

# THE UNIVERSITY OF AUCKLAND

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FIRST SEMESTER, 2011

Campus: City

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## COMPUTER SCIENCE

### Mastering Cyberspace: An Introduction to Practical Computing

(Time Allowed: TWO hours)

**NOTE:**

You must answer **all** questions in this exam.

No calculators are permitted

Answer Section A (Multiple choice questions) on the Teleform answer sheet provided.

Answer Section B in the space provided in this booklet.

There is space at the back for answers that overflow the allotted space.

<b>Surname</b>	<i>Sample</i>
<b>Forenames</b>	<i>Solutions</i>
<b>Student ID</b>	
<b>Login (UPI)</b>	

	<b>Question</b>	<b>Mark</b>	<b>Out Of</b>
1 - 25	Multiple Choice		50
26	Programming using Python		10
27	Spreadsheets		10
28	Databases		10
29	XHTML and CSS		10
30	LaTeX		10
	<b>TOTAL</b>		<b>100</b>

CONTINUED

**SECTION A****MULTIPLE CHOICE QUESTIONS**

Each question in this section is worth **2 marks**. There is only **one** correct answer for each question. Select your preferred alternative on the Teleform answer sheet provided by shading in the appropriate box.

**Question 1**

[2 marks] Why do computers store data in binary rather than in decimal?

- (a) Different cultures use different number bases and binary is not used by anyone.
- (b) All data can be represented exactly in binary.
- (c) It is easier to design and build a computer which works with binary data.**
- (d) We have two hands.
- (e) The universe is binary at its lowest level.

**Question 2**

[2 marks] Imagine 3 switches, each able to show 0 or 1. How many different values (or states) can be represented by the 3 switches?

- (a) 6
- (b) 3
- (c) 111
- (d) 8**
- (e) None of the above.

**Question 3**

[2 marks] Which of the following is the closest to the size of a DVD movie?

- (a) 6 terabytes
- (b) 6 gigabytes**
- (c) 6 bytes
- (d) 6 kilobytes
- (e) 6 megabytes

**Question 4**

[2 marks] Rank these computer components from fastest to slowest:

- (a) optical drive, hard drive, RAM, CPU
- (b) CPU, RAM, hard drive, optical drive**
- (c) hard drive, optical drive, RAM, CPU
- (d) RAM, optical drive, CPU, hard drive
- (e) CPU, optical drive, RAM, hard drive

**Question 5**

[2 marks] Which of the following statements about software or programs is FALSE?

- (a) Programs execute from RAM.
- (b) All applications are software.
- (c) Executable programs are stored as English commands.**
- (d) Some programs are not applications.
- (e) Software is loaded from secondary memory into primary memory in order to run.

**Question 6**

[2 marks] Which of the following is NOT usually determined by the file format?

- (a) The programs which can work with that file.
- (b) How the data is represented in the file.
- (c) The file size.**
- (d) Whether the file can be played on an MP3 player.
- (e) What happens when a user opens the file.

**Question 7**

[2 marks] Which of the following is NEVER required to connect a home computer to the Internet?

- (a) A network card
- (b) An ISP
- (c) A RAID controller**
- (d) A phone jack
- (e) A modem

**Question 8**

[2 marks] What does the @ sign represent in an email address?

- (a) The separation of the DNS from the IP address.
- (b) The separation of the local part of the address from the IP address.
- (c) The separation of the local part of the address from the mail server domain name.**
- (d) The separation of the IP address from the mail server domain name.
- (e) The separation of the user's password from the mail server domain name.

**Question 9**

[2 marks] Which of the following is TRUE about online Chat systems?

- (a) Chat messages are always stored and never sent immediately.
- (b) Chat clients always send messages to a server and retrieve them from a server rather than communicating directly with each other.
- (c) All Chat clients find out who is online by connecting directly with every other Chat client.
- (d) Some Chat clients find out who is online by sending a list of your contacts to a server.**
- (e) Chat clients work in exactly the same way as email clients.

