



Entrance Assessment Sample Questions

The problems in this document are designed to give you an idea of the type of questions being asked in our entrance assessment. This is not an exhaustive account of all topics which will appear in the assessment. You will not need a calculator to answer these problems and, indeed, a calculator is not permitted during the assessment. Any answers involving surds or π should be left in exact form (e.g. $\sqrt{5} + \pi$).

Sample problems from Section A

Problem 1

- a) Solve the equation, expressing your solution as a fraction in simplest form:

$$\frac{3}{x-2} - \frac{5}{3x-6} = 2$$

- b) Prove that your solution to part a) is correct by substituting into the left-hand side.

Problem 2

A cone is completely filled with water. The radius of the cone is 0.3 m and the height of the cone is 1.2 m. The water is pumped out of the cone at a steady rate of $10\pi \text{ cm}^3 \text{ s}^{-1}$. How many hours does it take to empty the cone completely?

Problem 3

Simplify the following:

a) $(x^3)^{\frac{5}{6}}$

b) $\frac{1}{3}x^{-2} \times 6x^4$

c) $\frac{6x^4-12}{3x^2}$

d) $\left(\frac{27}{8}\right)^{-\frac{2}{3}}$

Problem 4

In the rectangle $ABCD$, AB is 2cm longer than BC .

The area of the rectangle is equal to its perimeter.

Find the length BC .

Problem 5

In a triangle ABC , the length of a is 16cm, the length of b is 10cm and the angle at B is 30° .

- a) Find the two possible lengths of side c
- b) Find the minimum area of the triangle

Sample problems from Section B

Problem 1

A is the set of positive integers less than 1000 which are not divisible by 2 or 5.

What is the mean value of the numbers in A ?

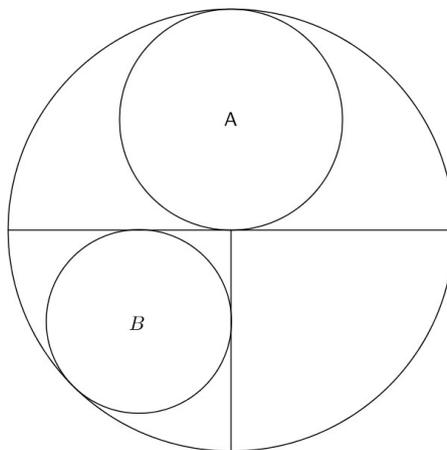
Problem 2

a) Prove that $3^8 - 2^8$ is divisible by 5

b) State and prove a similar theorem for $a^{2^k} - b^{2^k}$, where a and b are integers and $a > b > 0$

Problem 3

In the diagram below, the smaller circle has area B and the larger circle has area A .



Find the value of $\frac{B}{A}$