



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

Junior Certificate Examination 2016

# Mathematics

Paper 1  
Ordinary Level

Friday 10 June – Afternoon 2:00 to 4:00

300 marks

Examination number
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Centre stamp
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Running total	
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For examiner			
Question	Mark	Question	Mark
1		11	
2		12	
3		13	
4		14	
5			
6			
7			
8			
9			
10		Total	

Grade
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## Instructions

There are 14 questions on this examination paper. Answer **all** questions.

Questions do not necessarily carry equal marks. To help you manage your time during this examination, a maximum time for each question is suggested. If you remain within these times you should have about 10 minutes left to review your work.

Write your answers in the spaces provided in this booklet. You may lose marks if you do not do so. You may ask the superintendent for more paper. Label any extra work clearly with the question number and part.

The superintendent will give you a copy of the *Formulae and Tables* booklet. You must return it at the end of the examination. You are not allowed to bring your own copy into the examination.

You will lose marks if you do not show all necessary work.

You may lose marks if you do not include the appropriate units of measurement, where relevant.

You may lose marks if you do not give your answers in simplest form, where relevant.

Write the make and model of your calculator(s) here:



**Question 2**

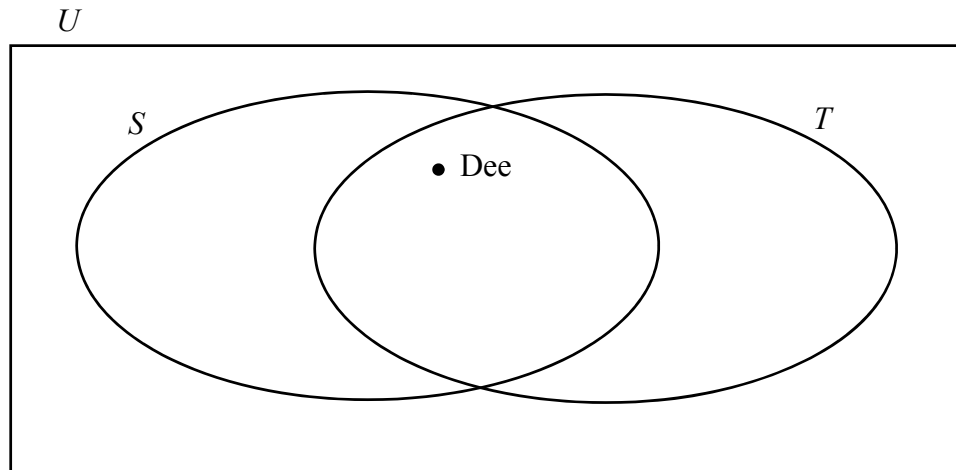
**(Suggested maximum time: 10 minutes)**

Dee, Máire, Ray, Evan, and Fiona all use Snapchat ( $S$ ).

Dee, Máire, and Ray use Twitter ( $T$ ).

Zach doesn't use Snapchat or Twitter.

- (a) Use this information to complete the Venn diagram below, where  $U$  is the universal set.



- (b) List the elements of each of the following two sets, where  $S'$  is the complement of the set  $S$ .

(i)  $S \cap T =$

(ii)  $S' =$

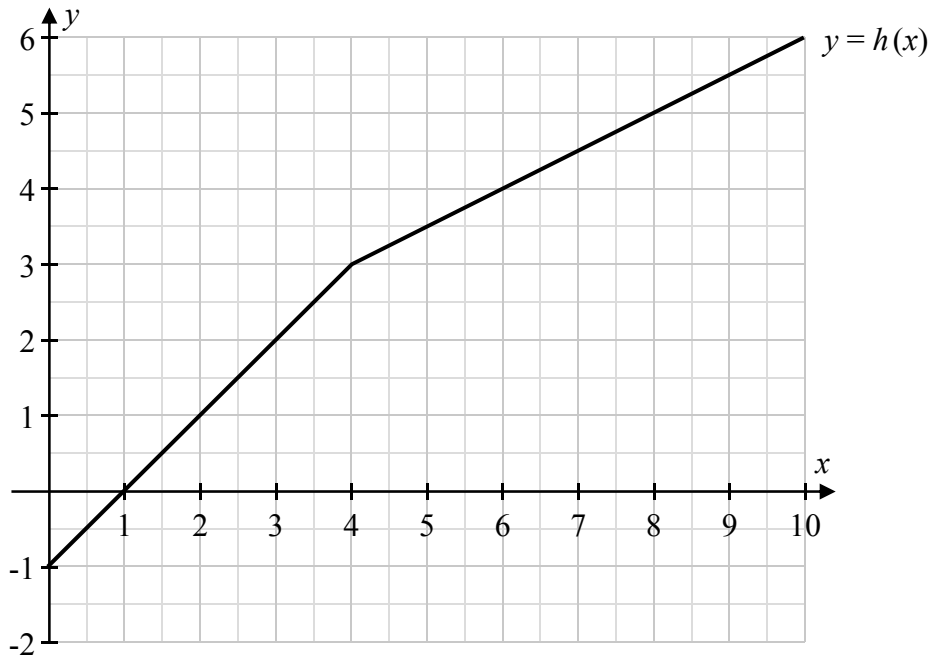
- (c) Put a tick ( $\checkmark$ ) in the correct box in each row of the table below, to show whether each statement is true or false.