**Question 10**

[2 marks] Which of the following statements about blogs is TRUE?

- (a) Many blogs are subjective.**
- (b) Blog entries are indexed automatically, so you always know the topic of the blog.
- (c) Blog posts are shown on the screen in chronological order (oldest post first).
- (d) All blogs are reviewed by others to ensure high quality content.
- (e) A blogger is a person who reads blogs.

**Question 11**

[2 marks] Which of the following statements about wikis is TRUE?

- (a) Wikipedia is the world's biggest wiki.**
- (b) If a wiki page is modified, no track is kept of the change.
- (c) Information in a wiki can't be trusted since it has been written by an individual.
- (d) All wikis have unrestricted access, so anyone can edit them.
- (e) Wikis were designed to be difficult to edit.

**Question 12**

[2 marks] Which of the following was NOT an aim of the WWW project?

- (a) To enable distributed access world-wide.
- (b) To access documents from multiple networks in a seamless manner.
- (c) To make it easy to add documents.
- (d) To provide access to video on demand.**
- (e) To link documents with hypertext.

**Question 13**

[2 marks] Which term means making links between text, images, sounds, animations, etc.?

- (a) Hyperlinkage
- (b) Multimedia
- (c) Client-server
- (d) Hypertext
- (e) Hypermedia**

**Question 14**

[2 marks] Which of the following is NOT normally involved in accessing a web page?

- (a) A Web server
- (b) A MEMEX system**
- (c) A DNS server
- (d) HTTP
- (e) A browser

**Question 15**

[2 marks] If the ASCII code for the letter "a" is 97, what is the ASCII code for the letter "c"?

- (a) 101
- (b) 99**
- (c) 103
- (d) 98
- (e) None of the above

**Question 16**

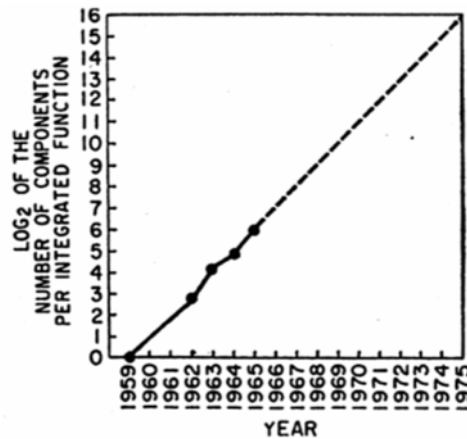
[2 marks] What advantage do vector graphics have over bitmap graphics?

- (a) Vector graphics images can be produced easily using HTML.
- (b) Vector graphics images are better for representing photographs.
- (c) When vector graphics images are enlarged they maintain their exact shapes.**
- (d) Vector graphics images are encoded with the JPEG compression algorithm.
- (e) Colours are represented more accurately with vector graphics.

**Question 17**

[2 marks] Which of the following is NOT a criticism of PowerPoint as presented in lectures?

- (a) Because PowerPoint is designed for bullet points it causes simplified presentations and misunderstandings.
- (b) PowerPoint provides too many options.**
- (c) PowerPoint constrains the presenter.
- (d) Ideas are forced to fit PowerPoint limits.
- (e) Tables and data are forced to fit in a PowerPoint slide.

**Question 18**

[2 marks]The above graph was used to make a prediction, now known as

- (a) Climate Change
- (b) Gates's Conjecture
- (c) Moore's Law**
- (d) Core rules of netiquette
- (e) Rule of 75

**Question 19**

[2 marks]Which one of the following statements is TRUE?

- (a) Unix was the dominant operating system during the period dominated by mainframe computers.
- (b) Microsoft was formed by Bill Gates and Steve Wozniak.
- (c) IBM dominated the entire computer market during the mainframe era, selling millions of computers.
- (d) The first computer at the University of Auckland was an IBM 1620.**
- (e) Visicalc was developed by Douglas Engelbart in collaboration with Xerox Palo Alto Research Center (PARC).

