Chapter # 8 – Spreadsheets

Specimen 2017

5 Here is a small section of a spreadsheet used to calculate the weekly wages of the workers in a company.

	A	B	C	D	E	F
1	First name	Second name	Hours worked	Hourly rate	Weekly wage ($)	Full name
2	John	Smith	40	8.50	=C2*D2	
3	Johann	Schmidt	42	9.25	=C3*D3	
4	Felix	Schnell	38	8.75	=C4*D4	
5	Maurice	LaPorte	46	11.50	=C5*D5	
			=SUM(C2:C5)	=MAX(D2:D5)	=AVERAGE(E2:E5)	

(a) Using examples from the spreadsheet, explain what is meant by a cell reference.

Answer:

5(a)	Award 1 mark for each correct answer up to a maximum of 2. **Two** from: A cell reference identifies the cell that is being referred to A cell reference consists of the column letter and row number that intersect at the cell's location For example cell C1 is in column C and in row 1	2

Question 5, Part (b) and (c)

(b) This spreadsheet uses formulae and functions. Explain the difference between formulae and functions.

Answer:

| 5(b) | Award 1 mark for each correct answer up to a maximum of 4.

Four from:

A formula is statement written by the user to perform a calculation
Formulae can be as simple or as complex as the user wants
A function is also a formula, but is predefined/comes with the spreadsheet software. Instead of having to accurately type out the details of the formula, the function acts as a shortcut to carry it out.

Allow up to 1 mark for an example from the spreadsheet.
For example =SUM is a function whereas =C2*D2 is a formula | 4 |

(c) The manager of the company wants the full name of the worker printed on the payslip. In order to do this a formula will need to be used in cell F2 combining the first name and the second name separated by a space.

Write down the formula which uses a function to combine this data.

Answer:

| 5(c) | **=CONCATENATE**(A2," ",B2)
1 mark for CONCATENATE
1 mark for A2
1 mark for " "
1 mark for B2 | 4 |

Question 5, Part (d) and (e)

(d) The manager wants to see immediately if a worker earns more than $500 per week, without reading through the spreadsheet.

Explain what you would do in cells E2 to E5 to make it easier for her to see this.

Answer:

5(d)	Award 1 mark for each correct answer up to a maximum of 4. **Four** from: Use conditional formatting Highlight E2 to E5 Select conditional formatting Select 'greater than' Type in 500 Select colour of font/background	4

(e) Relative cell referencing has been used in the spreadsheet. Using examples from this spreadsheet, explain why the use of absolute referencing would **not** be suitable.

Answer:

5(e)	Award 1 mark for each correct answer up to a maximum of 3. **Three** from: Absolute cell referencing is used when formulae are replicated It is used to keep cell references constant as they are replicated If it was used in column E the weekly wage for every worker would remain the same Here the wage needs to be calculated separately for each worker and the values do need to change	3

Question 5, Part (f)

(f) This spreadsheet could be used for modelling purposes. An example of modelling is the use of simulators for pilot training.

Describe **three** advantages of using computer simulations for pilot training rather than the real thing.

Answer:

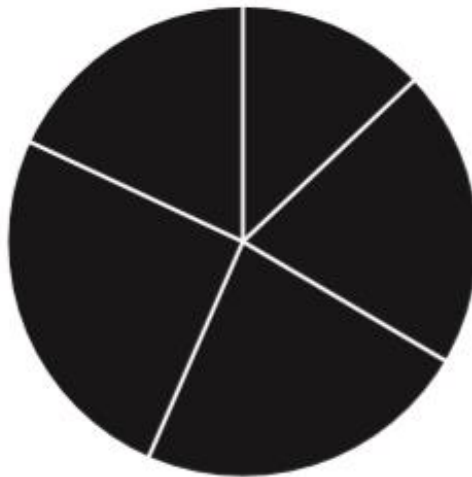| 5(f)	Award 1 mark for each correct answer up to a maximum of 3.	3
	Three from: If the plane crashed in real life the pilot might die whereas nothing would happen to him/her in a simulator If the plane crashed in real life the plane would cost a lot to replace whereas nothing would happen to the simulator Extreme weather conditions can be made to order in a simulator but you might have to wait a long time for them to happen in real life The cost of running a simulator is cheaper than the cost of fuel in a real plane	

June 2017 – P11 & P12

12 Dudley Nuclear Fuels (DNF) creates and operates nuclear reactors. They often create models of reactors before building them in real life.

Discuss the benefits and drawbacks to DNF of using models.

Answer:

12	Discussion based on:	8
	Benefits Testing nuclear reactor designs using computer models avoids safety problems… …such as explosions/meltdowns Testing nuclear reactor designs using computer models cuts costs… …as do not have to pay as much money for workers/materials to replace damaged reactors Can obtain results in a short period of time regarding reactions that take a long time in real life Re-designing computer models is cheaper than re-building a nuclear reactor Researchers will have the tools to simulate scenarios that are hard to observe in operating reactors *Drawbacks* Researchers will need to know how to apply simple modelling techniques in some situations and more complicated ones in others Models cannot always recreate exactly the real-world experiment In order to carry out test efficiently researchers will need specialist knowledge… …of mechanical engineering/materials science/reactor physics Most researchers who are specialists in one discipline will need to retrain/extend their studies… …which costs money Not every possible variable may be included in the model… …leading to inaccurate results. Allow one mark for a reasoned conclusion.	

13

Above is a pie chart showing the proportion of students following different courses at a school. In its present form it is not providing any information.

Describe, using examples related to this scenario, how you would improve this chart so that it did provide information which could be used by the head teacher of the school.

Answer:

13	**Four** from: Example of appropriate title Appropriately labelled sectors including example Percentages attached to sectors including examples Number of students taking each course in each sector including examples Different colour sectors Description of chart legend including example.	4

June 2017 – P13

5   Below is an extract from a spreadsheet showing the wages paid in one week to a group of workers. Any hours worked over 40 count as overtime. Overtime is paid at 1.5 times the normal rate.

	A	B	C	D	E	F	G	H
1								
2	Worker's name	Job type	Hours worked this week	Hours overtime worked	Rate per hour paid	Overtime earned this week	Wage paid this week	
3								
4	Johan Braun	Labourer	45	5	$13.00	$97.50	$617.50	
5	Lisa Moran	Skilled	40		$18.00		$720.00	
6	Chi Li	Labourer	40		$13.00		$520.00	
7	Susan Armstrong	Labourer	46	6	$13.00	$117.00	$637.00	
8	Luqman Hisham	Labourer	39		$13.00		$507.00	
9	Kanda Demir	Semi-skilled	40		$15.50		$620.00	
10	Paul Strong	Labourer	43	3	$13.00	$58.50	$578.50	
11	Shoba Purushothaman	Semi-skilled	48	8	$15.50	$186.00	$806.00	
12	Kulap Kaya	Semi-skilled	40		$15.50		$620.00	
13	Tony Fernandes	Skilled	40		$18.00		$720.00	
14	Halim Saad	Semi-skilled	51	11	$15.50	$255.75	$875.75	
15								
16		Workers working overtime	5					
17								

(a)   Write down the formula which should be used in cell C16 in order to display the number of workers who worked overtime.

Answer:

5(a)		4
	COUNTIF(C4:C14,">40")	
	COUNTIF()	1 mark
	C4:C14,	1 mark
	>40	1 mark
	""	1 mark

Question 5, Part (b) & (c)

(b) Write down the formula which should be used in cell D4 in order to display the number of *Hours overtime worked* for Johan Braun. The formula should be in a form that can be easily replicated and should leave the cell blank if no overtime has been worked.

Answer:

5(b)		5
	=IF(C4>40,C4-40,"")	
	=IF()	1 mark
	C4	1 mark
	>40	1 mark
	,C4-40	1 mark
	""	1 mark

(c) Write down the formula which should be used in cell F4 in order to display the amount of money earned for working overtime for Johan Braun. The formula should be in a form that can be easily replicated and should leave the cell blank if no overtime has been worked.

Answer:

5(c)		5
	=IF(C4>40,D4*E4*1.5,"")	
	=IF()	1 mark
	C4>40	1 mark
	,D4*E4	1 mark
	*1.5	1 mark
	""	1 mark

12 Below is part of a spreadsheet Deirdre has created to show her company's profits.

	A	B	C	D	E	F	G
1		DIY Inc.					
2							
3			2012	2013	2014	2015	2016
4							
5		1st quarter	$135,000	$146,000	$158,000	$162,000	$154,000
6		2nd quarter	$142,000	$149,000	$161,000	$167,000	$157,000
7		3rd quarter	$138,000	$150,000	$159,000	$163,000	$151,000
8		4th quarter	$129,000	$141,000	$146,000	$148,000	$147,000
9							
10		Total profits	$544,000	$586,000	$624,000	$640,000	$609,000
11							

Describe, giving reasons, the most appropriate type of graph or chart for displaying:

(i) the company's profits, throughout 2016 showing comparisons of each quarter.