Statement	Tick <b>one</b> only for each statement	
	True	False
$\# S = 3$	<input type="checkbox"/>	<input type="checkbox"/>
$Dee \in T$	<input type="checkbox"/>	<input type="checkbox"/>
$S \cup T = T \cup S$	<input type="checkbox"/>	<input type="checkbox"/>
$T \subset S$	<input type="checkbox"/>	<input type="checkbox"/>
$S \setminus T = \{ \}$	<input type="checkbox"/>	<input type="checkbox"/>

**Question 3**

**(Suggested maximum time: 5 minutes)**

The graph of the function  $y = h(x)$  is shown on the co-ordinate grid below.  
The graph is made up of two line segments.



(a) Use the graph to answer the following questions.

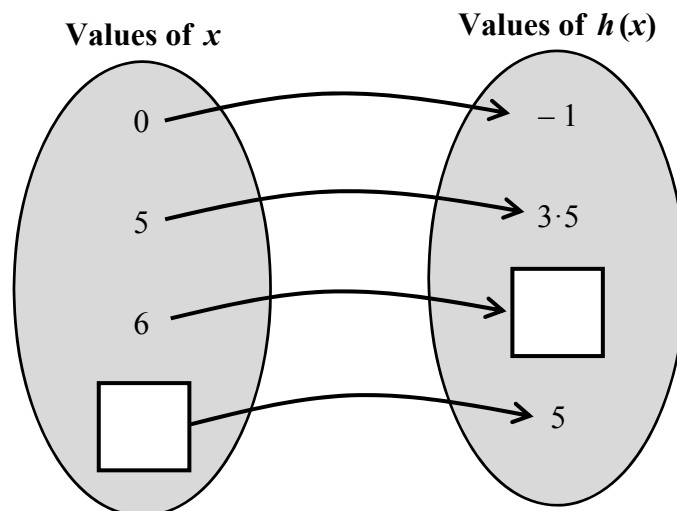
(i) Find the value of  $h(4)$ .

$h(4) =$

(ii) What number must  $\odot$  represent, if  $h(\odot) = 1$ ?

$\odot =$

(b) Use the graph above to fill in the two missing values in the arrow diagram below, which shows the values of  $h(x)$  for the given values of  $x$ .



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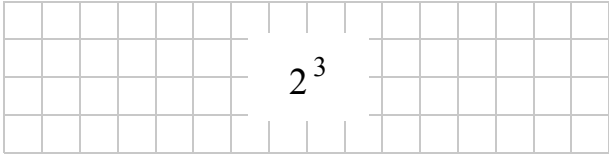
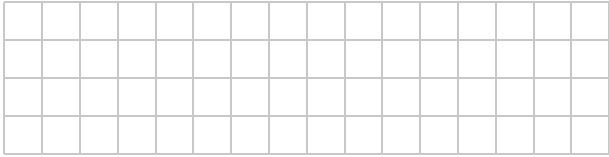
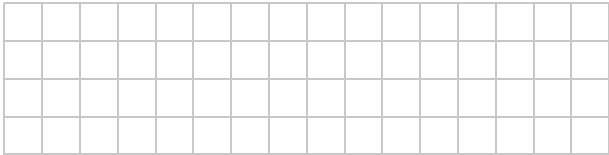
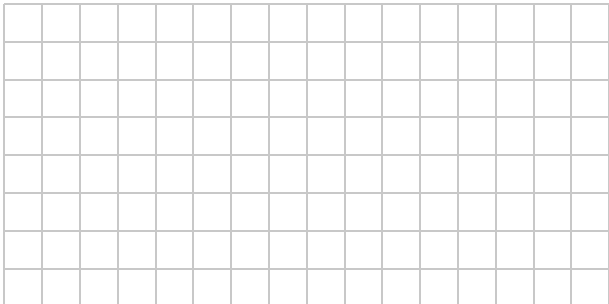





**Question 11**

**(Suggested maximum time: 5 minutes)**

Fill in the table by writing each expression in the form  $2^p$ , where  $p \in \mathbb{N}$ .  
 One has already been filled in for you.