**Question 20**

[2 marks]Which one of the following statements is TRUE?

- (a) The Chinese Room is a thought experiment used to argue against weak AI.
- (b) Combinatorial explosion is no longer a major problem for solving AI problems.
- (c) Today strong AI is the primary focus of research in artificial intelligence.
- (d) All modern computers pass the Turing test.
- (e) Today humans sometimes use computer expert systems to help make medical diagnoses.**

**Question 21**

[2 marks] Which one of the following statements is FALSE?

- (a) Turing reasoned that behaviour is all that matters, and if something behaves intelligently then it is intelligent.
- (b) Computers can equal or surpass humans at some tasks that require complex reasoning, such as playing chess.
- (c) Weak AI is the view that computers will be able to behave intelligently.
- (d) Computers can perform many tasks that appear to require intelligence, such as recognizing voices, faces, and differentiating objects.
- (e) Today's computers are better suited for AI because they are parallel and therefore mimic the human brain.**

**Question 22**

[2 marks] Which one of the following statements is TRUE regarding the Internet?

- (a) In New Zealand, there is no distinction regarding the rights of people to access material on the Internet based on age, gender, or nationality.
- (b) Information that is readily accessible and legal to view in one country might be illegal to view in another country.**
- (c) You cannot be charged with a crime over something posted on the Internet if it is not illegal in the country where you posted it.
- (d) Assuming a false identity on the Internet is always illegal.
- (e) Information that can be readily accessed directly through Google is always legal.

**Question 23**

[2 marks] Which one of the following statements is FALSE regarding anonymity on the web?

- (a) It prevents people from disclosing their identity.**
- (b) It permits people to be crude, insulting and irresponsible.
- (c) It allows deception, which can lead to fraud.
- (d) It allows individuals to participate in discussions they otherwise might find too embarrassing.
- (e) It is dangerous because it can be difficult to determine someone's true identity.

**Question 24**

[2 marks] Which one of the following statements about browser blocking software is FALSE?

- (a) A black list may allow access to a number of websites that are harmful.
- (b) A white list allows access to a number of websites that are harmful.**
- (c) A black list may allow access to a number of websites that are harmless.
- (d) A white list allows access to every website that is on the list.
- (e) A white list prevents access to a number of websites that are harmful.

**Question 25**

[2 marks] Which one of the following statements is FALSE?

- (a) Computers may cause failures that would not happen if humans were directly responsible for making the decisions.
- (b) Most computers have temperature detection, ensuring that they will never catch fire.**
- (c) Humans may cause failures that would not happen if computers were directly responsible for making the decisions.
- (d) Many programs containing bugs can run for years without any ill effects.
- (e) Virtually all complex programs contain errors.



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## SECTION B

Answer all questions in this section in the space provided. If you run out of space then please use the Overflow Sheet and indicate in the allotted space that you have used the Overflow Sheet.

### 26. Programming Using Python (10 marks)

- (a) Show the output from the following program after the user enters the year **1990** at the prompt. Show each space in the output with the “^” character.

```
year = int(input("In what year were you born? "))  
print("You will turn", 2012 - year, "next year")
```

**In^what^year^were^you^born?^1990**  
**You^will^turn^22^next^year**

(3 marks)

- (b) Write a Python program that reads in a number of days and weeks and prints out the number of minutes remaining until that much time has elapsed. The following examples show the exact formatting expected for the prompts. Your program must produce the same output as shown below given the input shown below.

