

Pearson Edexcel Level 3 Certificate

Thursday 15 May 2025

Afternoon (Time: 1 hour 40 minutes)

Paper
reference

7MC0/01

Mathematics in Context

PAPER 1: Comprehension

Source Booklet

Do not return this Booklet with the question paper.

Turn over ►

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Formulae sheet

There will be no credit for anything you write on this formulae sheet.

Mean of a frequency distribution $= \frac{\sum fx}{\sum f}$

Mean of a grouped frequency distribution $= \frac{\sum fx}{\sum f}$, where x is the mid-interval value

Variance $= \frac{\sum (x - \bar{x})^2}{n}$

Standard deviation (set of numbers) $\sqrt{\left[\frac{\sum x^2}{n} - \left(\frac{\sum x}{n} \right)^2 \right]}$

or $\sqrt{\left[\frac{\sum (x - \bar{x})^2}{n} \right]}$

where $\bar{x}$ is the mean of the set of values

Standard deviation
(discrete frequency distribution) $\sqrt{\left[\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f} \right)^2 \right]}$

or $\sqrt{\left[\frac{\sum f(x - \bar{x})^2}{\sum f} \right]}$

Spearman's rank correlation coefficient $1 - \frac{6\sum d^2}{n(n^2 - 1)}$



The product moment correlation coefficient is

$$r = \frac{S_{xy}}{\sqrt{S_{xx}S_{yy}}} = \frac{\sum x_i y_i - \frac{(\sum x_i)(\sum y_i)}{n}}{\sqrt{\left(\sum x_i^2 - \frac{(\sum x_i)^2}{n}\right)\left(\sum y_i^2 - \frac{(\sum y_i)^2}{n}\right)}}$$

The regression coefficient of y on x is $b = \frac{S_{xy}}{S_{xx}}$

Least squares regression line of y on x is $y = a + bx$ where $a = \bar{y} - b\bar{x}$

Arithmetic series

$$u_n = a + (n - 1)d$$

$$S_n = \frac{1}{2}n(a + l) = \frac{1}{2}n[2a + (n - 1)d]$$

Geometric series

$$u_n = ar^{n-1}$$

$$S_n = \frac{a(1 - r^n)}{1 - r}$$

$$S_\infty = \frac{a}{1 - r} \quad \text{for } |r| < 1$$

There will be no credit for anything you write in this source booklet.

