

## Algebra – Logs and Indices

### Project Maths Exam Questions Checklist

Question	Comments	Attempted	Repeated
2016 Paper 1 Q4 (b)		<input type="checkbox"/>	<input type="checkbox"/>
2014S Paper 1 Q2 (b)		<input type="checkbox"/>	<input type="checkbox"/>

### Project Maths Exam Questions Checklist (Relevant Ordinary Level)

Question	Comments	Attempted	Repeated
2014S Paper 1 Q1 (a)		<input type="checkbox"/>	<input type="checkbox"/>
2013 Paper 1 Q3 (c)		<input type="checkbox"/>	<input type="checkbox"/>

### Project Maths Exam Questions Checklist (Relevant Junior Cert Higher Level)

Question	Comments	Attempted	Repeated
2017 Paper 1 Q10		<input type="checkbox"/>	<input type="checkbox"/>
2016 Paper 1 Q9 (a)		<input type="checkbox"/>	<input type="checkbox"/>

## Relevant Old Course Questions Checklist

Question	Comments	Attempted	Repeated
2000 Paper 1 Q5 (c)		<input type="checkbox"/>	<input type="checkbox"/>
2001 Paper 1 Q5 (b) (i)		<input type="checkbox"/>	<input type="checkbox"/>
2002 Paper 1 Q5 (a)		<input type="checkbox"/>	<input type="checkbox"/>
2003 Paper 1 Q2 (c)		<input type="checkbox"/>	<input type="checkbox"/>
2004 Paper 1 Q1 (b) (ii)		<input type="checkbox"/>	<input type="checkbox"/>
2004 Paper 1 Q5 (b) (ii)		<input type="checkbox"/>	<input type="checkbox"/>
2005 Paper 1 Q1 (b) (i)		<input type="checkbox"/>	<input type="checkbox"/>
2005 Paper 1 Q5 (c)		<input type="checkbox"/>	<input type="checkbox"/>
2006 Paper 1 Q2 (c)		<input type="checkbox"/>	<input type="checkbox"/>
2006 Paper 1 Q5 (c)		<input type="checkbox"/>	<input type="checkbox"/>
2008 Paper 1 Q5 (b)		<input type="checkbox"/>	<input type="checkbox"/>
2009 Paper 1 Q5 (c)		<input type="checkbox"/>	<input type="checkbox"/>
2010 Paper 1 Q5 (a)		<input type="checkbox"/>	<input type="checkbox"/>
2011 Paper 1 Q5 (b)		<input type="checkbox"/>	<input type="checkbox"/>
2012 Paper 1 Q5 (a)		<input type="checkbox"/>	<input type="checkbox"/>

## Project Maths Exam Questions

### 2016 LCHL Paper 1 – Question 4 (b)

Given  $\log_a 2 = p$  and  $\log_a 3 = q$ , where  $a > 0$ , write each of the following in terms of  $p$  and  $q$ :

- (i)  $\log_a \frac{8}{3}$
- (ii)  $\log_a \frac{9a^2}{16}$

### 2014 LCHL Sample Paper 1 – Question 2 (b)

Given that  $p = \log_c x$ , express  $\log_c \sqrt{x} + \log_c(cx)$  in terms of  $p$ .

## Project Maths Exam Questions (Relevant Ordinary Level)

### 2014 LCOL Sample Paper 1 – Question 1 (a)

Write  $6^{-2}$  and  $81^{\frac{1}{2}}$  without using indices.

### 2014 LCOL Sample Paper 1 – Question 1 (c)

Show that  $\frac{(a\sqrt{a})^3}{a^4}$  simplifies to  $\sqrt{a}$ .

### 2014 LCOL Sample Paper 1 – Question 1 (d)

Solve the equation  $49^x = 7^{2+x}$  and verify your answer.

### 2013 LCOL Paper 1 – Question 3 (c)

Solve the equation  $27^{2x} = 3^{x+10}$ .

## Project Maths Exam Questions (Relevant Junior Cert Higher Level)

### 2017 JCHL Paper 1 – Question 10

Write each of the following in the form  $2^n$ , where  $n \in \mathbb{Q}$ .

- (a)  $2^3 \times 2^5 \times 2^{10}$
- (b)  $8^{25}$
- (c)  $\sqrt{8}$

### 2016 JCHL Paper 1 – Question 9 (a)

Write each of the following numbers in the form  $3^k$ , where  $k \in \mathbb{Q}$ .

