1. (a) Find  $\log_2 32$ .

**(1)** 

(b) Given that  $\log_2\left(\frac{32^x}{8^y}\right)$  can be written as px + qy, find the value of p and of q.

(4)

(Total 5 marks)

- **2.** Given that  $p = \log_a 5$ ,  $q = \log_a 2$ , express the following in terms of p and/or q.
  - (a)  $\log_a 10$
  - (b)  $\log_a 8$
  - (c)  $\log_a 2.5$

(Total 6 marks)

- 3. (a) Let  $\log_c 3 = p$  and  $\log_c 5 = q$ . Find an expression in terms of p and q for
  - (i)  $\log_c 15$ ;
  - (ii)  $\log_c 25$ .
  - (b) Find the value of d if  $\log_d 6 = \frac{1}{2}$ .

(Total 6 marks)

- **4.** Let  $\ln a = p$ ,  $\ln b = q$ . Write the following expressions in terms of p and q.
  - (a)  $\ln a^3 b$
  - (b)  $\ln\left(\frac{\sqrt{a}}{b}\right)$

(Total 6 marks)

5. Let  $p = \log_{10} x$ ,  $q = \log_{10} y$  and  $r = \log_{10} z$ .

Write the expression  $\log_{10} \left( \frac{x}{y^2 \sqrt{z}} \right)$  in terms of p, q and r.

Working:	
	Answer:
	(Total 6 marks

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<b>6.</b>	Let $a = \log x$ , $b = \log y$ , and $c = \log z$ .
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Write  $\log \left( \frac{x^2 \sqrt{y}}{z^3} \right)$  in terms of a, b and c.

Answer:	
	Answer:

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(a) $\log_5 x^2$ (b) $\log_5 \left(\frac{1}{x}\right)$ (c) $\log_{25} x$ Working:  Answers:  (a)	Give	en that $\log_5 x = y$ , express each of the follow	ing in terms of y.
(c) log <sub>25</sub> x  Working:  Answers:  (a)	(a)	$\log_5 x^2$	
Working:    Answers: (a)	(b)	$\log_5\left(\frac{1}{x}\right)$	
<i>Answers</i> :  (a)	(c)	$\log_{25} x$	
(a)			
			Answers:
(b)			
			(b)

(Total 6 marks)

8. Solve the equation  $\log_9 81 + \log_9 \frac{1}{9} + \log_9 3 = \log_9 x$ .

Working:	
	Answer:
	(Total 4 marks

9. Let  $\log_{10}P = x$ ,  $\log_{10}Q = y$  and  $\log_{10}R = z$ . Express  $\log_{10}\left(\frac{P}{QR^3}\right)^2$  in terms of x, y and z.

Working:	
	Answer:
	(Total 4 mark

(b) $\log_a 20$ .	
Working:	
	Answers:
	(a)
	(b)(Total 4 marks

If  $\log_a 2 = x$  and  $\log_a 5 = y$ , find in terms of x and y, expressions for

10.

(a)  $\log_2 5$ ;

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