SECTION A: EMPLOYMENT

Data source A

Record pay rises fuel fresh inflation fears

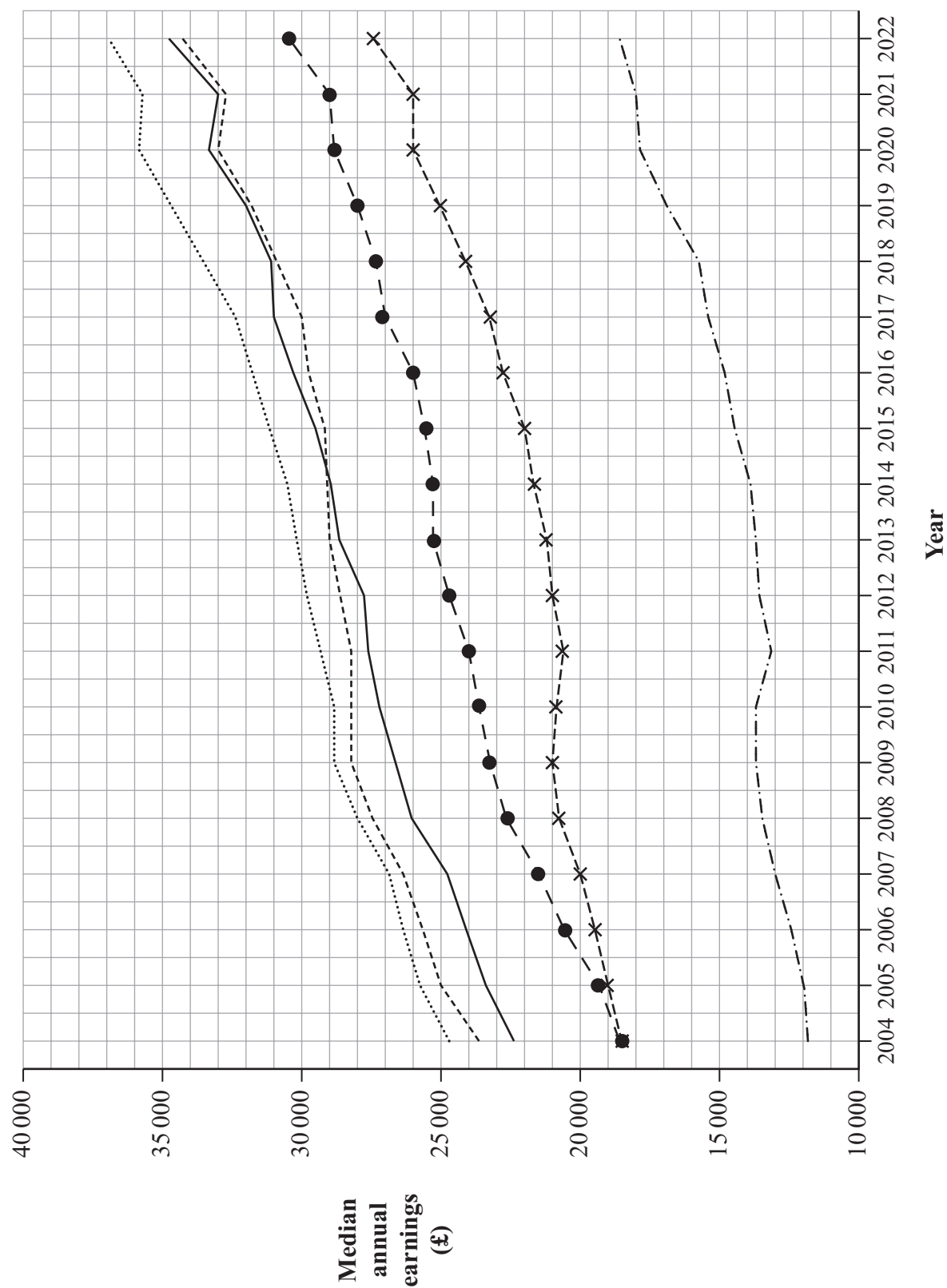
UK wages have risen at a record annual pace fuelling fears that inflation will stay high for longer.

Regular pay grew by 7.3% between 2022 and 2023, official figures showed.

However, despite the record increase, pay rises still lag behind inflation – the rate at which prices go up.



Figure 1: Median annual earnings for full-time employees in UK from 2004 to 2022 by age group

