Year 9 Entrance Exams

Maths

Specimen Paper 3

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. Solve $17 - \chi = 1 + 3\chi$

   Answer: $\chi = \underline{\hspace{1cm}}$

2. Brian was reading a novel. He said, “If I take the sum of the number of the page I’m on with the number of the page on its right, I get 425.” Which page is Brian on?

   Answer: $\underline{\hspace{1cm}}$

3. Calculate
   
   (a) $62.73 + 5.1$

   Answer: (a) $\underline{\hspace{1cm}}$

   (b) $7.21 \times 8.3$

   Answer: (b) $\underline{\hspace{1cm}}$

   (c) $0.1 - (0.1)^2$

   Answer: (c) $\underline{\hspace{1cm}}$

   (d) $\frac{1}{2} + \frac{2}{3} \times \frac{1}{5}$

   Answer: (d) $\underline{\hspace{1cm}}$
4. Write \( \frac{2}{11} \) as a recurring decimal.

Answer: ______________

5. A large protozoa is one tenth of a millimetre across.
Write down this length in metres.

Answer: ___________metres

6. The diagram shows squares, each of side 1cm. Calculate the area shaded.

Answer: Area = ___________cm\(^2\)

7. What is 5 divided by \( \frac{1}{3} \)

Answer: _________________

8. You are given \( 3721 \times 586 = 2180506 \)
What is the value of \( 2180506 \div 37.21 \)?

Answer: _________________
9. What is the value of $2004^2$?

(A) 4016  (B) 41616  (C) 400016  (D) 4000016  (E) 4016016

Answer: _______________

10. The diagram below shows a rectangle that just touches and equilateral triangle. 

Diagram not drawn to scale

Work out the size of the angle marked $a$

Answer: $a = $_______________
11. Simplify as much as possible, each of the following:
   (i) \(2x^2 - x - 1 - x^2 - 5x - 3\)

   Answer: \(\) 

   (ii) \(\frac{20x^6}{5x^4}\)

   Answer: \(\)

12. \(a = \frac{7}{15}\) On my calculator, \(a\) is shown as 0.4666666667

   (i) Write \(a\) to 3 significant figures

   Answer: \(\)

   (ii) Write 10\(a\) to 3 decimal places

   Answer: \(\)

   (iii) Write \(a\) to 12 decimal places

   Answer: \(\)
13. What is the area of the figure shown?

\[ \frac{1}{2} \chi (z - y) \quad \text{A.} \quad \frac{1}{2} \chi (z + y) \quad \text{B.} \quad \frac{1}{2} z (\chi + y) \quad \text{C.} \quad \frac{1}{2} y (\chi + z) \quad \text{D.} \quad \frac{1}{2} y (z - \chi) \quad \text{E.} \]

Answer: ______________

14. Factorise fully:
   (i) \(12\chi - 24\)

Answer: (i) ____________

   (ii) \(2\pi r^2 + 2\pi rh\)

Answer: (ii) ____________

15. Write in standard form:
   (i) \(20700000\)

Answer: (i) ____________

   (ii) \(0.0000000000605\)

Answer: (ii) ____________
16. After training, Simon increased his average speed in the ‘Sawston Fun Run’ by 25%. By what percentage did his time decrease?

(A) 50    (B) 30    (C) 25    (D) 20    (E) 10

Answer: ______________

17. A tool-hire company has a fixed charge of £9 plus £8 per day to hire a tool. If I hire a ladder for \(n\) days, write down a formula (£\(C\)) for the total hire cost.

Answer: \(C = \underline{\phantom{0}}\)

A different company represents its charges on the graph shown below. Use the graph to work out the fixed charge and the daily rate.

Answer: fixed charge = £______________
Answer: daily rate = £______________
18. The mean of five numbers 5, \( \chi \), 9, 10 and 20 is 10. Find the value of \( \chi \).

Answer: ______________

19. \( a = 5, \ b = 6 \) and \( c = -2 \)

Find the value of each of the following:

(i) \( 3a - 2c \)

Answer: (i) ____________

(ii) \( \frac{2a - b}{a - b} \)

Answer: (ii) ___________

(iii) \( 2b^2 \)

Answer: (iii) ___________

(iv) \( (b - 2c)^2 \)

Answer: (iv) ___________
20. The diagram shows a triangle and a semicircle. Calculate its area. (Take $\pi = 3.14$)

![Diagram of a triangle and a semicircle with sides labeled 12, 20, and 16.]

Answer: Area = ________________

21. The figure (not drawn to scale) is such that ABD is a straight line and AE = EB = BC = CD

If $\angle ABE = \chi$, find (in terms of $\chi$)

(i) $\angle BEC$

Answer: (i) ________________

(ii) $\angle DBC$

Answer: (ii) ________________

(iii) $\angle BCD$

Answer: (iii) ________________
If \( \angle ACD = 120^\circ \), calculate \( \chi \).

Answer: \( \chi = \) _______________

22. Calculate \( 7.59 \div 5.06 \)

Answer: __________________

23. I have some rabbits and some rabbit hutches. When I put seven rabbits in each rabbit hutch, one rabbit is left over. If I put nine rabbits in each rabbit hutch, one hutch is left over. How many rabbits and how many rabbit hutches are there?

[You must show your method to gain full marks for this problem]

Answer: Number of rabbits = _________
Answer: Number of hutches = ________
24. Suppose that a, b, c and d are different positive whole numbers, with c + b + c + a = 9, 
d + a + c = 10 and b = 1

What is d?

Answer: d = ___________

Now check through your work carefully!