Answer:

12(i)	Bar/column chart 1 mark	3
	The height of the bars represent the monetary value and the x axis is the category axis (the quarters) 1 mark	
	Viewers can see comparisons by distinguishing the relative heights/lengths of the bars 1 mark	

(ii) the company's profits, showing the trend for all four quarters in each year from 2012 to 2016.

Answer:

12(ii)	Line chart 1 mark	3
	Points are plotted, monetary value against year and these are joined together by straight lines 1 mark	
	Useful for emphasising the trend over time since they allow a viewer to trace it by working backwards or interpolating 1 mark	

November 2017 – P11 & P12

5   Below is an extract from a spreadsheet showing details of one day's train journeys between London and Paris. A hyphen, '-', in a cell indicates that the train does not stop at that station.

	I	J LONDON St Pancras Intl	K EBBSFLEET International	L ASHFORD International	M PARIS Gare du Nord	N Train No.
2						
3		05:40	05:58	06:24	09:17	9080
4		06:18	–	06:55	09:47	9002
5		07:01	–	–	10:17	9004
6		07:55	08:12	–	11:17	9008
7		08:19	08:38	–	11:47	9010
8		09:17	09:34	09:55	12:47	9014
9		10:01	–	–	13:17	9016
10		10:24	10:42	–	13:47	9018
11		11:01	–	–	14:17	9020
12		11:31	–	–	14:47	9022
13		12:01	–	–	15:17	9060
14		12:24	12:42	–	15:47	9024
15		13:31	–	–	16:47	9028
16		14:01	–	–	17:17	9030
17		14:31	–	–	17:47	9032
18		15:31	–	–	18:47	9036
19		16:01	–	–	19:17	9038
20		16:22	–	16:55	19:47	9040
21						
22			Number of non-stop trains		10	

Michelle, the train controller in London, wants to use this spreadsheet to count the number of trains that do not stop at any station between London and Paris.

(a)   Write down the formula which should go in cell M22 to give her this information.

Answer:

5(a)	=COUNTIFS(K3:K20,"-",L3:L20,"-")	6
	=COUNTIFS() 2 marks	
	(=COUNTIF() 1 mark)	
	(K3:K20 1 mark	
	,"-", immediately after K20 1 mark	
	L3:L20 immediately after ,"-", 1 mark	
	,"-") 1 mark	

Question 5, Part (b)

(b) Describe the steps that Michelle would need to carry out if she wanted to print out the *Train No.* of the trains that do not stop at any station between London and Paris.

Answer:

5(b)			5
	Select data, filter	1 mark	
	Filter on column K for "-"	1 mark	
	Filter on column L for "-"	1 mark	
	Highlight column N	1 mark	
	Select PRINT and PRINT selection.	1 mark	

7   A number of airline companies train their pilots using flight simulators.

Evaluate the use of simulation in this application.

Answer:

| 7 | **Eight** *from:*

Advantages:
The costs of fuel, aircraft maintenance and insurance of a regular aircraft are far greater than the running and maintenance costs of a flight simulator
The environment benefits from flight training in a simulator, as there is no air and noise pollution created by a flight simulator
Situations can be tackled in a flight simulator without putting the trainee and the flight training instructor in danger
If there is an accident there is no cost to replace parts unlike a real plane
Emergency procedures, adverse weather conditions and system failures can be <u>more easily/quickly</u> produced or recreated in a flight simulator
There is less time wasted on booking aircraft for flight training/scheduling flights/ waiting for the aircraft to warm up
Less time wasted travelling to the desired destination to undergo specific flight training instruction
The environmental conditions in a simulator are far more comfortable than flight training in a real aircraft as the temperature and humidity are controlled in a flight simulator
The level of noise in a flight simulator is not as deafening as in an aircraft…
…makes the communication between the instructor and trainee much easier

Disadvantages:
The simulator response will not always be exactly the same as an actual airplane, <u>as there too many variables</u>
Sometimes pilots become bolder/more overconfident after training on the simulator and overreact to real flight situations…
…overuse of parts such as the rudder can cause damage to a real aircraft but not in the simulator
Amount of stress the pilot would be under in dangerous situations is less likely to be created
Length of training session is more likely to be shorter than a realistic flight making it difficult to recreate boredom/fatigue of a real flight.

Must have at least two from each to gain full marks.
1 mark is available for a reasoned conclusion/opinion. | 8 |

November 2017 – P13

6   Below is part of a spreadsheet Xia has created to model his personal finances.

	A	B
1	2600	Wages/salary
2		
3	1000	Mortgage/rent
4	120	Utilities
5	50	Phone
6	100	Satellite/TV
7	80	Internet
8	550	Groceries
9	100	Clothing
10	150	Eating out
11	75	Hair/beauty
12	30	Pet food
13	40	Cinema
14	160	Car/travel
15	100	Insurance
16		
17	=SUM(A3:A15)	Total outgoings
18	=MAX(A3:A15)	=VLOOKUP(A18,$A$3:$B$15,2,FALSE)
19		
20	=A1-A17	Balance
21		

(a) Identify the value which would appear in cell B18 explaining how you arrived at your answer.

Answer:

6(a)		4
	The value in B18 would be Mortgage/rent	
	The value in A18 would be the maximum value in A3:A15 which is 1000	
	The lookup function would search the range A3:B15 to find 1000	
	It returns the value in the same row but in column 2.	

Question 6, Part (b)

(b) Xia is not sure whether the spreadsheet would work if some of the values were changed. Describe the test plan you would use to help Xia make sure there are no errors in his spreadsheet.

Answer:

6(b)	**Eight** from:	8
	A table with columns for Test, Test data, Actual result, Expected result and comments on comparison of actual result – 2 marks (1 for at least 3 appropriate headings and 2 for 5 appropriate headings) Test the SUM function by changing some values in A3:A15 Test the MAX function by changing some values in A3:A15 Calculate the expected results for SUM using a calculator, MAX using sight Test the VLOOKUP function by changing values in B3:B15 and some values in A3:A15 Look through the data to find what should be in the LOOKUP cell To test the A1-A17 formula change the value in A1 and some of the values in A3:A17 Calculate the expected results for =A1-A17 using a calculator Run each test Make a note saying whether there are any differences between actual results and expected results.	

10 Describe the characteristics which make spreadsheets suitable for modelling situations.

Answer:

10	**Four** from:	4
	Absolute and relative cell referencing makes sure you only increment the parts of a formula you need to Cell protection makes sure that the cells you want do not change by accident User interface forms makes it easier to input values into the model Macros make it easier to create more complex formulae or functions Automatic re-calculation means it is not necessary to evaluate a formula every time you change it Conditional formatting allows you to highlight certain values that match specific criteria Graphs/charts to detect trends.	

March 2017 – P12

8 Below is part of a spreadsheet Jose has created to model his personal finances.

	A	B	
1	$2,600	Wages/salary	
2			
3	$120	Utilities	
4	$100	Satellite/TV	
5	$80	Phone	
6	$30	Pet food	
7	$1,000	Mortgage/rent	
8	$80	Internet	
9	$100	Insurance	
10	$75	Hair/beauty	
11	$550	Groceries	
12	$150	Eating out	
13	$100	Clothing	
14	$40	Cinema	
15	$160	Car/travel	
16			
17	$2,585	Total outgoings	
18			
19	$15	Balance	

Using **only** the sort feature explain how you would be able to get the following values in the given cells.

(i) $80 in cell A11 with Internet in cell B11 and $1,000 in cell A3.

Answer:

8(i)	**Three** from: Select A3:B15… …Sort in descending order of column A… …Add a level… …Sort in ascending order of column B	3

Question 8, Part (ii)

(ii) $100 in cell A8 with Clothing in cell B8.

Answer:

8(ii)	**Three** *from:*	3
	Select A3:B15… …Sort in ascending/descending order of column A …Add a level …Sort in ascending order of column B	

11 Below is an extract from a spreadsheet showing the wages paid in one week to a group of workers. Their wages depend on the type of job they do as well as the number of hours worked. Cells C2 to E4 contain the data which is referred to in the lower part of the spreadsheet.

