



# Coimisiún na Scrúduithe Stáit State Examinations Commission

*Leaving Certificate Applied 2014*

## Mathematical Applications

(200 marks)

**Friday 6 June**

**Morning, 9:30 – 11:30**

### General Directions

1. Write your EXAMINATION NUMBER in this space:
2. Write all answers in the boxes or spaces in this answerbook.
3. Show necessary work on right hand blank page opposite each question.
4. Calculators may be used.
5. Answers involving money should be given correct to the nearest cent, unless otherwise indicated.

**ANSWER QUESTION ONE AND THREE OTHER QUESTIONS.**  
ALL QUESTIONS CARRY EQUAL MARKS.

<i>For the Superintendent only</i>	
Centre Stamp	

<i>For the Examiner only</i>				
			Question	Mark
			1	
			2	
			3	
<i>Cumulative check</i>			4	
Running total			5	
– Disallowed		↔	Total	
= Total				

1. (a) Find 13.5% of €168.

(b) In a season, Jim scores 9 tries and 24 penalties. A try is worth 5 points and a penalty is worth 3 points. Find the total number of points Jim scores in this season.

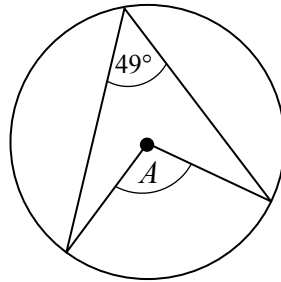
(c) A rectangle is 20 m long and 35 m wide. Find the length of the perimeter of the rectangle.

(d) A car travels 80 km in 1 hour and 20 minutes. Find the average speed of the car.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

(e) Given an exchange rate of €1 = \$1.3523 US dollars, convert €250 to dollars.

(f) Find the value of  $A$ .



(g) Write the number 16 666 to the nearest thousand.

(h) In a sale all items are reduced by 30%. During the sale a pair of jeans sells for €17.50. Find the cost of the pair of jeans before the sale.

(i) The heights of five students are 165 cm, 142 cm, 158 cm, 157 cm, and 169 cm. Find the average (mean) height of the five students.

(j) Find  $3\frac{2}{3} \times 2\frac{1}{6}$ .

**Use this page to show any necessary work for Question 1**

## 2. Research Element Question on Income Tax / PAYE

Below is the Tax Credit Certificate for Ian Murphy.

Tax Credit Certificate	
FOR THE YEAR 1 JANUARY 2013 TO 31 DECEMBER 2013 AND FOLLOWING YEARS	
<b>Tax Credits</b>	<b>€</b>
Personal Tax Credit	1650
PAYE Tax Credit	1650
Rent Relief	300
<b>Gross Tax Credits</b>	
<b>Net Tax Credits</b>	
<b>Tax Rate Bands</b>	<b>€</b>
<b>Rate Band 1</b>	32 800
The amount of your income taxable at <b>20%</b>	32 800
All income over <b>€32 000</b> is taxable at <b>41%</b>	

- (a) Fill in the missing details in the Tax Credit Certificate above.
- (b) Using the information from the Tax Credit Certificate, fill in the missing details in the table on the right.
- (c) This week Ian earned €610.00.  
Find Ian's **gross tax** and Ian's **net tax** for this week.