Example 1:

```
How many weeks? 2
And how many days? 4
Just wait 25920 minutes!
```

Example 2:

```
How many weeks? 0
And how many days? 1
Just wait 1440 minutes!
```

```
weeks = int(input("How many weeks? "))

days = int(input("And how many days? "))

totalDays = days + weeks * 7

minutesInADay = 24 * 60

minutes = minutesInADay * totalDays

print("Just wait", minutes, "minutes!")
```

(4 marks)

- (c) Show the output from the following program after the user types in the number **9** at the first prompt and **4** at the second prompt. Show each space in the output with the “^” character.

```
num = int(input("Number to be divided: "))
div = int(input("Divisor: "))
print(num, "/", div, "=", num//div, "r", num%div)
```

```
Number^to^be^divided:^9
Divisor:^4
9^/^4^=^2^r^1
```

(3 marks)

## 27. Spreadsheets (10 marks)

The following Microsoft Excel spreadsheet was created using the official NZ exchange rate table, from the Reserve Bank of New Zealand. The table on the left indicates various exchange rates for each business day. The table on the right was added, recording the date and offer price of a vehicle for sale in Australia, varying when the vehicle was offered at a sale price. Column I reports the offered price in Australian dollars, and column J shows the price in NZ dollars, using the most recently reported exchange rate. Under the table is the lowest price offered in Australian dollars (AUD 13,349) on the 8<sup>th</sup> of March, and the lowest price in New Zealand dollars (NZD 18,275) on the 14<sup>th</sup> of March.

	A	B	C	D	E	F	G	H	I	J	K	
1	<b>History - B1 Exchange Rates</b>											
2									<b>Price of car</b>			
3	As at 11:10 am	<b>USA</b>	<b>UK</b>	<b>Aust.</b>	<b>Japan</b>	<b>Euro</b>		<b>Date</b>	<b>AUD</b>	<b>NZD</b>		
4								1-Mar-2011	13,999	18,925	March 1, 2011	
5		Mid-rates all quoted to NZ\$1							2-Mar-2011	13,999	18,989	March 2, 2011
6	1-Mar-2011	0.7533	0.4633	0.7397	61.65	0.5457		3-Mar-2011	13,999	19,130	March 3, 2011	
7	2-Mar-2011	0.7466	0.4590	0.7372	61.15	0.5420		4-Mar-2011	13,999	19,169	March 4, 2011	
8	3-Mar-2011	0.7434	0.4554	0.7318	60.84	0.5362		5-Mar-2011	13,999	19,169	March 5, 2011	
9	4-Mar-2011	0.7403	0.4547	0.7303	61.01	0.5300		6-Mar-2011	13,999	19,169	March 6, 2011	
10	7-Mar-2011	0.7370	0.4528	0.7266	60.69	0.5265		7-Mar-2011	13,499	18,578	March 7, 2011	
11	8-Mar-2011	0.7374	0.4551	0.7287	60.66	0.5279		8-Mar-2011	13,349	18,319	March 8, 2011	
12	9-Mar-2011	0.7397	0.4577	0.7323	61.15	0.5320		9-Mar-2011	14,499	19,799	March 9, 2011	
13	10-Mar-2011	0.7363	0.4545	0.7289	60.94	0.5294		10-Mar-2011	14,399	19,754	March 10, 2011	
14	11-Mar-2011	0.7351	0.4578	0.7344	60.99	0.5328		11-Mar-2011	14,499	19,743	March 11, 2011	
15	14-Mar-2011	0.7409	0.4609	0.7332	60.49	0.5309		12-Mar-2011	14,499	19,743	March 12, 2011	
16	15-Mar-2011	0.7395	0.4571	0.7324	60.41	0.5285		13-Mar-2011	14,499	19,743	March 13, 2011	
17	16-Mar-2011	0.7309	0.4546	0.7388	59.04	0.5226		14-Mar-2011	13,399	18,275	March 14, 2011	
18								15-Mar-2011	14,499	19,797	March 15, 2011	
19	Last updated 29 April 2011								16-Mar-2011	14,499	19,625	March 16, 2011
20	Source: Reserve Bank of New Zealand, Reuters, NZFMA											
21								<b>Lowest Price</b>	<b>13,349</b>	<b>18,275</b>		
22									<b>March 8, 2011</b>	<b>March 14, 2011</b>		
23												
24												

- (a) Fill in the box with a formula to display the lowest price offered in Australia during the period covered (cell I21).

