# 1.5 Intro to logs\_P1

**1a.** *[2 marks]*

The intensity level of sound,  measured in decibels (dB), is a function of the sound intensity,  watts per square metre (W m). The intensity level is given by the following formula.

,  ≥ 0.

An orchestra has a sound intensity of 6.4 × 10W m . Calculate the intensity level,  of the orchestra.

**1b.** *[2 marks]*

A rock concert has an intensity level of 112 dB. Find the sound intensity, .

**2.** *[7 marks]*

Solve .

**3.** *[7 marks]*

Solve the simultaneous equations



.

**4a.** *[2 marks]*

Let *b* = log*a* , where *a* > 0 . Write down each of the following expressions in terms of *b*.

log*a*

**4b.** *[2 marks]*

log8*a*

**4c.** *[2 marks]*

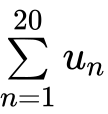
log*a*

**5a.** *[2 marks]*

An arithmetic sequence has  and , where  and .

Show that .

**5b.** *[6 marks]*

Let  and . Find the value of .

**6.** *[6 marks]*

Solve .

**7a.** *[2 marks]*

Show that  where .

**7b.** *[5 marks]*

It is given that .

Express  in terms of . Give your answer in the form , where *p* , *q* are constants.

**8.** *[5 marks]*

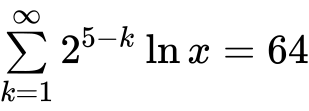
Solve the equation .

**9a.** *[3 marks]*

The first three terms of a geometric sequence are , , , for .

Find the common ratio.

**9b.** *[5 marks]*

Solve .

**10.** *[7 marks]*

Solve , for .

**11.** *[4 marks]*

Find the solution of .

**12.** *[5 marks]*

Solve the equation .

**13.** *[4 marks]*

Let  and . Write the following expressions in terms of  and .

.

**14.** *[4 marks]*

Find integer values of  and  for which



**15.** *[6 marks]*

An arithmetic sequence has the first term  and a common difference .

The 13th term in the sequence is . Find the value of .

**16a.** *[2 marks]*

Given that  and , write down the value of  and of .



**16b.** *[4 marks]*

Hence or otherwise solve .

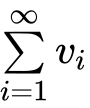


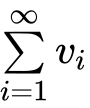
**17a.** *[8 marks]*

Let , be an arithmetic sequence with first term equal to  and common difference of , where . Let another sequence , be defined by .

Let  be the sum of the first  terms of the sequence .

(i)     Find , in terms of ,  and .

(ii)     Find the values of  for which  exists.

You are now told that  does exist and is denoted by .

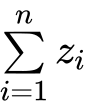
(iii)     Write down  in terms of  and  .

(iv)     Given that  find the value of  .



**17b.** *[6 marks]*

Let , be a geometric sequence with first term equal to  and common ratio , where  and  are both greater than zero. Let another sequence  be defined by .

Find  giving your answer in the form  with  in terms of ,  and .



**18a.** *[3 marks]*

Write the expression  in the form , where .



**18b.** *[3 marks]*

Hence or otherwise, solve .

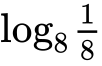


**19a.** *[1 mark]*

Write down the value of

(i)     ;

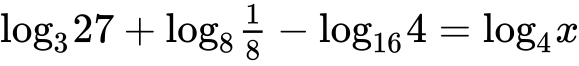
**19b.** *[1 mark]*

(ii)     ;

**19c.** *[1 mark]*

(iii)     .

**19d.** *[3 marks]*

Hence, solve .

**20a.** *[2 marks]*

Find the value of each of the following, giving your answer as an integer.



**20b.** *[2 marks]*



**20c.** *[3 marks]*



**21.** *[5 marks]*

Consider . Given that , find the value of *a*.

**22.** *[5 marks]*

Solve the equation . Express your answer in terms of  and .