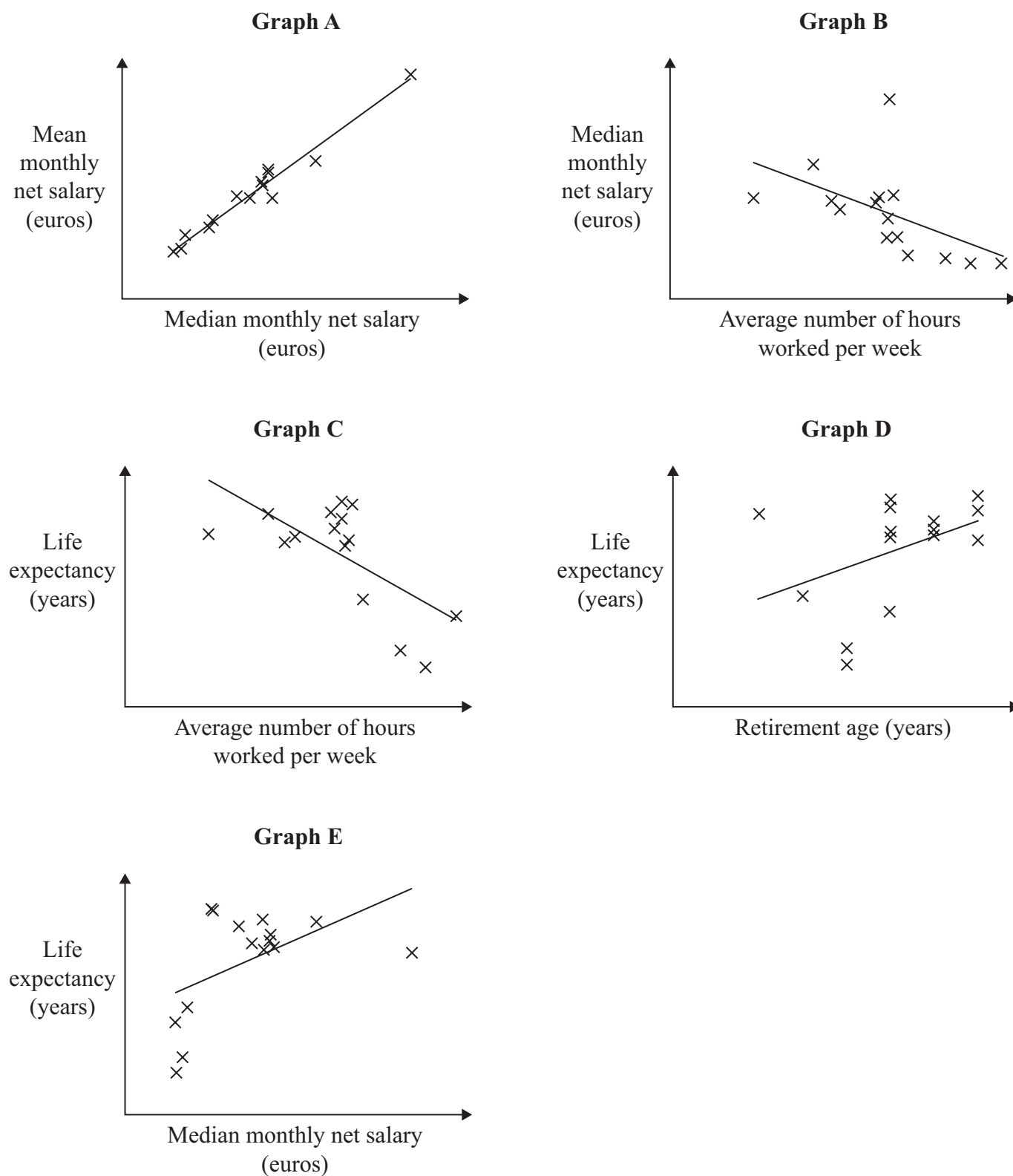


Data source B**Table 1: Employment data by European country 2022**

Country	Mean number of hours worked per week	Median monthly net salary (euros)	Mean monthly net salary (euros)	Retirement age (years)	Life expectancy (years)	Productivity (GDP per hour worked US\$)
Belgium	34.9	2190	2463	65	82.46	86.8
Estonia	36.8	1084	1545	63	79.31	47.7
France	36.2	1975	2464	62	83.35	79.7
Germany	34.6	2402	2802	65	82.18	76.7
Ireland	36.0	2509	3086	66	82.88	119.1
Italy	36.2	1503	1740	67	84.20	64.3
Latvia	38.6	888	1128	64	76.06	43.1
Lithuania	37.9	1002	1212	64	76.85	49.8
Netherlands	32.4	2498	3145	66	82.58	77.0
Norway	34.1	3314	3386	67	83.55	85.6
Poland	39.5	868	1139	65	78.60	44.9
Spain	36.5	1530	1910	65	84.05	58.3
Sweden	35.9	2376	2857	65	83.65	79.1
Switzerland	36.3	4941	5492	67	82.03	87.7
UK	36.4	2576	2459	66	82.31	70.3

Gross domestic product (GDP) is a monetary measure of the market value of all the final goods and services produced by a country over a fixed time period.