	A	B	C	D	E	F	G
1				Standard rate per hour			
2			L	Labourer	₹55		
3			Se	Semi-skilled	₹65		
4			Sk	Skilled	₹75		
5							
6	Worker ID	Job Code	Job type	Hours worked this week	Rate per hour paid	Wage paid this week	
7							
8	12478L	L	Labourer	40	₹55	₹2200	
9	13691R	Se	Semi-skilled	38	₹65	₹2470	
10	21463R	Se	Semi-skilled	40	₹65	₹2600	
11	29816M	L	Labourer	36	₹55	₹1980	
12	36479L	Sk	Skilled	34	₹75	₹2550	
13	49786R	Sk	Skilled	40	₹75	₹3000	
14	52376M	Se	Semi-skilled	36	₹65	₹2340	
15	18964L	L	Labourer	35	₹55	₹1925	
16	13578R	L	Labourer	40	₹55	₹2200	
17	38945M	L	Labourer	40	₹55	₹2200	
18	36249M	Se	Semi-skilled	40	₹65	₹2600	
19							

(a) Write down the formula which should be used in cell C8 in order to display the Job type using the Job Code in the preceding column. The formula should be in a form that can be easily replicated.

Answer:

11(a)	**=VLOOKUP(B8,C\$2:D\$4,2)** VLOOKUP() – 1 mark B8, – 1 mark C2:D4 – 1 mark 2 – 1 mark Use of appropriate absolute referencing – 1 mark	5

Question 11, Part (b)

(b) The spreadsheet contains different formulae in different columns.

Explain the other formulae used in the spreadsheet which enable the data in the *Wage paid this week* column to be displayed. The formulae should be in a form so that they can be easily replicated.

Answer:

11(b)	**Six** *from:*	6
	In order to calculate the wage paid this week the Rate per hour paid has to be known then is multiplied by the hours worked this week– 1 mark	
	Cell E8 should contain the rate per hour paid for a labourer – 1 mark	
	=VLOOKUP(B8,C$2:E$4,3)	
	VLOOKUP(B8…) – 1 mark C2:E4 – 1 mark 3 – 1 mark Use of appropriate absolute referencing in VLOOKUP – 1 mark	
	Involves looking up Job Code in cells C2 to E4 and returns rate per hour from third column/column E	
	Cell F8 should contain wage paid this week which is hours worked multiplied by rate per hour – 1 mark	
	D8*E8 – 1 mark	

June 2018 – P11

8   Juan is the owner of a small company. He has created a spreadsheet to calculate the payroll.
His spreadsheet is shown below.

Each worker pays one of four different rates of tax.

Each worker has one of four different tax allowances. A tax allowance is the amount that can be
earned before workers start paying tax.

	A	B	C	D	E	F	G	H	I	J
1	Range of tax rates						Tax allowance range			
2										
3	A	20%					W	X	Y	Z
4	B	30%					200	220	240	260
5	C	35%								
6	D	40%								
7										
8										
9	Worker's name	Weekly wage	Tax rate	Tax allowance		Taxable pay	Wage after tax deduction			
10										
11	Patrick O'Reilly	250	B	Y		10	$247			
12	John McDonnell	300	D	Z		40	$284			
13	Louise Gimenez	280	A	X		60	$268			
14	Jeanette Grimault	260	A	Y		20	$256			
15	Xavier Hernandes	250	C	W		50	$233			
16	Paolo Riva	240	B	W		40	$228			
17	David Kennedy	280	D	Z		20	$272			
18	Sian Evans	270	A	Y		30	$264			
19	Karl Gustaffson	260	B	W		60	$242			
20										

(a)   To make it easier to do the calculations Juan has used named ranges. The *Range of tax rates*
is called **Rate** and the *Tax allowance range* is called **Allowance**.

Describe how you would set up the named range **Allowance**.

Question 8, Part (a)

Answer:

8(a)	Select G3:J4	1
	Click the Name box at the left end of the formula bar	1
	Type Allowance and press enter	1
	Or	
	On the Formulas tab, in the Defined Names group, click Define Name	1
	In the New Name dialog box type Allowance	1
	In the refers to box type G3:J4	1

Question 8, Part (b)

(b) Each worker has an amount, related to their *Tax allowance*, deducted from their weekly wage to calculate the *Taxable pay*.

Write down the formula that should go in cell F11 to calculate the *Taxable pay* for Patrick O'Reilly. The formula should be easy to replicate and use a named range.

Answer:

| 8(b) | =B11-HLOOKUP(D11,Allowance,2,0)

B11-   1 mark
HLOOKUP(D11,) 1 mark
Allowance,   1 mark
2, 0   1 mark | 4 |

Question 8, Part (c)

(c) The *Taxable pay* is multiplied by the rate of tax to calculate the tax which must be paid, which is then deducted from their *Weekly wage*. The result will be their *Wage after tax deduction*.

Write down the formula that should go in cell G11 to calculate the *Wage after tax deduction*. The formula should be easy to replicate and use a named range. Identify the steps which need to be taken to display the value in G11 exactly as shown in the spreadsheet.

Answer:

8(c)	=B11- (F11*VLOOKUP(C11,Rate,2,0))	7
	B11- (F11* 1 mark VLOOKUP(C11,) 1 mark Rate, 1 mark 2, 0) 1 mark Select cell G11 and choose Format, format cells – 1 mark Click on currency – 1 mark Select $ and 0 decimal places – 1 mark	

Question 10, part (b) and (c) are only relevant to this chapter (spreadsheets)

10 Below is an excerpt from a database showing some holiday bookings.

Country	Group size	Code	Discount	Duration
Egypt	4	EGY	☑	10
Malaysia	5	MAL	☑	14
Thailand	8	THA	☐	7
Costa Rica	4	COZ	☑	10
Sri Lanka	2	SRI	☐	14
Bahamas	3	BAH	☑	21
Indonesia	4	IND	☐	14
Indonesia	4	IND	☑	10
Costa Rica	5	COZ	☑	14
Egypt	6	EGY	☑	14
Sri Lanka	4	SRI	☑	21
Egypt	8	EGY	☑	7
Thailand	5	THA	☐	7
Costa Rica	4	COZ	☐	14
Costa Rica	2	COZ	☑	7
Indonesia	2	IND	☐	14
Malaysia	5	MAL	☑	14
Thailand	2	THA	☐	14
Sri Lanka	6	SRI	☑	14
Thailand	3	THA	☑	14
Egypt	4	EGY	☑	14
Malaysia	2	MAL	☑	7
Indonesia	2	IND	☐	14
Malaysia	4	MAL	☑	10
Bahamas	4	BAH	☐	7
Costa Rica	4	COZ	☐	14
Thailand	5	THA	☐	14
Sri Lanka	6	SRI	☐	10
Thailand	8	THA	☐	7
Thailand	4	THA	☐	14
Egypt	4	EGY	☐	7
Egypt	2	EGY	☐	14

(a) (i) Describe the steps that need to be followed to set up a dynamic query to allow you to search on the *Group size* and *Code* fields. All fields are to be printed except *Discount*.

Answer:

10(a)(i)	**Five** *from:*	5
	Open the create... query design Select all fields except Discount Under Code field next to criteria row Type in square brackets [Enter required code] Under Group size field next to criteria row Type in square brackets [Enter required group size]	

Question 10, Part (a)ii, (b) and (c)

(ii) You run the query and type in the Group size as 4 and the Code as EGY.

Answer:

10(a)(ii)	10, 14 and 7	2

(b) The *Duration* field has only the values shown in the database excerpt. The database needs to be set up to allow you to enter the data in this field without using the keyboard to type in the value each time.

Describe how this would be done and explain how you would now enter the data.

Answer:

10(b)	Select Duration and set up a lookup table	1
	With the values 7, 10, 14, 21	1
	Click the arrow to activate the drop down list	1
	Select the appropriate value from the list.	1

(c) When the database was initially set up it did not have the *Country* field. Data was exported to a spreadsheet and a formula created, using the *Code* field, to add the names of the countries with the layout exactly as shown in the database excerpt.

Without specifying the formula precisely, explain how this could be achieved.

Answer:

10(c)	Insert rows, above the data exported, for the Lookup table	1
	In adjacent columns/rows type in values for names of countries and codes	1
	Insert a column to the left of the data exported	1
	In the cell adjacent/to the left of the group size type in the VLOOKUP/HLOOKUP formula	1
	Replicate this formula down for all countries.	1

June 2018 – P12

8 Here is a spreadsheet showing the prices of various toys in a shop. The discounted price is found by using a VLOOKUP formula in cells E8:E13.

| E8 | | f_x | =D8-(VLOOKUP(C8,$C$3:$D$5,2,FALSE)*D8) | | | | |

	A	B	C	D	E	F	G	H
1								
2			Discount code					
3			A	20%				
4			B	15%				
5			C	10%				
6								
7	Toy			Price	Discounted price		Number sold	
8	Elephant		A	$45	$36.00		4	
9	Cheetah		A	$35	$28.00		6	
10	Giraffe		C	$55	$49.50		10	
11	Lion		B	$50	$42.50		5	
12	Leopard		A	$40	$32.00		6	
13	Zebra		B	$30	$25.50		3	
14								
15								
16								

(a) By describing what the formula in cell E8 does, explain the need for absolute and relative cell referencing.