**= MIN(I4:I19)**

(2 marks)

- (b) Fill in the box with a formula to display the lowest price available in New Zealand currency during the period covered (cell J21).

**= MIN(J4:J19)**

(2 marks)

- (c) What is the **best** formula to use in Cell J4? Your formula should look up the date from H4 in the Exchange Rates table and retrieve the appropriate exchange rate to divide the Australian price by to determine the price of the vehicle in New Zealand currency.

**Note:** You must ensure that your formula can be filled down.

The syntax of the **vlookup** function to search the first column of a table, and then return a value from any cell on the same row of the table is given below:

`vlookup(lookup_value, table_array, col_index_num, [range_lookup])`

**= I4 / VLOOKUP(H4,\$A\$6:\$F\$17,4,TRUE)**

(3 marks)

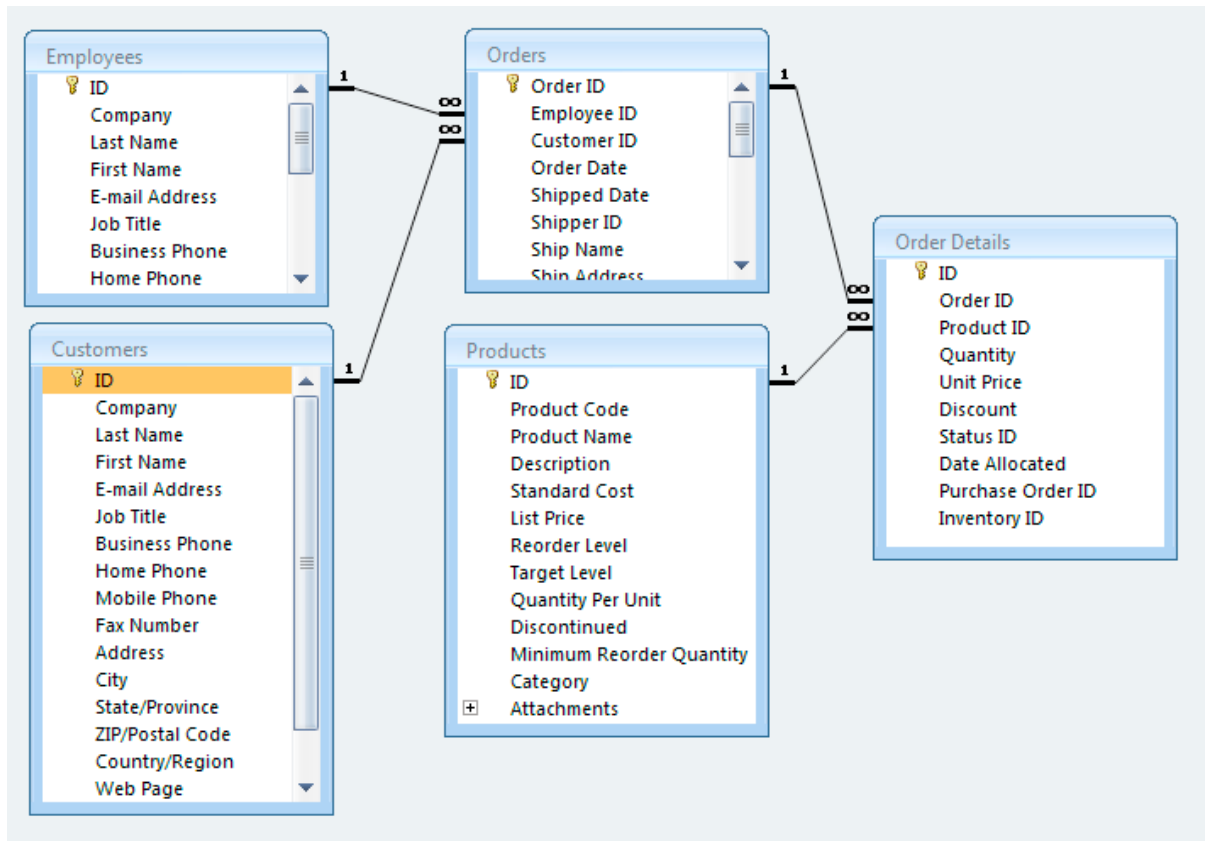
- (d) What is the **best** formula to use in Cell J22? Your formula should determine the date when the New Zealand price was the lowest.

