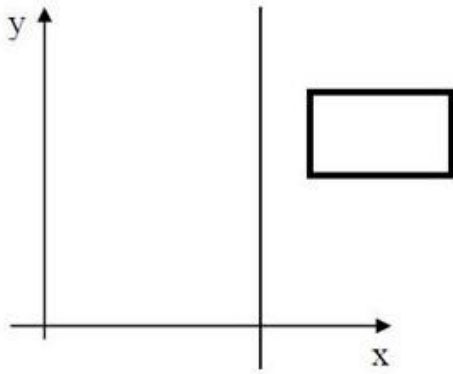   A: $y = 2x - 3$

        B: $y = 6$

        C: $y = 4 - x$

        D: $x = 5$

Write the letter of the appropriate graph in each box.

11. (a) Factorise fully, $3xy + 9x^2$

                                             Answer: (a) _____

(b) Hence simplify

$$\frac{2xy + 9x^2}{3x}$$

                                             Answer: (b) _____

12. Calculate each of the following:

(a) $1\frac{11}{12} + 3\frac{3}{8}$ **[leave your answer as a mixed number]**

Answer: (a) _____

(b) $\frac{1}{5} - \frac{1}{2} \times \frac{1}{3}$

Answer: (b) _____

(c) $6\frac{2}{3} \div 2\frac{1}{2}$ **[leave your answer as a mixed number]**

Answer: (c) _____

13. Simplify as much as possible:

(a) $3(m + 2n) - 2m + 5(n + p)$

Answer: (a) _____

(b) $\dfrac{3x^2y}{6xy^2}$

Answer: (b) _____

14. Given that x is a whole number, write down the largest value of x for which $4x - 1 < 28$.

Answer: _____

15. The speed of light is 3×10^{10} cm/s

What is the speed of light in m/s, when written in standard form?

A 3×10^8 **B** 0.03×10^{10} **C** 300×10^{10} **D** 3×10^{12}

Answer: _____

16. The bill for my mobile telephone consists of a fixed charge plus a charge that is proportional to the number of units used.
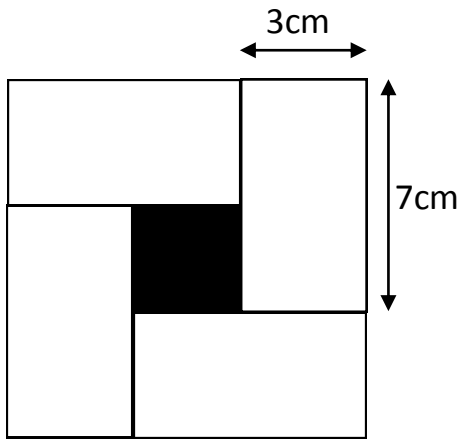
When 50 units had been used, the bill was £27.77

When 70 units had been used, the bill was £36.17

How much was the charge for each unit used?

Answer: £_____

17. The diagram shows four identical white rectangles around a black square. Calculate the area of the black square. **[Diagram not drawn to scale]**

3cm

7cm

Answer: _____cm^2

18. Which of these numbers is the average of the other four?

A 38   **B** 40   **C** 36   **D** 47   **E** 39

Answer: _____

19. Simplify the following ratios **[leave your answer in the form a : b, where a and b are whole numbers with no common factor]**
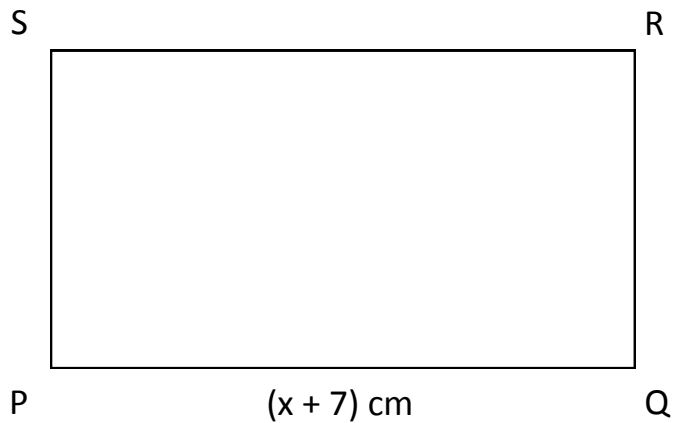
(a) 39 : 57

Answer: (a) _____ : _____

(b) 1¼ : $\dfrac{5}{7}$

Answer: (b) _____ : _____

20. In the rectangle PQRS, the length of PQ is x +7cm

S   R

P   (x + 7) cm   Q

(i) If PS is 8cm shorter than PQ, write down and simplify an expression for the length of PS.