Question 8, Part (a) and (b)

Answer:

8(a)	**Six** *from*:	6
	It looks for the discount code in cells C3:D5/for each animal	
	Looks for an exact match	
	It reads the percentage discount from cells D3:D5, corresponding to the discount code	
	Multiplies the percentage discount by the Price and subtracts from the original price	
	The values in the lookup range/discount code must remain constant	
	When the formula in cell E8 is replicated the range C3:D5 requires absolute cell referencing	
	If relative referencing were used for cells C3:D5 the formula in cell E9 would contain C4:D6	
	This would produce an error as discount code A cannot be found in the range C4:D6	
	The lookup value cell reference (accept example) must increment for each successive row	
	The Price cell reference (accept example) must increment for each successive row	
	When the formula in cell E8 is replicated C8 (and) D8 need to increment to (C9, D9) which requires relative cell referencing.	

(b) The owner of the shop wants to see which toys have a *Discounted price* that could be considered cheap and those that could be considered expensive. He would like to see all the cells with toys which are more than $40 shaded blue, all those that are less than $30 shaded yellow and the remainder shaded green.

Describe how this could be achieved without each individual cell having to be changed.

Answer:

8(b)	Highlight E8:E13/cells containing discounted price – 1 mark	5
	Select/use conditional formatting – 1 mark	
	Manage rule/create rule if >40 format colour blue – 1 mark	
	Add rule if between 30 and 40 format colour green – 1 mark	
	Add rule if <30 format colour yellow – 1 mark	

Question 8, Part (c)

(c) The owner wants a chart showing the *Number sold* of each toy as a proportion of the total number of toys sold.

Identify the most suitable type of chart which would be used to show this information and describe how it would be produced.

Answer:

8(c)	Pie chart – 1 mark Select A8:A13 and using ctrl key select G8:G13 – 1 mark Go to Insert chart – 1 mark Select pie chart – 1 mark	**4**

12 Financial models are often created using spreadsheet software rather than using manual methods.

Evaluate the use of spreadsheet models for this purpose.

Answer:

12	**Eight** *from*:	8
	Benefits:	
	Calculations can be performed more quickly/more easily/recalculated automatically	
	What if statements can be asked without rebuilding a model from scratch each time the test is carried out	
	Models provide quick answers to events that may take months to actually happen	
	Graphs that are produced to help understand the result will automatically change (as new values are added/old values altered)	
	Graphs can be produced automatically/more quickly/no manual method required	
	They provide consistent results/not affected by user's inconsistent decisions	
	There are templates for regularly used spreadsheet models	
	Spreadsheets can also interact with databases	
	Data can automatically be imported (from a database) into a spreadsheet	
	Data can be entered more accurately because of computer-based validation and verification	
	Drawbacks:	
	You cannot account for every possible variable in a financial model	
	Banks cannot model exactly how much money they think people will save or borrow	
	There is no way of predicting the effect that financial crises will have on real life behaviour	
	Many variables need to be considered and it is easy to omit some	
	Some situations will need purpose-built software/technical expertise which is expensive to buy.	

June 2018 – P13

7

Using examples from the spreadsheet above, describe in detail:

(a) Cells

Answer:

7(a)	**Two** *from*: A cell is a specific location within a spreadsheet and is defined by the intersection of a row and column Cells are often referenced by a letter and number combination For example, C6 is the cell containing the value 7. Must have an example to gain both marks.	2

(b) Rows

Answer:

7(b)	**Two** *from*: Rows run horizontally in a worksheet Each row is identified by a number in the row header Row 7 is highlighted in the spreadsheet/contains the values 4, 6, 9, 15, 5. Must have an example to gain both marks.	2

Question 7, Part (c) and (d)

(c) Columns

Answer:

7(c)	**Two** *from*:	2
	Columns run vertically in a spreadsheet Each column is identified by a letter in the column header Column C is highlighted in the spreadsheet/contains the values 11, 7, 9, 6, 8. Must have an example to gain both marks.	

(d) Worksheets

Answer:

7(d)	**Two** *from*:	2
	A worksheet or sheet is a single page in a spreadsheet Each worksheet has a name and by default the worksheets are named Sheet1, Sheet2 and Sheet3 In this example they are named Values, Formulae and Functions. Must have an example to gain both marks.	

Question 8, Part (d), (e) and (f) only

(d) The data from this section of the database has been imported into a spreadsheet. This is because the manager wants to calculate the average wage earned by the workers who work more than 40 hours a week but less than 50 hours a week.

	A	B	C	D	E	F
1	Family name	First name	Telephone	Weekly wage	Hours worked	
2	Smith	John	01632 267145	220	47	
3	Prudhomme	Pierre	01632 342016	250	51	
4	Gonzales	Jose	01632 941368	260	42	
5	Signusson	Lars	01632 643821	240	40	
6	Thorsvald	Olaf	01632 811276	190	45	
7	Mueller	Dieter	01632 351156	180	48	
8	Lucio	Silvio	01632 281146	210	43	
9	Boko	Peter	01632 444707	260	51	
10	Ndlovu	Joseph	01632 319249	300	41	
11	James	Peter	01632 860787	310	40	
12	Gordon	James	01632 205775	280	40	
13	McDonnell	Jamie	01632 430332	250	45	
14	Kelly	Peter	01632 832287	290	50	
15						
16			Average	230		
17						

Write down the formula which should go in cell D16.

Answer:

8(d)	=AVERAGEIFS(D2:D14,E2:E14,">40",E2:E14,"<50")	6
	=AVERAGEIFS() – 1 mark (D2:D14, – 1 mark First E2:E14, – 1 mark ">40", immediately after E2:E14 – 1 mark Second E2:E14, – 1 mark "<50" immediately after E2:E14 – 1 mark	

Question 8, Part (e) and (f)

(e) Describe how the spreadsheet could be sorted so that Dieter Mueller is the first worker in the list and Pierre Prudhomme is the seventh.

Answer:

8(e)	**Three** *from*: Select A2:E14 Sort in ascending order of column D Add a level Sort in ascending order of column E/column B/column A. Must be in this order.	3

(f) The manager has decided that the name fields should be combined. He wants a name field containing the first name initial and the family name. Write down the formula that would give Jamie McDonnell's name as J McDonnell.

Answer:

8(f)	=CONCATENATE(LEFT(B13,1)," ",A13) =CONCATENATE() – 1 mark LEFT(B13,1), – 1 mark ," ",A13 – 1 mark	3

November 2018 – P11 & P13

5   Many applications use computer models to trial new processes.

Give **four** drawbacks of using a model to create and run simulations.

Answer:

5	**Four** *from:*	4
	It can be expensive to buy the software/bring in expertise Sometimes there is not sufficient data to produce a mathematical model The simulator response will not always be exactly the same as an actual situation, <u>as there may be too many variables</u> Complex simulations can require a computer system with a fast processor/large amounts of memory which is very expensive An event that may occur instantaneously in the real world may actually take hours to imitate in a simulated environment The reduction of simulation time may be based on oversimplification of assumptions Users may be given a false sense of security and not react well in the real situation.	

9   Schmidt and Partners own a chain of shoe shops. They pay their workers a weekly wage consisting of a basic wage plus commission. Workers only get paid commission if they have made $500 worth of sales in that week.

The commission is paid at the rate of 10% of the amount of sales made over $500.
Below is a spreadsheet showing some of the workers and the wages they were paid in one week.

	A	B	C	D	E	F	G
1	Sales person	Department	Value of sales	Basic wage	Commission		Total wage
2							
3	Li Chung	Childrens	$550	$50	$5		$55
4	Graham Phillips	Adults	$450	$60			$60
5	Karl Gustaph	Childrens	$700	$55	$20		$75
6	Paula Meldrew	Childrens	$850	$60	$35		$95
7	Shen Bin	Adults	$1,000	$55	$50		$105
8	Ram Babu	Childrens	$350	$45			$45
9	Joan Adams	Childrens	$780	$55	$28		$83
10	Hu Zheng	Adults	$620	$65	$12		$77
11	Louis Raphael	Adults	$420	$45			$45
12	Ambrin Satem	Childrens	$900	$50	$40		$90
13	Tong Mu	Adults	$940	$60	$44		$104
14	Malcolm Novak	Adults	$870	$70	$37		$107
15							
16					$131		

Fig. 1

(a)   Write down the formula which should go in cell E4 which is easily replicable. It should calculate the commission earned but leave the cell blank if no commission is earned.

