

**HL AA mixed prep 5**

**Please solve on extra paper!**

1.

A geometric sequence has the second term equal to 24 , the third term equal to  $12(p-1)$ ,  $p > 1$  and the sum of the first three terms equal to 76 .  
Work out the value of  $p$  and the ratio of the sequence for the case that it is a convergent sequence where  $-1 < r < 1$  .

[4]

2. Given that  $\log (p - q + 1) = 0$  and  $\log (pq) + 1 = 0$

Show that  $p = \frac{1}{\sqrt{10}}$

[4]

3.

Write  $\frac{20}{(2x-3)(x+1)}$  as the sum of partial fractions.

[2]

4.

Solve the exponential equation

$$2e^x = 9 + \frac{5}{e^x}$$

[4]

5.

$x^3 + 8x^2 + ax + b$  has a factor of  $(x-2)$  and leaves a remainder of 15 when divided by  $(x-3)$ .  
Find  $a$  and  $b$ .

[4]

6.

Peter and Sally take 2 hours to complete a job. Peter and Tom take 3 hours for the same job. Sally and Tom need 4 hours.

How long would it take the three of them to finish the same job?

[4]