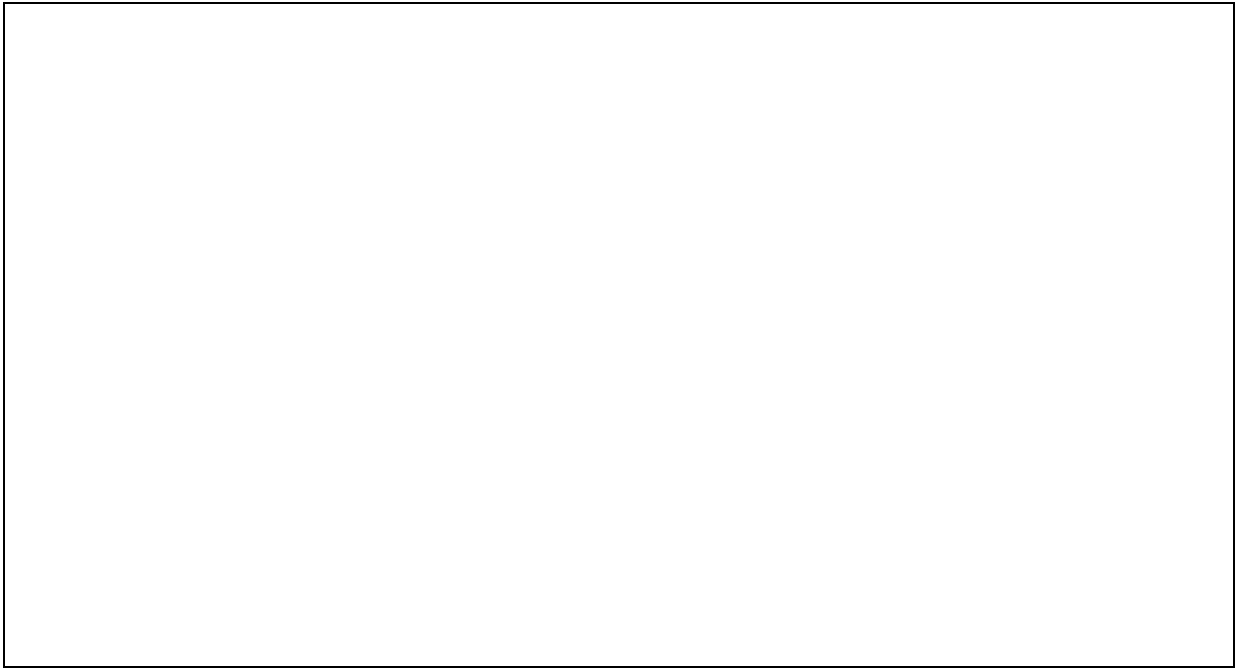
Standard rate cut-off point (€)		
<i>Yearly</i>	<i>Monthly</i>	<i>Weekly</i>
32 800	2733.33	630.77
<b>Tax Credits (€)</b>		
<i>Yearly</i>	<i>Monthly</i>	<i>Weekly</i>

Gross tax = _____	Net tax = _____
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(d) Put a tick (✓) in the correct box on each line to show the effect of each event on <b>Ian's net pay for this week</b> .	Will increase pay	Will have no effect on pay	Will decrease pay
The <b>Standard rate of tax</b> is changed from 20% to 22%.			
The <b>PAYE Tax Credit</b> is changed from €1650 to €1700.			
The <b>Standard rate cut-off point</b> is changed from €32 800 to €33 000.			

**Use this page to show any necessary work for Question 2**

3. (a) Construct a triangle in which one side is 8 cm, another side is 6 cm, and the angle between these two sides is  $90^\circ$ .

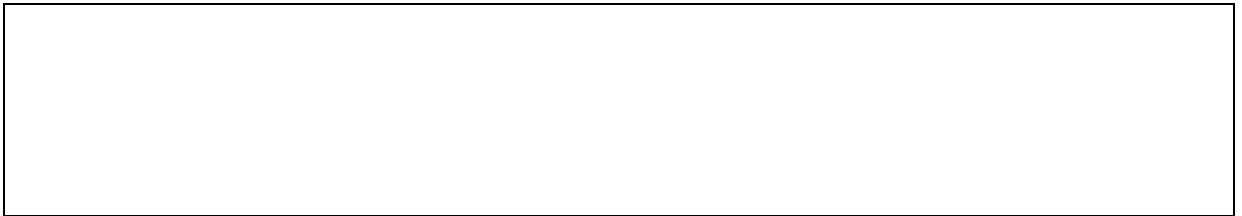


- (b) Measure the length of the third side.

Length = \_\_\_\_\_

- (c) Use the lengths of the sides of your triangle to check the Theorem of Pythagoras.

*Theorem of Pythagoras: "In a right-angled triangle the square of the hypotenuse is the sum of the squares of the other two sides."*

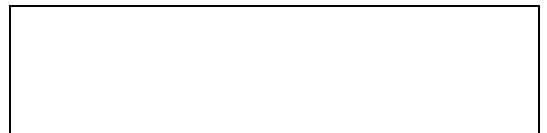


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- (d) A bathroom floor measures 3.75 m by 2.1 m.

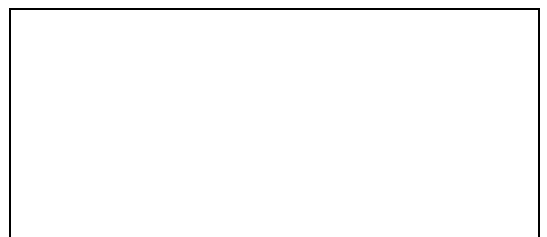
- (i) Calculate the area of the floor.



- (ii) Square tiles of side 0.15 m are used to cover the floor. How many tiles are needed to cover the floor completely?