Answer:

9(a)	=IF(C4>500,(C4-500)*0.1,"") =IF() – 1 mark C4>500, – 1 mark (C4-500) – 1 mark *0.1 – 1 mark ,"" – 1 mark	5

Question 9, Part (b) and (c)

(b) The shop manager wants to know the total commission the shop is paying to those workers in the Adults department who sold over $800 worth of shoes.

Write down a conditional formula which should go in cell E16.

Answer:

| 9(b) | =SUMIFS(E3:E14,C3:C14,">800",B3:B14,"Adults")

=SUMIFS() – 2 marks (SUMIF() – 1 mark) as first part of formula
E3:E14 as first part of bracketed formula – 1 mark
,C3:C14 – 1 mark
,">800" – 1 mark
,B3:B14 – 1 mark
,"Adults" – 1 mark | 7 |

(c) The manager wishes to know the number of workers who did not earn any commission.

Write down the formula he would enter into cell E18 to obtain this value. The formula must work even if the data in the spreadsheet changes in the future.

Answer:

| 9(c) | =COUNTBLANK(E3:E14)

COUNTBLANK() – 1 mark
E3:E14 – 1 mark | 2 |

Question 9, Part (d)

(d) When the manager was originally given the spreadsheet by the IT technician it looked as shown in Fig. 2 below:

	A	B	C	D	E	F	G	H
1	Sales per	Departmen	Value of	Basic Wag	Commission		Total wage	
2								
3	Li Chung	Childrens	550.00	50.00	5.00		55.00	
4	Graham F	Adults	450.00	60.00			60.00	
5	Karl Gust	Childrens	700.00	55.00	20.00		75.00	
6	Paula Me	Childrens	850.00	60.00	35.00		95.00	
7	Shen Bin	Adults	1000.00	55.00	50.00		105.00	
8	Ram Bab	Childrens	350.00	45.00			45.00	
9	Joan Ada	Childrens	780.00	55.00	28.00		83.00	
10	Hu Zheng	Adults	620.00	65.00	12.00		77.00	
11	Louis Rap	Adults	420.00	45.00			45.00	
12	Ambrin S	Childrens	900.00	50.00	40.00		90.00	
13	Tong Mu	Adults	940.00	60.00	44.00		104.00	
14	Malcolm	Adults	870.00	70.00	37.00		107.00	
15								
16					131.00			

Fig. 2

Explain, in detail, the features of spreadsheet software he had to use to change its appearance as shown in Fig. 2 to that shown in Fig. 1 (page 8), using the shortest number of steps. The larger column widths became 20 points wide and the narrower one (column F) 12 points.

Answer:

9(d)	**Five** *from:*	5
	Highlight columns A to G Use format tool and column width tool and enter 20 Highlight column F, use format tool and column width tool and enter 12 / move cursor over right hand edge of letter F and drag to 12pt Highlight cells C3:G16 and select format and format cells Select currency Choose symbol (format) $ and enter 0 for decimal places.	

November 2018 – P12

5 Spreadsheet software enables users to make use of formulas and functions.

Using examples, compare and contrast a formula and a function.

Answer:

5	**Four** *from:*	4
	Both provide representations of mathematical operations/equations Both can involve the use of cell references within them Both are not visible in csv format A function is also a formula, but the parts have been predefined by the spreadsheet software Formulae can be as simple or as complex as the user wants Instead of having to accurately type out the details of the formula a function acts as a shortcut to carry them out A formula can contain a function, but it is possible to write a formula without a function A function is provided by the spreadsheet software Most functions have criteria, but not always as with RAND() A formula is something that is user-created and can include spreadsheet functions For example, =C3-D2 is a formula For example, AVERAGE() is a function Must have at least one similarity and one example to gain full marks.	

6   Aeroplane manufacturers often use computer models to trial new aircraft.

Describe **four** benefits of using a model to create and run simulations.

Answer:

6	**Four** *from:*	4
	Developers can be freer to test all of the aspects of the machine without worrying about damaging an expensive machine	
	Can provide results that are generally not measurable in some experiments (e.g. all weather conditions)	
	Computer simulation can allow you to see how a system might respond before you design or modify it, thus avoiding mistakes	
	It is cheaper as there is no need to make different prototypes to test them out	
	It is safer to use a model and simulation for nuclear power plants/learning to drive/fly	
	Designing an item as a model on a computer before the real item is built saves time	
	Models allow accurate prediction of changes in trends or patterns	
	Critical situations can be investigated without risk	
	Critical situations can be created more quickly	
	Can be slowed down to study behaviour more closely.	

8   A secretary has been given a list of product details. She was asked to type the details into a spreadsheet. Unfortunately, when she typed them in, wrong data was entered into cells A7, A10, A16 and B10.

List secretary was given

Product number	Department code
38366614481	B167
14533707617	B132
92648277616	C185
83028907250	A675
99028485231	D132
77662318299	B453
11997211500	E342
71458052066	D543
81391876632	E723
13917086392	Z418
45608392059	M329
54445757756	B132
14050284074	A675
30965517520	E647
43270336250	F341
97118134256	C231

Spreadsheet produced by secretary

	A	B	C	D
1	Product number	Department code		Price
2	38366614481	B167		$383.00
3	14533707617	B132		$145.00
4	92648277616	C185		$926.00
5	83028907250	A675		$830.00
6	99028485231	D132		$990.00
7	76762318299	B453		$767.00
8	11997211500	E342		$119.00
9	71458052066	D543		$714.00
10	8118xy76632	ET23		$811.00
11	13917086392	Z418		$139.00
12	45608392059	M329		$456.00
13	54445757756	B132		$544.00
14	14050284074	A675		$140.00
15	30965517520	E647		$309.00
16	3270336250	F341		$327.00
17	97118134256	C231		$971.00
18				

(a) Describe **four** validation checks which could have prevented these errors from occurring, including a description of how they would have prevented the errors.

Answer:

8(a)	*Check digit check* for transposed digits in A7 – **1 mark** 67 instead of 76 would have resulted in a different check digit being calculated – **1 mark** *Type check* to check for invalid characters in A10 – **1 mark** xy would register as text in a numeric field – **1 mark** *Length check* to check exact number of characters entered in A16 – **1 mark** Would have registered that only 10 characters entered – **1 mark** *Format check* to check that correct format has been followed in B10 – **1 mark** Would have trapped two letters and two digits entered instead of one letter followed by three digits – **1 mark**	8

Question 8, Part (b)

(b) The secretary's manager typed a formula into cell D2 to calculate the price of the product which is given at the beginning of each Product number.

Write down the formula which he would have entered in cell D2 and describe how the Price was formatted so that it would appear as it does in the spreadsheet.

Answer:

8(b)	=VALUE(LEFT(A2,3)) VALUE() – **1 mark** LEFT(A2, 3) – **1 mark** **Two** *from:* Highlight D2 and select format (format cells)/right click and select format cells Select currency Set to $ and 2 decimal places.	**4**

March 2018 – P12

8   Jagwant has typed data into a spreadsheet. Part of the spreadsheet is shown below.

For each column, explain in detail why the data is not fully visible, and describe the most efficient way he could use to make all the data fully visible by only using the mouse.

C1	▼	⋮	✗	✓	fx	4.678932156	
	A		**B**		**C**	**D**	
1	##########		joseph j		4.678932		
2	##########		william		5.986433		
3	##########		jasvinde		7.325689		

Answer:

8	**Six** *from:*	6
	What has happened: Column A contains numbers which are too long to fit in the cell so have been changed by the spreadsheet software to ###### Column B contains text which has a font size too big for the cells and the spreadsheet software has truncated the right hand side and bottom to fit the cell Column C contains decimal numbers which are too long to fit so the spreadsheet software has ignored the rightmost digits *Solution:* Click on top left corner to highlight all cells Double click on join/boundary between column headings Double click on join/boundary between row headings.	

9   Farzana was given a problem to solve by her maths teacher – 'Add two integers 15 and 16 and then multiply the answer by 45^4.' She has worked out the answer but now wishes to check her answer by using the spreadsheet below.

◢	A	B	C	D	E	F	G	H
1								
2	15	16	45	4			127119375	
3								

Write down the formula she would have used in cell G2 to produce her answer.

Answer:

9	=(A2+B2)*C2^ D2 **or** =(A2+B2)* POWER(C2,D2) (A2+B2)* with correctly positioned brackets 1 mark C2^D2 or POWER(C2,D2) 1 mark	2

11 A company keeps details of their payroll data in a single computer file.

Evaluate the use of spreadsheet and database software to store this data using examples related to payroll for your argument.