Expression	In the form $2^p$ , where $p \in \mathbb{N}$
8 =	
32 =	
$2 \times 2 \times 2 \times 2 \times 2 \times 2 =$	
$2^7 \times 2^{10} =$	
$(2^6)^4 =$	

**Question 12****(Suggested maximum time: 10 minutes)**

The letter  $J$  stands for Jake's age, in years.

- (a) Fill in the table by writing an algebraic term, in terms of  $J$ , to match each description. Two have already been filled in for you.

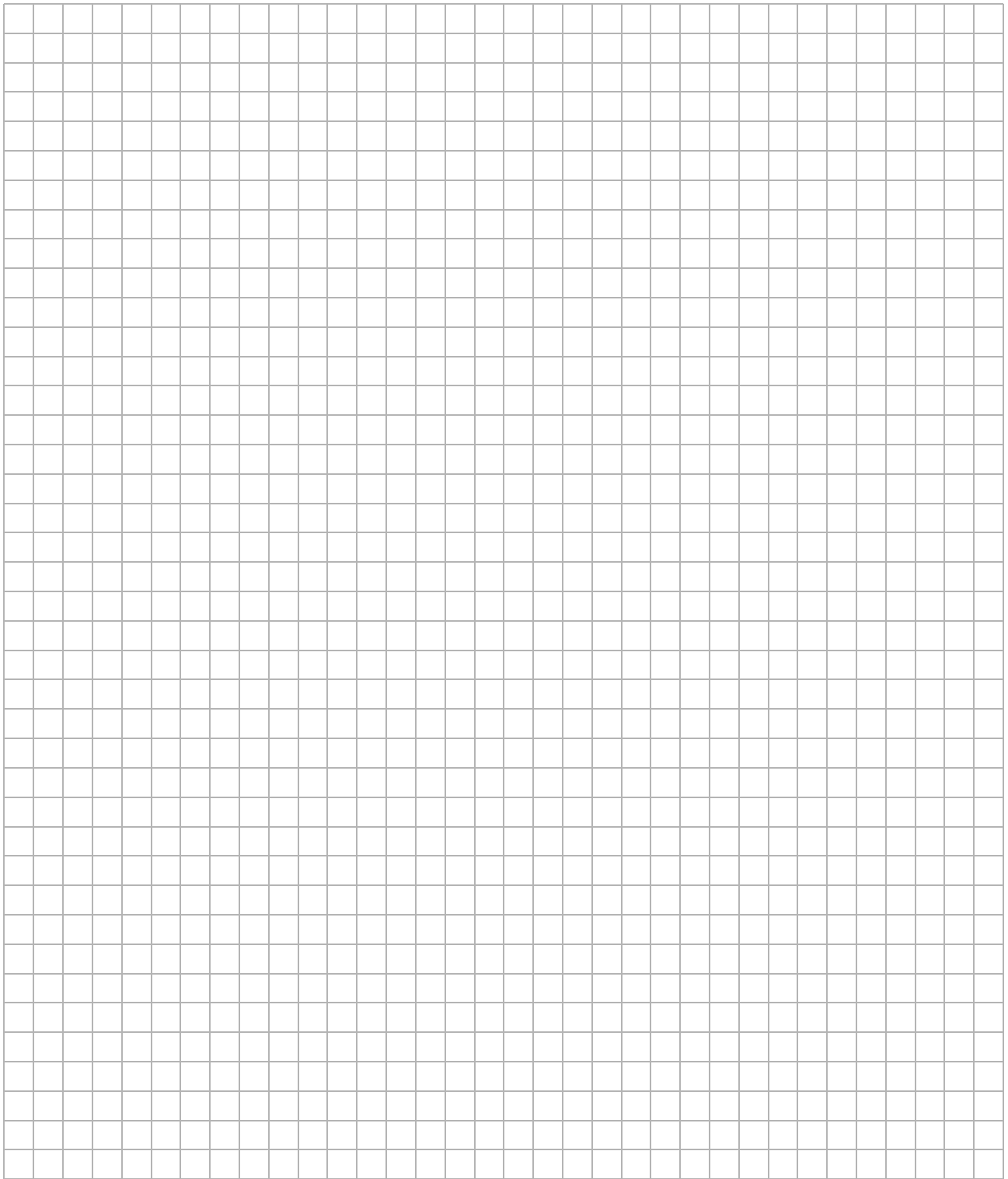
Description	Algebraic term
Jake's age now.	$J$
Jake's age in 2 years' time.	$J + 2$
Jake's age in 5 years' time.	
Jake's age 4 years ago.	
Twice Jake's age.	
One third of Jake's age.	

- (b) Solve this equation:

$$5M + 2 = 2M + 35.$$







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**Mathematics – Paper 1**

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