Figure 2: Scatter graphs using information in Table 1



Data source C

Many people are now choosing to work mainly from home when it is possible. They say greater flexibility increases their work ethic and savings made on transport to work are amongst the main benefits.

Some analysts claim the reduction in commuters travelling to work has reduced the level of traffic on the roads and the number of people using public transport, and that this has led to a reduction in carbon dioxide (CO₂) emissions from transport.

Other analysts say working from home is not the only reason for a reduction in CO₂ emissions from transport, claiming that a greater increase in the sales of electric cars may also be a key factor.

Some analysts also believe that, of the people now working mainly from home, not all would have previously used transport to travel to work and may have walked or cycled.

Table 2: Number of people working from home and CO₂ emissions from transport, million tonnes carbon dioxide equivalent (MtCO₂e) in the UK, 2009 to 2020

Year	Number of people mainly working from home (millions)	Carbon dioxide emissions from the transport sector (MtCO ₂ e)
2009	3.679	125.6
2010	3.670	124.0
2011	3.698	121.7
2012	3.800	120.6
2013	3.998	119.3
2014	4.202	120.7
2015	4.351	122.8
2016	4.388	125.4
2017	4.378	125.5
2018	4.481	123.9
2019	4.607	121.9
2020	5.641	98.3

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Please turn over for source data for Section B



SECTION B: TV VIEWING

Data source D

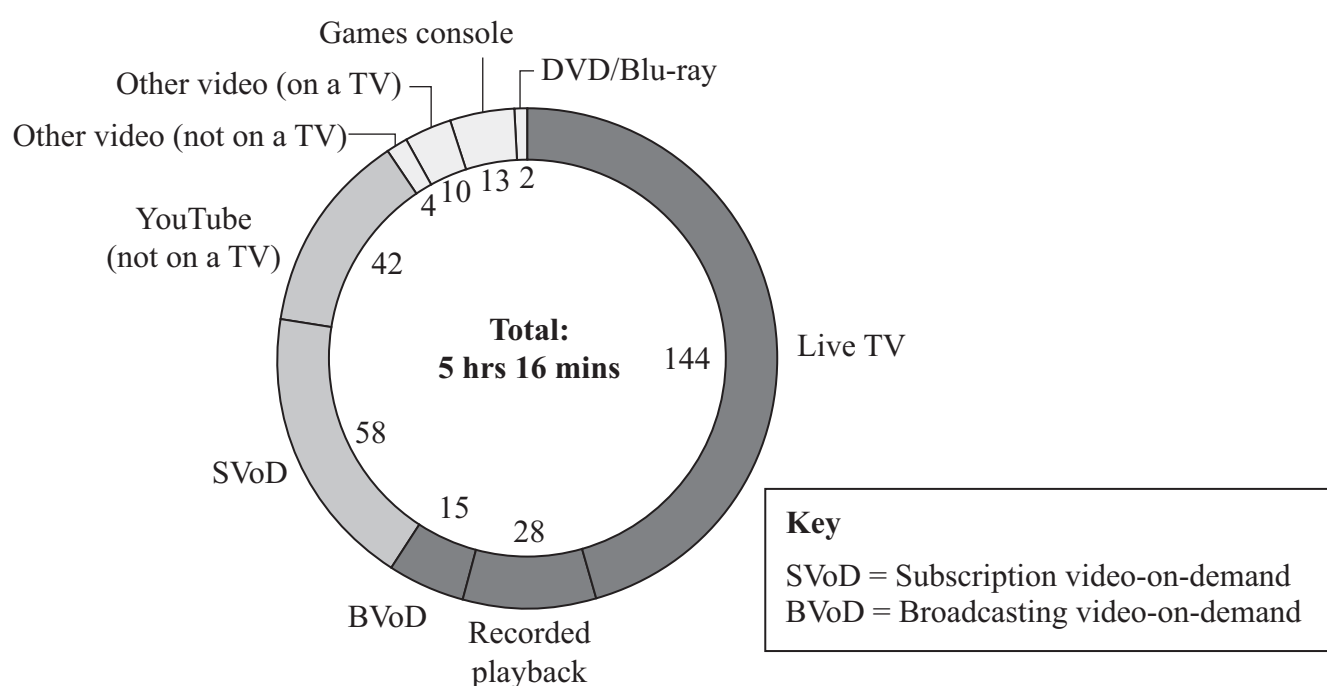
Viewing time trends:

Overall viewing of TV and video, in the UK, has fallen from its peak in 2020, with broadcasters losing market share despite improved performance of their on-demand services.

The average total amount of time people spent watching TV and video content across all devices, per day, in 2021 was 25 minutes less than in 2020 but up on 2019.

Subscription video-on-demand (SVoD) services like Netflix and Disney+ have broadly retained their share of viewing after achieving a surge in take-up in 2020, accounting for over 18% of total TV viewing in 2021. The values inside the ring in **Figure 3** show the average minutes spent watching that service per day.

Figure 3: Average minutes of viewing per day, all people and all device types in 2021



Source: Ofcom estimates of total viewing time. Modelled from BARB, Comscore and TouchPoints

Table 3: Average time people spent viewing traditional broadcast TV (including Live TV, recorded playback and BVoD) viewing per day in 2021 by age group

Age (years)	Average time spent viewing broadcast TV (minutes)
16 – 24	51
25 – 34	90
35 – 44	126
45 – 54	204
55 – 64	273

Video on demand: Take-up and subscription habits

After years of strong growth in the number of households using SVoD services, take-up began to slow in 2021. The proportion of households subscribing to at least one SVoD service reached a peak of 68% of all UK households. This percentage is equivalent to 19.5 million households.

Table 4: Share of SVoD, by provider, in UK households at the end of 2021

Provider	Percentage of all UK households with subscription
Netflix	60
Amazon Prime Video	47
Disney+	23
Now	7
Apple TV+	6
Other	6

Data source E

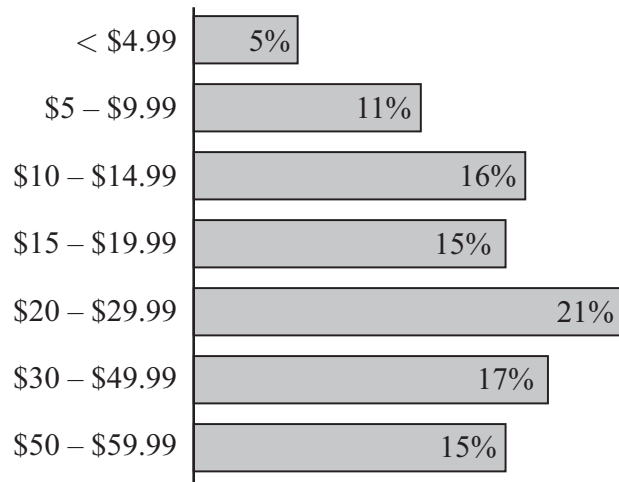
A media consumer survey showed that 64% of respondents said they wished there was a ‘bundled video streaming service’ that would let them choose which video streaming services they wanted.

However, 93% of American viewers expect either to increase their paid streaming service plans or make no changes to their existing plans over the next year.

According to this survey, 35% of American viewers now pay for four or more streaming services, compared with 11% who did so in 2019.

The survey found that more than half of American viewers (53%) now pay at least \$20 per month for video streaming services.

Figure 4: Monthly spend on video streaming services (US\$)



Top Netflix statistics 2023: Subscriber amount, time watched and platform growth

The growth rate in the number of Netflix subscribers slowed down between 2021 and 2022, when Netflix gained just 11.6 million subscribers, compared to the previous year's gain of 16.05 million subscribers.