Answer:

11	**Eight** from:	8
	Advantages of database software/Disadvantages of spreadsheet software Complex filters are easier to create using database software such as names of workers working in a specific department who earn above a certain amount Queries can be saved using database software then used with updated data such as new workers joining the company Fields easier to name and query using database software such as name, address, rate of pay, wages Can only create a relational database using database software to relate a table of workers' payroll data to a table of personal details *Disdvantages of database software/Advantages of spreadsheet software* Calculated fields can be difficult to create using database software such as calculating wages Easier to create complex formulae in spreadsheets for calculating net wages after taxes, insurance, pension contributions Easier to use functions in spreadsheets such as countif to count the number of workers earning more than a certain wage Charts are easier to produce using spreadsheet software to show expenditure on wages over time Repeated data can be easier to enter using spreadsheet software Spreadsheets are easier to use to model different scenarios such as future wage expenditure. One mark is available for a reasoned conclusion. Must have at least two from each section to gain full marks.	

13 Sachin has typed in three dates in column A in the spreadsheet shown below. He has used the formula =TEXT(A1,"dd mmmm yyyy") in C1 and replicated it down. He has used another formula in column E to extract the name of the month from C1.

Write down the formula he used in E1 which he then replicated down to E3 to extract the months shown.

	A	B	C	D	E	
1	03/11/2017		03 November 2017		November	
2	26/09/2017		26 September 2017		September	
3	03/06/2017		03 June 2017		June	
4						

Answer:

13	=MID(C1,4,LEN(C1)-8)		4
	MID(C1,)	1 mark	
	4,	1 mark	
	LEN(C1)	1 mark	
	-8	1 mark	

June 2019 – P11

9 Paolo is the owner of a small company with ten workers. He is developing a spreadsheet to calculate the payroll. He has started by importing a text file of the workers' names. The list consisted of each worker's family name followed by a comma then a space then their first name.

He wants to split the names into separate family names and first names by finding the position of the comma in each cell in column A.

He has discovered a new function, LOCATE, which gives the position of the first occurrence of a single character in a word.
For example, =LOCATE("e",I4) gives the result 2.

His first attempt at the spreadsheet is shown below.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Name		Position of comma		Family name	First name			Job	Weekly pay		Rate per hour	Hours worked
2													
3	Smith, John								Polishing	450		15	30
4	McDonnell, Louise								Secretary	500		10	50
5	Hernandes, Juan								Welding	450		10	45
6	Kennedy, Sean								Orders	500		16	31.25
7	Gustaffsson, Johan								Fitter	500		20	25
8	Davies, Iueuan								Electrician	550		11	50
9	Lopez, Ramon								Manager	500		25	20
10	Garcia, Isabel								Painting	550		20	27.5
11	Costa, Albertina								Invoices	450		15	30
12	Fernandez, Mariela								Sales	550		11	50
13													

(a) Using this LOCATE function, write down the formula he would use in cell C3. The formula must be easy to replicate.

Answer:

9(a)	=LOCATE(",",A3)	
	=LOCATE(,A3) 1 mark	**1**
	"," 1 mark	**1**

FAISAL CHUGHTAI

Question 9, Part (b), (c) and (d)

(b) He will use a formula in cell E3 to produce Smith. Making use of cell C3, write down the formula, **without** using the MID function, which must be easy to replicate.

There must be no spaces, before, or after the name.

Answer:

9(b)	=LEFT(A3,C3-1)	
	=LEFT()	1
	A3, as first item	1
	C3-1 as second item	1

(c) He will use a formula in cell F3 to produce John. Making use of cell C3, write down the formula, **without** using the MID function, which must be easy to replicate.

There must be no spaces before, or after, the name.

Answer:

9(c)	=RIGHT(A3,LEN(A3)-C3-1)	
	=RIGHT(A3,…)	1
	LEN(A3)	1
	-C3-1)	1

(d) Describe the steps he would use to format the Weekly pay column so that the only difference that would be made would be to place a $ sign in front of the value.

Answer:

9(d)	Three from: Highlight J3:J12 Click on format then format cells Click on currency then select $ symbol Select 0 decimal places	3

Question 9, Part (e)i and (e)ii

(e) Using **only** the sort feature on columns I and J, explain how you would be able to get the following values in the given cells. You need to ensure data integrity is maintained.

(i) 500 in cell J6 with Secretary in cell I6 and Davies, Iueuan in A12.

Answer:

9(e)(i)	Select A3:M12…	1
	…Sort in ascending order of column J…	1
	…Add a level and sort in descending order of column I	1

(ii) 500 in J7 with Orders in I8 and Smith, John in A11.

Answer:

9(e)(ii)	Select A3:M12…	1
	…Sort in descending order of column J…	1
	…Add a level and sort in ascending order of column I	1

June 2019 – P12

10 An examinations officer has created a spreadsheet containing a list of students and their dates of birth. It will be used to calculate each student's age in years. This is the age that they will be on the date of a science exam which is on 21/05/2019.

	A	B	C	D	E	F	G	H
1								
2	Family name	First name	Date of birth (dd/mm/yyyy)	Age	Number of exams entered for		21/05/2019	
3								
4	Purewal	Sandeep	17/05/2002	17	4		6	number of students aged 17 taking 3 exams
5	Jones	Ieuan	15/10/2001	17	3		4	number of students aged 16 taking 4 exams
6	Astle	Roberta	21/07/2002	16	4			
7	Herreira	David	10/08/2002	16	4			
8	Maninga	Jeff	17/09/2001	17	3			
9	Charlton	Leona	08/03/2002	17	4			
10	van Gaal	Ruud	09/02/2002	17	4			
11	Alonso	Maria	17/11/2001	17	3			
12	Lagat	Mary	10/11/2001	17	3			
13	Kibaki	Robert	13/04/2002	17	4			
14	Mbabasi	Apolo	30/06/2002	16	5			
15	Dansua	Albert	24/06/2002	16	4			
16	Kirshwan	Kiran	30/08/2002	16	3			
17	Patel	Alpa	15/03/2002	17	4			
18	Bhutto	Waseem	14/09/2001	17	3			
19	Abbasi	Akhtar	18/12/2001	17	4			
20	Kunwar	Ishwar	16/01/2002	17	3			
21	al-Hafi	Saad	14/03/2001	18	4			
22	Hala	Bassem	25/05/2002	16	5			
23	Namet	Fawzi	31/05/2002	16	4			

(a) She entered a formula in D4 to calculate the student's age.

Write down the formula she used. This formula should be easy to replicate.

You can assume for the purpose of this exercise that the number of days in a year averages out to 365.25.

Answer:

10(a)	=INT((G$2-C4)/365.25)	
	INT()	1
	(G$2	1
	-C4)	1
	/365.25	1

Question 10, Part (b)i, (b)ii and (c)

(b) **(i)** The spreadsheet is to be sorted in ascending order of *Age* and then descending order of *Number of exams entered for.*

Write down the values which would be displayed in D9 and E9.

Answer:

10(b)(i)	16	**1**
	4	**1**

(ii) The **original** spreadsheet is to be sorted in descending order of *Age* and then ascending order of *Number of exams entered for.*

Write down the values which would be displayed in D17 and E17.

Answer:

10(b)(ii)	16	**1**
	3	**1**

(c) A teacher wanted to know the number of students aged 17 taking three exams.

Write down the formula containing a counting function she used in cell G4 to calculate this number. This formula should work even if the data changes.

Answer:

10(c)	=COUNTIFS(D4:D23,17,E4:E23,3)	
	=COUNTIFS()	**1**
	(D4:D23	**1**
	,17, immediately after D4:D23	**1**
	E4:E23 (and must come) after D4:D23 within same function	**1**
	,3) immediately after E4:E23 within the same function as D4:D23	**1**

Question 10, Part (d)

(d) The teacher now wants to know the number of students aged 16 taking four exams.

Write down the formula containing a counting function she used in cell G5 to calculate this number. This formula should work even if the data changes.

Answer:

10(d)	=COUNTIFS(D4:D23,16,E4:E23,4)	
	=COUNTIFS(D4:D23....)	1
	,16,E4:E23	1
	,4) immediately after E4:E23	1

13 Many driving schools are asking IT companies to develop simulators for teaching customers to drive.

Evaluate the development of simulators for this purpose.