- (iii) The tiles are sold in boxes.  
Each box contains 40 tiles, and costs €32.  
Only full boxes may be bought – it is not possible to buy part of a box of tiles.  
Find the total cost of the tiles.



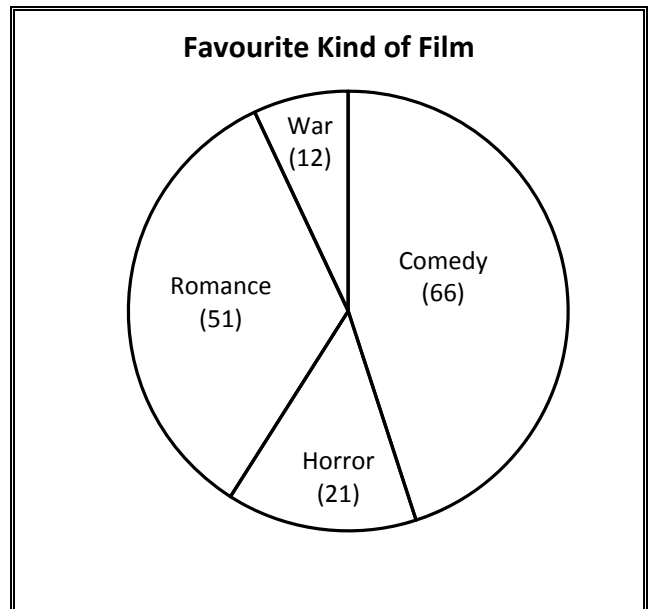
**Use this page to show any necessary work for Question 3**

4. A group of students were asked about their favourite kind of film. The results are shown in the graph on the right.

(a) What is this type of graph called?

(b) The number of students who picked each kind of film is shown in brackets on the graph.

How many students were surveyed, in total?



(c) What percentage of students chose *Comedy* as their favourite type of film?

(d) Five candidates stood for election to Dáil Éireann in a constituency with 3 seats. The election was conducted under the PR system.

The total electorate, as contained in the Register of Electors, was 16 950.

The total poll was 12 500.

The number of spoiled votes (votes which were invalid) was 240.

(i) Calculate the valid poll.

(ii) Calculate the quota, using the formula in the box.

$$\text{Quota} = \frac{\text{valid poll}}{\text{number of seats} + 1} + 1 =$$

On the right is a menu for a restaurant.

(e) Complete the table below to show all of the 8 different three-course meals that can be chosen.

Starter	Main Course	Dessert
Soup or Melon	Chicken or Beef	Apple pie or Ice cream

<b>Soup, Beef, Ice cream</b>	

(f) A customer chooses a three-course meal at random. What is the probability that she chooses **Soup** as her starter?



**Use this page to show any necessary work for Question 4**

5. (a) Fill in the missing details on the *Call Charges* page of the telephone bill, using the *Guide to call prices* shown below.

Note: customers are charged for the **exact** duration of their calls.

<b>Guide to call prices</b>			
	<i>Daytime price per min</i>	<i>Evening price per min</i>	<i>Weekend price per min</i>
<b>Local calls</b>	5·25c	1·34c	1·34c
<b>National calls</b>	8·71c	5·25c	1·34c
<b>Mobile calls</b>	21·33c	15·14c	10·19c

<b>Call Charges</b>				
<i>Type of call</i>	<i>rate</i>	<i>number of calls</i>	<i>duration hr:min:sec</i>	<i>Cost (€)</i>
<b>Local</b>	Daytime	15	00:28:50	1·51
	Evening calls	28	01:16:30	<input type="text"/>
<b>National</b>	Evening calls	8	00:44:40	2·35
<b>Mobile</b>	Daytime	6	00:30:00	<input type="text"/>
<b>Total call charges</b>				<input type="text"/>

- (b) Using your answers from (a), fill in the missing details on the summary page of the telephone bill below.

<b>Your two-monthly telephone bill</b>				
<b>Your charges for this period</b>				
Your service charges				44·42
Your call charges ... <i>see (a) above</i>				<input type="text"/>
Total VAT on €	<input type="text"/>	at 23·00%		<input type="text"/>
<b>Total charges for this period</b>				<input type="text"/>

- (c) A bag contains 28 discs. Each disc is coloured red, yellow, or green. There are twice as many red discs as yellow discs, and half as many green discs as yellow discs.  
How many yellow discs are there?

**Use this page to show any necessary work for Question 5**

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