A reported loss of 200,000 subscribers at the end of Q1 2022 resulted in the price of Netflix's stock plummeting by over 35 per cent, the single biggest drop in the company's history. Another reported loss of a million more subscribers in Q2 2022 came in July 2022. Netflix put this loss down to increasing competition from other streaming services, while also pointing the finger at inflation.

However, could the cause really be related to the streaming service's rising prices given that

- in the US, a Standard plan went from \$14 in January 2022 to \$15.49 in July 2022
- in the UK, a Standard plan went from £6.99 in January 2022 to £10.99 in July 2022.

Table 5: Netflix's total global subscriber base at the end of each year from 2011 to 2022

Year	Number of subscribers (millions)
2011	21.50
2012	25.71
2013	35.63
2014	47.99
2015	62.71
2016	79.90
2017	99.04
2018	124.35
2019	151.56
2020	192.95
2021	209.00
2022	220.60

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Source information (source available at the time of writing)

Data source A adapted from:

<https://www.bbc.co.uk/news/business-66156713>

<https://www.statista.com/statistics/802196/full-time-annual-salary-in-the-uk-by-age-group/>

Data source B adapted from:

© Euronews

<https://www.euronews.com/next/2023/07/22/average-working-hours-in-europe-which-countries-work-the-longest-and-shortest-weeks>

© worldpopulationreview.com

<https://worldpopulationreview.com/>

Data source C adapted from:

Working from home UK 2020 | Statista

<https://www.statista.com/statistics/312345/working-from-home-in-the-united-kingdom-levels-employed-uk-y-on-y/>

Provisional UK greenhouse gas emissions national statistics 2022 - GOV.UK (www.gov.uk)

Data source D adapted from:

https://www.ofcom.org.uk/__data/assets/pdf_file/0016/242701/media-nations-report-2022.pdf

Data source E adapted from:

<https://variety.com/2022/digital/news/streaming-tv-titles-us-nielsen-1235226336/>

Data source F adapted from:

© Rob Binns/Independent Digital News & Media Ltd

<https://www.independent.co.uk/advisor/vpn/netflix-statistics>

Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				

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Thursday 15 May 2025

Afternoon (Time: 1 hour 40 minutes) **Paper reference** **7MC0/01**

Mathematics in Context

PAPER 1: Comprehension



You must have: Ruler graduated in centimetres and millimetres, pen, HB pencil, eraser, calculator. Source booklet (enclosed)

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- **Calculators may be used.**

Information

- The total mark for this paper is 60
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

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SECTION A

Answer ALL questions. Write your answers in the spaces provided.

EMPLOYMENT

Refer to **data source A** in the source booklet for Question 1.

- 1 (a) Between which two consecutive years did the median annual earnings for employees aged 30 to 39 years first fall below the median annual earnings for employees aged 50 to 59 years?

(1)

- (b) Which age group showed the largest increase in median annual earnings between 2021 and 2022?

Use Figure 1 in the source booklet to justify your answer.

(2)

- (c) Calculate an estimate for the median annual earnings for full time employees aged 22 to 29 years in the UK in 2023.

(3)

(Total for Question 1 is 6 marks)

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Refer to **data source B** in the source booklet for Questions 2 and 3.

- 2 (a) Which of the graphs shown in Figure 2 in the source booklet shows the strongest correlation?
Give a reason for your answer.

(1)

Julie says that when comparing the average monthly net wage of European countries, using the median rather than the mean is more reliable.