Answer:

13	This question to be marked as levels of response:	8
	Level 3 (7–8 marks) Candidates will include the advantages and disadvantages of simulations. The information will be relevant, clear, organised and presented in a structured and coherent format. There may be a reasoned conclusion / opinion. Specialist terms will be used correctly and appropriately. **Level 2 (4–6 marks)** Candidates will include the advantages and disadvantages of simulations. Although development of some of the points will be limited to one side of the argument. For the most part, the information will be relevant and presented in a structured and coherent format. Specialist terms will be used appropriately and for the most part correctly. **Level 1 (1–3 marks)** Candidates will present advantages or disadvantages of simulations. There will be little or no use of specialist terms. Answers may be simplistic with little or no relevance. **Level 0 (0 marks)** Response with no valid content.	

Question 13

Answer (Continued):

Examples may include:

Advantages:
Driving schools can test all aspects of driving without worrying about damaging an expensive car
Can provide results that are generally difficult to measure such as reaction times
Computer simulation can allow you to see how a system might respond before you design or modify it avoiding mistakes
It is safer to use a model and simulation for car driving
Can be slowed down to study behaviour more closely
Is easier to create a simulation of a critical event rather than waiting for it to happen in real life
Is easier to create a simulation of different driving conditions rather than waiting for it to happen in real life

Disadvantages:
Sometimes there is not sufficient data to produce a mathematical model
Sometimes it is impossible to create simulations that can accurately predict the occurrence / effects of human behaviour
The formula and functions that are used may not provide an accurate description of the system resulting in inaccurate output from the simulation
Sometimes simulations can require the use of a computer system with a fast processor and large amounts of memory which are very expensive
May give drivers a false sense of security regarding their ability to drive.

June 2019 – P13

6   Spreadsheets are commonly used to create models of real situations.

Using examples, explain why the characteristics of spreadsheets are suitable for producing financial models.

Answer:

6	**Eight** *from:*	8
	Absolute and relative cell referencing makes sure you only increment the parts of a formula you need to…	
	… allows you to change prices / costs of individual items to see the effect	
	Cell protection makes sure that the cells you want do not change by accident …	
	… such as fixed costs such as overheads	
	User interface forms makes it easier to input quantities / costs into the model	
	Macros make it easier to create more complex formulae or functions …	
	… such as comparing different costs simultaneously	
	Automatic re-calculation means it is not necessary to evaluate a formula every time you change it …	
	… such as changing individual costs / prices	
	Conditional formatting allows you to highlight certain values that match specific criteria …	
	… such as seeing at a glance which items are making a profit	
	Values can be changed to ask whatif questions	
	Graphs can be used to show trends and illustrate forecasts …	
	… such as which goods are likely to make profits over time	
	Goalseek can be used to determine which variables need to be changed to achieve a target or goal …	
	… such as how many goods need to be sold / what price needs to be charged to make a given profit.	

9 Below is a spreadsheet of a company's balance sheet. It shows its expenditure, income and profit for each year between 2009 and 2018.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2				Expenditure									
3			Wages	Utilities	Stock		Total expenditure		Income		Profit		
4	2009		350250	54565	475623		€880,438		€925,365		€44,927		very bad year
5	2010		467032	61022	519429		€1,047,483		€1,097,652		€50,169		bad year
6	2011		476414	68124	567178		€1,111,716		€1,185,858		€74,142		bad year
7	2012		512209	75936	619224		€1,207,369		€1,342,020		€134,651		good year
8	2013		553156	84530	675954		€1,313,640		€1,518,483		€204,843		good year
9	2014		648589	93983	737790		€1,480,362		€1,717,886		€237,524		good year
10	2015		732877	104381	805191		€1,642,449		€1,943,211		€300,762		good year
11	2016		774954	115819	878658		€1,769,431		€2,197,828		€428,397		good year
12	2017		838925	128401	958737		€1,926,063		€2,485,546		€559,483		good year
13	2018		868577	142241	1046023		€2,056,841		€2,810,667		€753,826		good year
14													
15			>2011	<2017									
16													
17		Variable average	644357										
18													

(a) Write down the formula which uses a function, in cell G4, to calculate the *Total expenditure* for 2009.

Answer:

9(a)	=SUM(C4:E4)	1

(b) The percentage profit is calculated by dividing the *Profit* by the *Income*. The company secretary has entered a formula in M4 which displays a message:

- very bad year, if *Income* was less than €1,000,000
- bad year, if the company's percentage profit was less than 10%
- good year, if the percentage profit was not less than 10%

Write down the formula he used in cell M4 which would be replicated in cells M5 to M13.

Answer:

9(b)	=IF(I4<1000000,"very bad year",IF(K4/I4<0.1,"bad year","good year"))	6
	Nested IF with correct brackets and no absolute cell referencing	1 mark
	I4<1000000	1 mark
	Returns very bad year	1 mark
	IF (K4/I4<0.1	1 mark
	Returns bad year	1 mark
	IF (K4/I4>=0.1/otherwise returns good year	1 mark

Question 8, Part (c)

(c) The manager wants to be able to find the *Variable average* of the wages bill for any sequence of years between 2009 and 2018.
He has set up the spreadsheet to calculate the average between 2011 and 2017.
To calculate the average between any other sequence of years he will just change the conditions >2011 and <2017.

Write down the formula he will need to use in C17 to calculate the *Variable average*.

Answer:

9(c)	=AVERAGEIFS(C4:C13,A4:A13,C15,A4:A13,D15)		6
	=AVERAGEIFS()	1 mark	
	(C4:C13	1 mark	
	,A4:A13	1 mark	
	,C15,	1 mark	
	A4:A13 immediately after ,C15,	1 mark	
	,D15)	1 mark	

November 2019 – P11 & P13

11 Here is a spreadsheet showing the medal winners at some of the 2016 Olympics swimming events.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	Country code	Country name		Gold	Silver	Bronze		Swimmer	Distance	Stroke	Gender	Position	Code of country		Time (secs)	Average speed (m/s)	Name of country
2																	
3	AUS	Australia		1	0	1		Kyle Chalmers	100m	Freestyle	M	1	AUS		47.58	2.10	Australia
4	BEL	Belgium		0	1	0		Pieter Timmers	100m	Freestyle	M	2	BEL		47.80	2.09	Belgium
5	CAN	Canada		1	1	0		Nathan Adrian	100m	Freestyle	M	3	USA		47.85	2.09	United States
6	CHN	China		1	0	0		Penny Oleksiak	100m	Freestyle	F	1	CAN		52.70	1.90	Canada
7	GBR	Great Britain		1	0	0		Simone Manuel	100m	Freestyle	F	2	USA		52.71	1.90	United States
8	RSA	South Africa		0	2	0		Sarah Sjostrom	100m	Freestyle	F	3	SWE		52.99	1.89	Sweden
9	SWE	Sweden		1	1	1		Adam Peaty	100m	Breaststroke	M	1	GBR		57.13	1.75	Great Britain
10	USA	United States		1	1	4		Cameron Van der Burgh	100m	Breaststroke	M	2	RSA		58.69	1.70	South Africa
11								Cody Miller	100m	Breaststroke	M	3	USA		58.87	1.70	United States
12								Sarah Sjostrom	100m	Butterfly	F	1	SWE		55.48	1.80	Sweden
13								Penny Oleksiak	100m	Butterfly	F	2	CAN		56.46	1.77	Canada
14								Dana Vollmer	100m	Butterfly	F	3	USA		56.63	1.77	United States
15								Yang Sun	200m	Freestyle	M	1	CHN		104.65	1.91	China
16								Chad Le Clos	200m	Freestyle	M	2	RSA		105.20	1.90	South Africa
17								Conor Dwyer	200m	Freestyle	M	3	USA		105.23	1.90	United States
18								Katie Ledecky	200m	Freestyle	F	1	USA		113.73	1.76	United States
19								Sarah Sjostrom	200m	Freestyle	F	2	SWE		114.08	1.75	Sweden
20								Emma McKeon	200m	Freestyle	F	3	AUS		114.92	1.74	Australia

(a) Write down the formula which should go in cell D3 to calculate the number of gold medals that Australia won in the events. The formula should be easily replicable to show the number of gold medals won by the other countries.

The formula should work even if the swimmer details are changed.

Question 11, Part (a)

Answers:

11(a)	=COUNTIFS($M$3:$M$20,$A3,$L$3:$L$20,1)	6
	=COUNTIFS() – 2 marks (COUNTIF – 1 mark) ($M$3:$M$20 – 1 mark ,$A3 – 1 mark ,$L$3:$L$20 – 1 mark ,1) – 1 mark or =COUNTIFS($L$3:$L$20,1,$M$3:$M$20,$A3) =COUNTIFS() – 2 marks (COUNTIF – 1 mark) ($L$3:$L$20 – 1 mark ,1 – 1 mark ,$M$3:$M$20 – 1 mark ,$A3) – 1 mark $ signs before <u>letters</u> are optional	

Question 11, Part (b)

(b) The average speed of each swimmer is calculated by dividing the distance swum by the time taken in seconds.