**= VLOOKUP(J21,\$J\$4:\$K\$19,2,FALSE)**

(3 marks)

### 28. Databases (10 marks)

Use the following Microsoft Access relationship diagram to answer the questions in this section. This simple database structure was described in the lectures. Note that the primary key of each table uses the AutoNumber type to ensure uniqueness.



(a) Give the name of every field in the Orders table in a many-to-one relationship, along with the related table.

**Order ID - related table is Order Details**  
**Employee ID - related table is Employees**  
**Customer ID - related table is Customers**

(3 marks)

(b) What is an appropriate **data type** for the **Customer ID** field of the **Orders** table?

**Number**

(2 marks)

- (c) Is it possible for a particular Customer ID to appear in more than one record in the Orders Table? Why or why not?

**Yes, it is possible. From the Relationship diagram above we can see that the Customer ID in the Orders table is in a many-to-one relationship with the ID in the Customers table.**

(2 marks)

- (d) Give an SQL statement that displays the first name, last name and city of each customer in the State of California (i.e., State/Province = "CA"). Example output from the SQL query is shown below.

First Name	Last Name	City
Thomas	Axen	Los Angeles
Daniel	Goldschmidt	San Francisco
Alexander	Eggerer	Los Angeles
*		

Example output from the SQL query

**SELECT [First Name], [Last Name], City**  
**FROM Customers**  
**WHERE State/Province = "CA";**

(3 marks)

## 29. XHTML and CSS (10 marks)

The following screenshot shows a web page created using XHTML 1.0 strict and Cascading Style Sheets:

The screenshot shows a web page with the following content:

- Private Transport** (h1, right-aligned)
- Rating** (h2)
- Miles per gallon equivalent** (h3)
- Table with 2 columns: Vehicle, MPGE
- Ranked according to least damage to the Earth.
- 1. Walking
- 2. Cycling
- 3. Motorcycling
- 4. Driving a car
- The End** (p, bold, centered)

Vehicle	MPGE
cycling	670
walking	360
motorcycling	50
driving a car	25

Ranked according to least damage to the Earth.

1. Walking
2. Cycling
3. Motorcycling
4. Driving a car

**The End**

Complete the XHTML code below so that it produces the output shown above. You **must** use the styles defined in the internal style sheet in the head section below, and **must not** define any new styles.

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE html
  PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">

<head>
<title>Transport</title>
<style type="text/css">

h1 {
  text-align: right;
}
h2 {
  border-bottom-color: black;
  border-bottom-style: solid;
  border-bottom-width: thin;
}
```



```

td {
  text-align: right;
}
.outline {
  border-color: black;
  border-style: solid;
  border-width: thick;
  padding: 10px;
}
.label {
  font-weight: bold;
}
#footer {
  background-color: black;
  color: white;
  text-align: center;
  font-weight: bold;
}
</style>
</head>

```

```
<body>
```

```
<!-- Headings -->
```

```

<h1>Private Transport</h1>
<h2>Rating</h2>

```

(1 mark)

```
<!-- Table label "Miles per gallon equivalent" -->
```

```
<p class = "label">Miles per gallon equivalent</p>
```

(1 mark)

```
<!-- Table of fuel efficiency" -->
```

```

<table border="1px">
  <tr>
    <th>Vehicle</th> <th>MPGE</th>
  </tr>
  <tr>
    <td>cycling</td><td>670</td>
  </tr>
  <tr>
    <td>walking</td><td>360</td>
  </tr>

```