- (i) 9
- (ii) 1
- (iii)  $\sqrt{27}$

### 2016 JCHL Paper 1 – Question 9 (b)

Write  $(-2n)^4$ , in the form  $a n^b$  where  $a, b \in \mathbb{Z}$ .

### 2013 JCHL Paper 1 – Question 1 (b) (i)

Place the following numbers in order, starting with the smallest number:

$$4^{\frac{1}{2}}, 4^{-2}, 2^0, 2^{-3}.$$

## Relevant Old Course Questions

### 2012 LCHL Paper 1 – Question 5 (a)

Solve for  $x \in \mathbb{R}$ :

$$\log_4(2x + 6) - \log_4(x - 1) = 1$$

### 2011 LCHL Paper 1 – Question 5 (b) (i)

Solve the equation:

$$\log_2 x - \log_2(x - 1) = 4\log_4 2$$

### 2011 LCHL Paper 1 – Question 5 (b) (ii)

Solve the equation:

$$3^{2x+1} - 17(3^x) - 6 = 0$$

Give your answer correct to two decimal places.

### 2010 LCHL Paper 1 – Question 5 (a)

Solve the equation:

$$\log_2(x + 6) - \log_2(x + 2) = 1$$

### 2009 LCHL Paper 1 – Question 5 (c)

Solve the simultaneous equations

$$\begin{aligned}\log_3 x + \log_3 y &= 2 \\ \log_3(2y - 3) - 2\log_9 x &= 1\end{aligned}$$

### 2008 LCHL Paper 1 – Question 5 (b) (i)

Solve the equation

$$2^{x^2} = 8^{2x+9}$$

### 2008 LCHL Paper 1 – Question 5 (b) (ii)

Solve the equation

$$\log_e(2x + 3) + \log_e(x - 2) = 2 \log_e(x + 4)$$

### 2006 LCHL Paper 1 – Question 2 (c)

$f(x) = 1 - b^{2x}$  and  $g(x) = b^{1+2x}$ , where  $b$  is a positive number.

Find, in terms of  $b$ , the value of  $x$  for which  $f(x) = g(x)$ .

### 2006 LCHL Paper 1 – Question 5 (c)

(i) Given two real numbers  $a$  and  $b$ , where  $a > 1$  and  $b > 1$ , prove that

$$\frac{1}{\log_b a} + \frac{1}{\log_a b} \geq 2$$

(ii) Under what condition is

$$\frac{1}{\log_b a} + \frac{1}{\log_a b} = 2$$

### 2005 LCHL Paper 1 – Question 1 (b) (i)

Express  $2^{\frac{1}{4}} + 2^{\frac{1}{4}} + 2^{\frac{1}{4}} + 2^{\frac{1}{4}}$  in the form  $2^{\frac{p}{q}}$ , where  $p, q \in \mathbb{Z}$

**2005 LCHL Paper 1 – Question 5 (c)**

- (i) Show that  $\frac{1}{\log_a b} = \log_b a$ , where  $a, b > 0$  and  $a, b \neq 1$ .
- (ii) Show that  $\frac{1}{\log_2 c} + \frac{1}{\log_3 c} + \frac{1}{\log_4 c} + \dots + \frac{1}{\log_r c} = \frac{1}{\log_{r!} c}$ , where  $c > 0, c \neq 1$ .

**2004 LCHL Paper 1 – Question 1 (b) (ii)**

Show that

$$\frac{3}{1+x^p} + \frac{3}{1+x^{-p}}$$

simplifies to a constant.

**2004 LCHL Paper 1 – Question 5 (b) (ii)**

Solve

$$\log_4 x - \log_4(x-2) = \frac{1}{2}.$$

**2003 LCHL Paper 1 – Question 2 (c)**

Solve for  $y$ :

$$2^{2y+1} - 5(2^y) + 2 = 0.$$

**2002 LCHL Paper 1 – Question 5 (a)**

Find the value of  $x$ :

(i)  $\frac{8}{2^x} = 32$

(ii)  $\log_9 x = \frac{3}{2}$

**2001 LCHL Paper 1 – Question 5 (b) (i)**

Solve  $\log_6(x+5) = 2 - \log_6 x$  for  $x > 0$ .

**2000 LCHL Paper 1 – Question 5 (c)**

- (i) Solve for  $x$   
 $2 \log_9 x = \frac{1}{2} + \log_9(5x+18), x > 0$
- (ii) Solve for  $x$   
 $3e^x - 7 + 2e^{-x} = 0.$