ST GEORGE'S COLLEGE
WEYBRIDGE

Common Entrance Scholarship
Mathematics Examination

1 hour 30 minutes

INSTRUCTIONS

1. **Calculators are not to be used**
2. **Set out your answers neatly**
3. **Show all necessary working**
4. **Include full explanations where appropriate**
5. **There are 20 questions on this paper**
6. **Marks allocated are shown for each question**
7. **If you have time, check your work**

1. Give the number 3.29573 correct to:
   (i) 3 decimal places
   (ii) 3 significant figures [3]

2. Evaluate $\dfrac{5.9 - 0.75 \times 0.4}{12 + 40 \times 2.5}$ [4]

3. Three children inherited some money from a rich relation. The eldest was left $\frac{2}{5}$ of the money, whilst the second child received $\frac{3}{8}$ of it. The youngest child was given £27,000. How much was left altogether by their relation? [5]

4. Arrange in order of size, with the smallest first, $\frac{3}{4}, \frac{7}{9}$ *and* $\frac{11}{15}$ [3]

5. A drawing pin weighs $\frac{1}{8}$ of a gram. The box in which they are stored weighs 8 grams. How many drawing pins are there in the box if the total weight of box and pins is 24 grams? [3]

6 (*a*) Find 14% of £80

(*b*) Decrease £60 by 15% [4]

7 (*a*) The length and width of a rectangle are both increased by 50%. Find the resulting percentage increase in area.

(*b*) Between April 2005 and November 2006 the price of a new sports car rose by 10%. The price in November 2006 was £25,300. What was the price in April 2005? [4]

8. A cyclist covers two laps of a 600m circuit in 90 seconds. What is his average speed in km per hour? [4]

9. Class 8A has eight girls and twelve boys. The average mark in class 8A's mathematics examination was 80%. The average mark for the eight girls was 90%. What was the average mark for the twelve boys? [5]

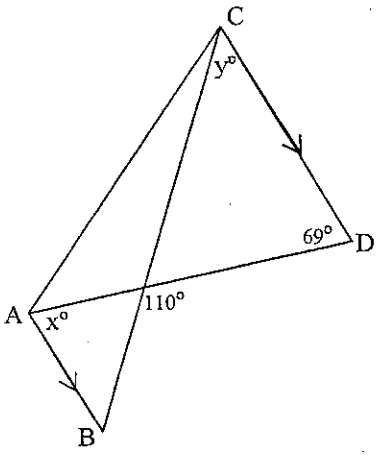
10 A 45-seater coach is to be hired, at a cost of £300, for an outing. The cost is to be covered exactly, without making a profit, by charging £6 for a child and £10 for an adult. Not every seat needs to be occupied.

(a) Find the smallest number of adults which need to go.

(*b*) Find the largest number of children which can go [6]

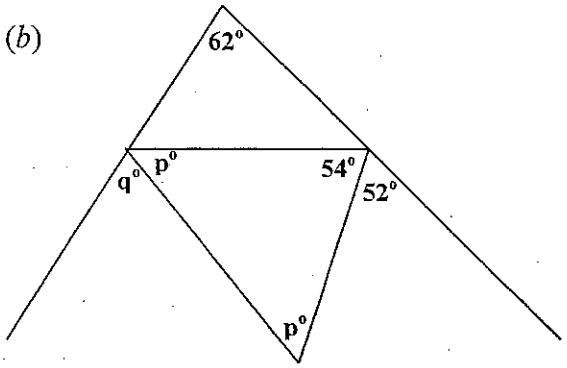
11.

(*a*)



In the diagram A is parallel to CD. Calculate, with reasons, the size of the angles x and y.

(*b*)



Calculate, with reasons, the size of angles p and q.

[8]

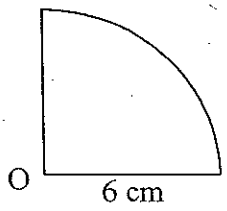
12. One angle of an isosceles triangle is 40°. What are the other two angles? (There are two possible answers – give both) [4]

13. In a triangle the smallest angle is half the size of the second smallest which is one third of the size of the largest angle. What is the size in degrees, of the largest angle?

[4]

14. Take the value of π to be 3 in this question.

(*a*) The diagram shows a quarter of a circle, centre O, which has a radius of 6 cm. Calculate the perimeter of the shape.

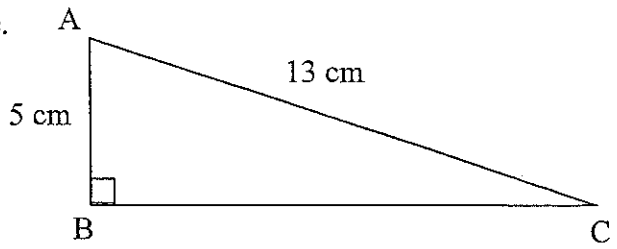


(*b*) The circumference of a circle is 30 cm. What is its radius?

(*c*) The area of a circle is 75 cm². What is its diameter? [9]

[Turn over]

15. The diagram shows a right angled triangle. Calculate the length of the side BC



[5]

16. A pie chart is drawn to represent the favourite sport of 120 students. Twenty three of the students said that tennis was their favourite sport. What angle will be used in the pie chart for tennis?

[3]

17. (*a*) Express 120 as a product of its prime factors.

(*b*) Find the highest common factor of 120 and 72 [5]

18. (*a*) Solve the equation: $7x - 2(x + 1) = 2(x + 3) + 4$

(*b*) Make a the subject of the formula $c = \dfrac{bd - ae}{a}$

(*c*) Starting with a number, multiplying by 3 and then subtracting 8 gives the same value as subtracting twice the number from 102. Find the number.

[9]

19. Given that $a * b = (a + 2b) \div a$ find

i) $a * b$ if $a = 2$ and $b = 4$
ii) $a * b$ if $a = -4$ and $b = -2$
iii) b if $a = 10$ and $a * b = 6$
iv) a if $b = 3$ and $a * b = 5$ [6]

20. Here is a sequence of numbers: 7, 11, 15, 19, 23, …
(*a*) Write down the next two terms of the sequence.
(*b*) Write down the 100th term of the sequence
(*c*) Find a formula for the n^{th} term of the sequence. [6]

Total: 100 marks