```
<tr>
  <td>motorcycling</td><td>50</td>
</tr>
<tr>
  <td>driving a car</td><td>25</td>
</tr>
</table>
```

(3 marks)

```
<p></p>
```

```
<div class = "outline">
```

(1 mark)

```
<p>Ranked according to least damage to the Earth.</p>
```

```
<!--List of Transport types -->
```

```
<ol>
  <li>Walking</li>
  <li>Cycling</li>
  <li>Motorcycling</li>
  <li>Driving a car</li>
</ol>
```

(3 marks)

```
</div>
```

```
<!-- Footer -->
```

```
<p id = "footer">
  The End
</p>
```

(1 mark)

```
</body>
</html>
```

**30. LaTeX (10 marks)**

- (a) Draw the output that would be generated by the following LaTeX code. If quote marks appear, make it clear what type will appear. The first one-liner is a long line that wraps. The second one-liner is shorter than one line.

```
\documentclass[a4paper]{article}
\begin{document}
\title{One Liners}
\author{CompSci111 Geek}
\date{14 Jun 2011}
\maketitle

``Knowledge is knowing a tomato is a fruit; wisdom is not
putting it in a fruit salad''.
\begin{flushright}
``Money takes the sting out of poverty''.
\end{flushright}
``42.7 percent of all statistics are made up on the spot''.
\end{document}
```

One Liners

CompSci111 Geek

14 Jun 2011

“Knowledge is knowing a tomato is a fruit; wisdom is not putting it in a fruit salad”.

“Money takes the sting out of poverty”.

“42.7 percent of all statistics are made up on the spot”.

(4 marks)

(b) Write the LaTeX code that will produce the following output:

# Exam Question

[By Anonymous]

14 Jun 2011

## 1 Factorials

### 1.1 Approximations to Factorial

The factorial can be approximated by the equation,

$$n! \sim \sqrt{2\pi n} \left(\frac{n}{e}\right)^n .$$

The following LaTeX commands have been included as a reference. You will not need to use all of these commands. Note that the basic document structure has been completed for you.

<i>Normal commands</i>	<i>Environments</i>	<i>Math mode commands</i>
<code>\emph{}</code>	<code>itemize</code>	<code>\frac{}{}</code>
<code>\section{}</code>	<code>enumerate</code>	<code>\sqrt{}</code>
<code>\subsection{}</code>	<code>verbatim</code>	<code>\geq</code>
<code>\large</code>	<code>flushright</code>	<code>\pi</code>
<code>\textbf{}</code>	<code>center</code>	<code>\left(</code>
<code>\title{}</code>	<code>quote</code>	<code>\right)</code>
<code>\author{}</code>	<code>displaymath</code>	<code>\pi</code>
<code>\date{}</code>	<code>equation</code>	<code>\sim</code>
<code>\maketitle</code>	<code>quotation</code>	<code>^</code>
<code>\item</code>		<code>-</code>

```
\documentclass[a4paper]{article}
\begin{document}

\title{Exam Question}

\author{[By Anonymous]}

\date{14 Jun 2011}

\maketitle

\section{Factorials}

\subsection{Approximations to Factorial}

The factorial can be approximated by the equation,

\begin{displaymath}
n! \sim \sqrt{2\pi n} \left(\frac{n}{e}\right)^n.
\end{displaymath}

\end{document}
```

(6 marks)

**- Overflow Sheet 1 -**

**Write the question number and letter next to your answer. You must ALSO indicate in the allotted space that you have used the overflow sheet.**

**- Overflow Sheet 2 -**

**Write the question number and letter next to your answer. You must ALSO indicate in the allotted space that you have used the overflow sheet.**

**- Overflow Sheet 3 -**

**Write the question number and letter next to your answer. You must ALSO indicate in the allotted space that you have used the overflow sheet.**



**Rough Working – This page will not be marked**

**Rough Working – This page will not be marked**

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