Write down the formula which should go in cell P3 to calculate Kyle Chalmers' speed. The formula should be easily replicable to show the speeds of the other swimmers.

Answer:

11(b)	=VALUE(LEFT(I3,3))/O3	5
	=VALUE() – 1 mark (LEFT() – 1 mark I3, – 1 mark 3) – 1 mark /O3 – 1 mark All cell references must be relative but can have $ in front of letters	

Question 11, Part (c) and (d)

(c) Explain how you would amend the spreadsheet so that the cells between M3 to M20 could only accept the country codes listed. If any other code was input an error message informing the user an error had occurred would be output.

Answer:

11(c)	**Four** from: Highlight M3:M20 Click on data then on data validation Ensure Settings is highlighted and click on drop down menu under Allow Click on list then go to Source window Type in =$A$3:$A$10 / individual codes for countries separated by commas and click OK	4

(d) Explain how you would sort the data so that all the female swimmers were grouped together before the male swimmers and with the furthest distance at the top.

Answer:

11(d)	Highlight cells H3:Q20 … … Sort on column K ascending … … add a level and sort on Column I descending	3

12 The principal of a college wishes to keep records of all his students' details including exam scores. He is not sure whether he should use a spreadsheet or a database to do this.

Evaluate the use of databases and spreadsheets for such a task.

Answer:

12	To be marked as a level of response:	8
	Level 3 (7–8 marks)	
	Candidates will describe the advantages and disadvantages of both types of software The issues raised will be justified. The information will be relevant, clear, organised and presented in a structured and coherent format. Specialist terms will be used accurately and appropriately	
	Level 2 (4–6 marks)	
	Candidates will describe the advantages and disadvantages of at least one type of software although development of some of the points will be limited For the most part the information will be relevant and presented in a structured and coherent format. Specialist terms will be used appropriately and for the most part correctly.	
	Level 1 (1–3 marks)	
	Candidates may only address one side of the argument, and give basic advantages/disadvantages Answers may be simplistic with little or no relevance. There will be little or no use of specialist terms.	
	Level 0 (0 marks)	

Question 12

Answer (continued):

| | | Response with no valid content.

Candidates may refer to e.g.

Benefits of spreadsheets
The amount of learning required by the principal to use spreadsheets is not as much as that for databases ...
... it's easier to use spreadsheets and get solutions straight away
Spreadsheets are easier to use to store student data/perform numerical calculations on exam scores/format cells/adjust layouts to generate output and reports
Easier to create complex formulae such as exam scores per teaching group in spreadsheets
Easier to use functions to calculate average exam scores in spreadsheets
Repeated data such as names or classes can be easier to enter using spreadsheet software
Charts to show student progress are easier to produce using spreadsheets

Drawbacks of spreadsheets
As work gets more complex, such as an increase in the number of students, spreadsheets become more difficult to change and manage
Spreadsheets are good for creating one-time analysis such as exam scores for one year, but become problematic as the data grows and evolves over time
As new rows and columns are added for extra scores and students, ranges and formulas may need to be modified or new ones created | |
| 12 | Benefits of databases
Data structure and normalisation are available through multiple tables
Data and referential integrity is inbuilt
Queries and reports on student progress/exam score trends are easier to create with databases

Drawbacks of databases
They take more skill and training for the principal to use well
Structuring the information so it's easy to edit, query, view, and report can be difficult for the principal (if normalisation is employed)
Creating a database is more complicated for the principal than just entering data in the cells of a spreadsheet
It is not as easy to copy and paste blocks of data

A hybrid solution where data from a database is exported or copied to a spreadsheet is often the best solution | |

November 2019 – P12

5 Here is a spreadsheet showing the top European goal scorers in the 2018 Football World Cup qualification matches.

	A	B	C	D	E	F	G	H	I	J	K
1						Code of country	Footballer	Name of country	Games played	Goals scored	Average
2											
3						POL	Robert Lewandowski	Poland	10	16	
4						SWE	Marcus Berg	Sweden	11	16	
5			Country code	Country name		DEN	Christian Eriksen	Denmark	12	16	
6			POL	Poland		POR	Cristiano Ronaldo	Portugal	9	15	
7			SWE	Sweden		GRE	Kostantinos Mitroglou	Greece	10	12	
8			DEN	Denmark		ITA	Ciro Immobile	Italy	12	12	
9			POR	Portugal		BEL	Romelu Lukaku	Belgium	8	11	
10			GRE	Greece		CRO	Mario Mandžukic	Croatia	11	10	
11			ITA	Italy		POR	André Silva	Portugal	10	9	
12			BEL	Belgium		ITA	Andrea Belotti	Italy	9	8	
13			CRO	Croatia		DEN	Thomas Delaney	Denmark	12	8	
14			SWI	Switzerland		SWI	Haris Seferovic	Switzerland	12	8	
15			ROI	Republic of Ireland		ROI	James McClean	Republic of Ireland	11	8	
16			MON	Montenegro		SWE	Emil Forsberg	Sweden	12	8	
17			NED	Netherlands		MON	Stevan Jovetic	Montenegro	8	7	
18						NED	Arjen Robben	Netherlands	7	6	
19						BEL	Eden Hazard	Belgium	8	6	
20						ROI	Daryl Murphy	Republic of Ireland	8	6	
21											

(a) Write down the formula which should go in cell H3 to display the name of the country for Robert Lewandowski. The formula must be easily replicable.

Answer:

5(a)	**VLOOKUP(F3,$C$6:$D$17,2,0)** VLOOKUP() – 1 mark (F3 – 1 mark ,$C$6:$D$17 – 1 mark ,2 – 1 mark ,0) – 1 mark $ before the column letter is optional	5

Question 5, Part (b)

(b) Explain, in detail, the steps you would take to amend the spreadsheet so that the players will be put in order of the average number of goals scored per games played for each player. The highest average number should be first in the list.

Answer:

5(b)	**One** mark for **each step** In cell K3 insert a new formula Enter J3/I3 Highlight K3 and replicate down to K20 Highlight F3:K20 Click on data then click on sort Click on sort by column K Select descending order	6

March 2019 – P12

11 Juanita is the company secretary of a small business in the USA. She has created a spreadsheet to calculate the payroll.
The spreadsheet is shown below.

	A	B	C	D	E	F	G	H	I	J	K	L
1							Roles					
2							L	F	OS	M	D	
3							Labourer	Fitter	Office secretary	Manager	Director	
4							$15	$25	$22	$40	$80	Hourly rate
5		Job codes	Job title	Hours worked	Weekly pay							
6												
7	John Vercoe	L	Labourer	40	$600							
8	Lauren Hall	OS	Office secretary	38	$836							
9	Chloe Rhodes	F	Fitter	39	$975							
10	Owen Williams	OS	Office secretary	42	$924							
11	Lotte Charles	L	Labourer	35	$525							
12	Jeannie Burke	OS	Office secretary	38	$836							
13	Jimmy Lee	F	Fitter	40	$1,000							
14	Dawid Jones	F	Fitter	32	$800							
15	Li Sun Wu	M	Manager	45	$1,800							
16	Charlotte Watson	D	Director	50	$4,000							
17	Joe Norfolk	M	Manager	41	$1,640							
18	Joanne Floyd	F	Fitter	38	$950							
19	Anthony Campbell	F	Fitter	40	$1,000							
20	Linda Stuart	L	Labourer	38	$570							
21	Kate Smith	L	Labourer	37	$555							
22	Sam Smith	OS	Office secretary	40	$880							
23	Duncan Rydell	L	Labourer	36	$540							
24	Tony Thomson	L	Labourer	37	$555							
25	Dougie Ryder	OS	Office secretary	41	$902							
26												

(a) She has created a named range **Roles**

Describe how she created this named range.

Answer:

11(a)	Select G2:K4	1
	Click the Name box at the left end of the formula bar	1
	Type Roles and press enter	1
	Or	
	Select G2:K4	1
	On the Formulas tab, in the Defined Names group, click Define Name	1
	In the New Name dialog box type Roles and press enter	1

Question 11, Part (b)

(b) She entered a formula in E7 using the named range and the information in column B to calculate the weekly pay for John Vercoe.

Write down the formula she used. This formula should be easy to replicate.

Answer:

11(b)	=D7*HLOOKUP(B7,Roles,3,FALSE)	6
	D7* outside the brackets 1 mark HLOOKUP() 1 mark (B7 1 mark ,Roles 1 mark ,3 1 mark FALSE) 1 mark Items must be in correct position to gain a mark.	