Answer: (i) _____cm

(ii) Now write down and simplify an expression for the perimeter of PQRS

Answer: (ii) _____cm

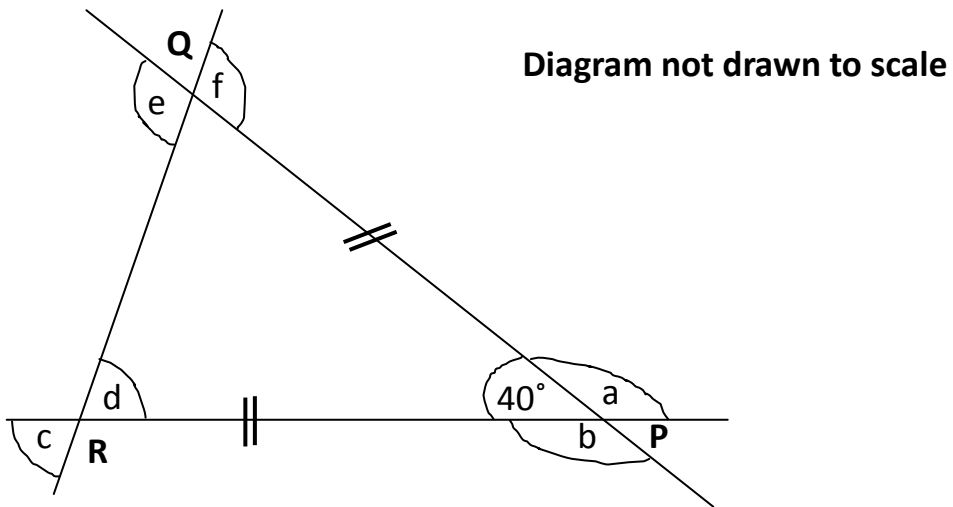(iii) If the perimeter is 36cm, form an equation in x and solve it.

Answer: (iii) _____cm

21. Which of the following expressions is equal to 2006?

   A $1 + (1^2 + 1)(10^3 + 1)$ **B** $1 + (2^2 + 1)(20^2 + 1)$

   C $1 + (3^2 + 1)(30^2 + 1)$ **D** $1 + (4^2 + 1)(40^2 + 1)$
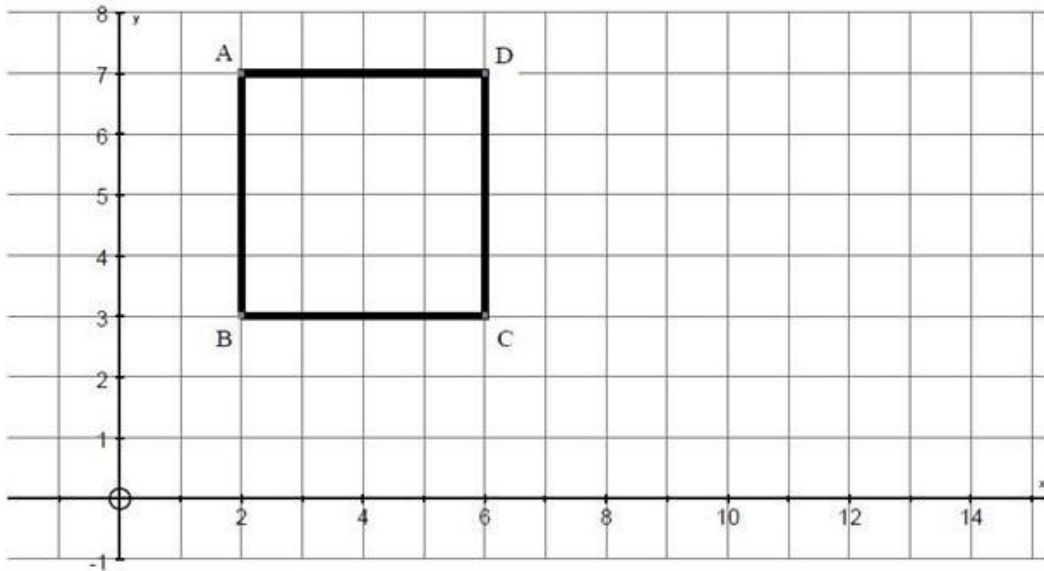
Answer: _____

22. The triangle PQR is isosceles, with PQ = PR

Calculate the value of $a + b + c + d + e + f$

Diagram not drawn to scale

Answer: _____

23. The graph shows a square ABCD.

The equation of the line AB is x = 2

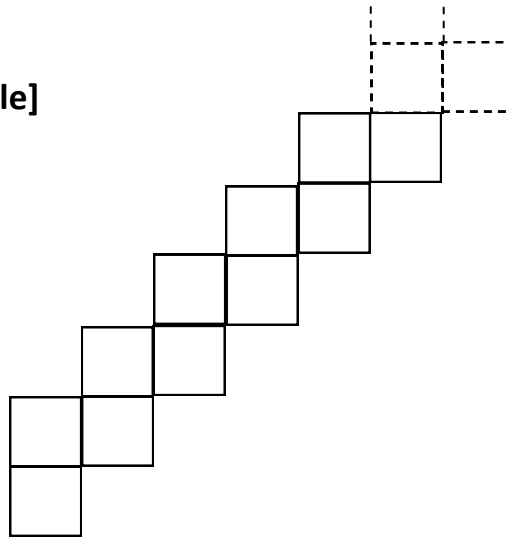(a) What is the equation of the line through AD?

Answer: (a) _____

(b) What is the equation of the line through BD?

Answer: (b) _____

24. A shape consisting of 2006 small squares is made by continuing the pattern shown in the diagram. The small squares have sides of length 1cm. What is the length, in cm, of the perimeter of the whole shape?

[Not drawn to scale]

Answer: _____ cm

Now check through your work carefully!