

MARLBOROUGH COLLEGE
ENTRANCE & FOUNDATION SCHOLARSHIPS EXAMINATIONS 2007

Mathematics I

Compulsory Paper

TUESDAY 6th MARCH 2007

Time: 1 hour 20 minutes

*Attempt all questions. You are advised to show enough working.
If an answer is not exact, you should give it to 2 decimal places unless otherwise stated.*

1. Without using a calculator, find the value of

(a) 345345345345345345 divided by 345

(b) $2\frac{1}{6} + 3\frac{1}{5} \div 2\frac{2}{15}$

2. Solve the following equations:

(a) $4x(x+3) = (2x-5)(2x+1)$

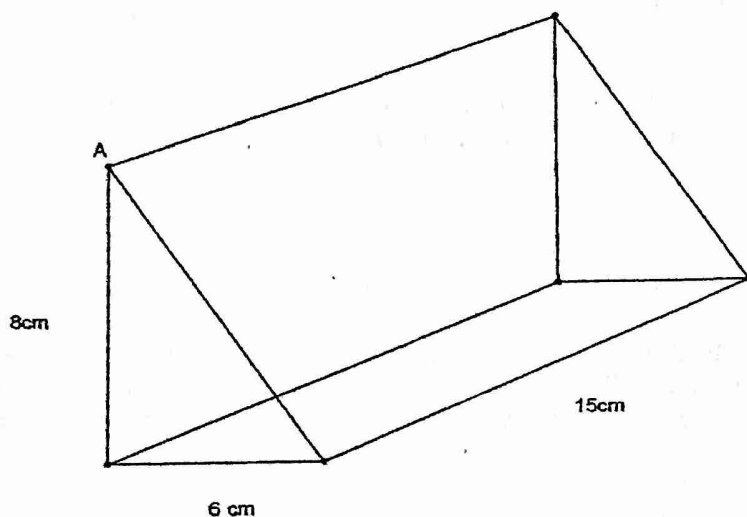
(b) $2x + 3y = 3$
 $3x - y = 10$

Please Turn Over

3. The Flåm railway in Norway is 20.20 km long and rises 863.6m from the lower station at Myrdal to the upper station at Flåm. The time taken for Jack's journey is 55 minutes on the way up and 40 minutes on the way down.

- Find
- (i) The length of the railway in miles if 1 mile = 1.609km
 - (ii) The height difference between the upper and lower stations in feet.
(1 foot = 30.48cm)
 - (iii) Find the speed in km/h for the journey on the way up and for the journey on the way down.

4. A piece of cheese is in a wedge shape. The base is a rectangle and the ends are right-angled triangles. The triangles are identical and have base length 6cm and vertical height 8cm. The length of the wedge is 15cm. The diagram is not to scale.



Thomas wants to make a model of the shape using wire for the framework. How much wire is needed? Give the units of the answer.

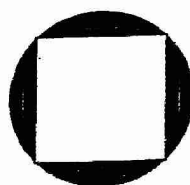
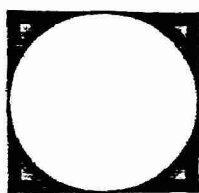
Gervase wants to know the volume and the surface area of the cheese. Find both, giving the units for both answers.

5. A year ago, Alex was five times as old as Alex's pet dog, Monty. In a year's time the sum of their ages will be 22. Letting x be the age of Monty now, give expressions for the age of Monty a year ago; the age of Alex a year ago and the present age of Alex. Using algebra, set up and solve an equation to find the present ages of Alex and his dog Monty.

(Answers by trial and improvement will gain no marks.)

6. Sophie and Charles are comparing their pocket money. The ratio of their weekly amounts is 5:3. If their total weekly amount is £12, find out how much they each receive. After good results in their exams, Sophie receives an increase of 20% while Charles receives an increase of 50%. Find the ratio of their pocket money after the increase. Find the ratio of the *additional amounts* they received after their exam successes. Your answers should be in the form $x : y$ where x and y are whole numbers with no common factors.

7.



A circle of radius 5cm is surrounded by a square in the first diagram and surrounds a square in the second diagram. The difference between the shapes is shown shaded. Find the shaded areas.

8. Claire gives some clues to David about a small set of positive whole numbers. The mode is 8, which is not the largest number. The median is 6 and the difference between the largest and smallest numbers is 7. The total of the numbers is 42. Find the numbers and the mean of these numbers.

David then writes the numbers on pieces of paper and puts them in a bag. Claire chooses a piece of paper at random. Find the probability that Claire chooses an odd number.

End of examination, now go back and check your answers.