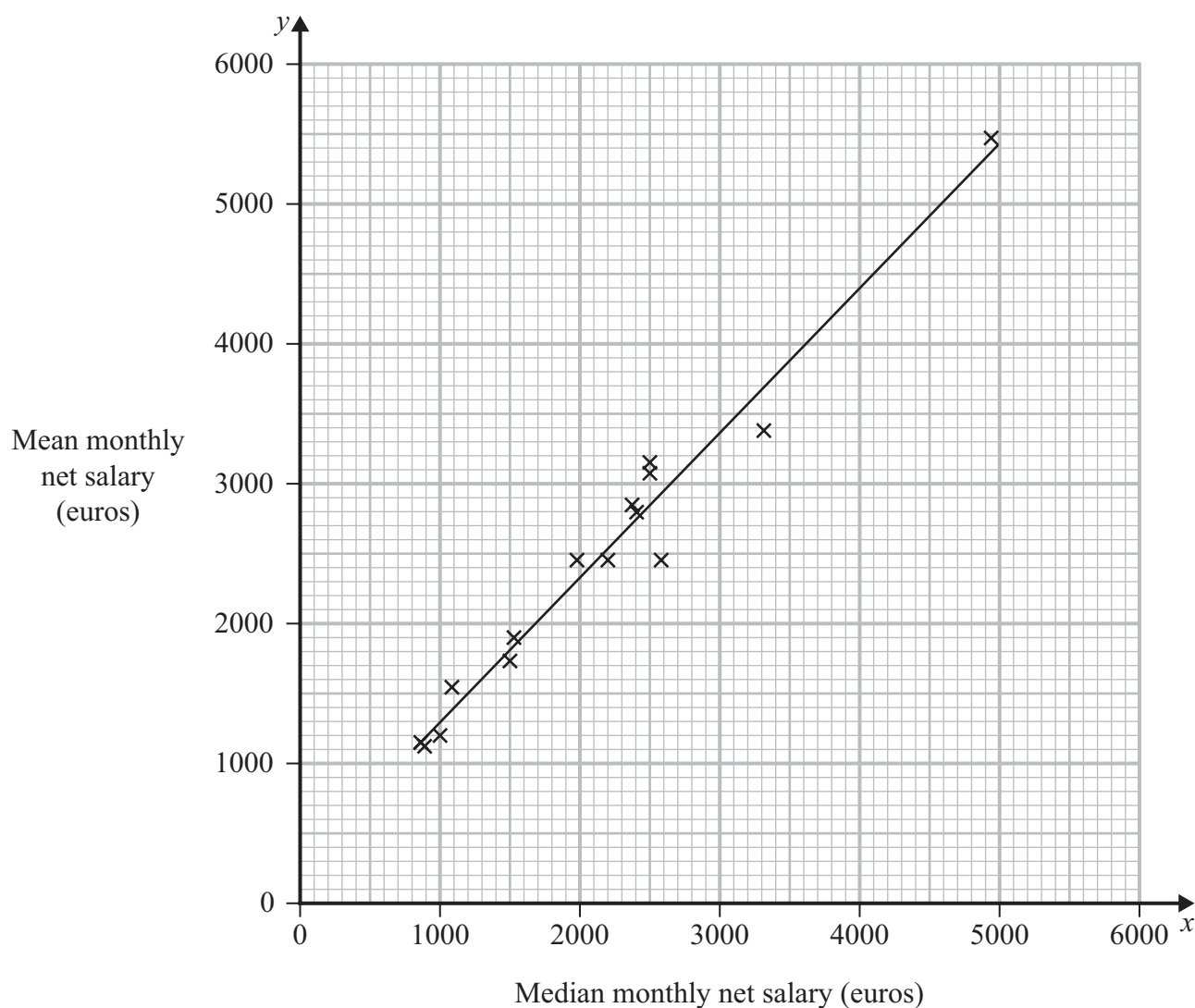
- (b) Give a reason why Julie is correct.

(1)



The scatter graph shows data about the median monthly net salary (euros) and the mean monthly net salary (euros) for the countries shown in Table 1 in the source booklet.

The line of best fit has been drawn on the scatter graph.



The line of best fit has the equation $y = mx + c$

(c) Use the graph to find the value of m and the value of c .

(4)



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(Total for Question 2 is 6 marks)



- 3 Let x be the average number of hours worked per week.
Let y be the productivity, in terms of GDP, in US\$ per hour worked.

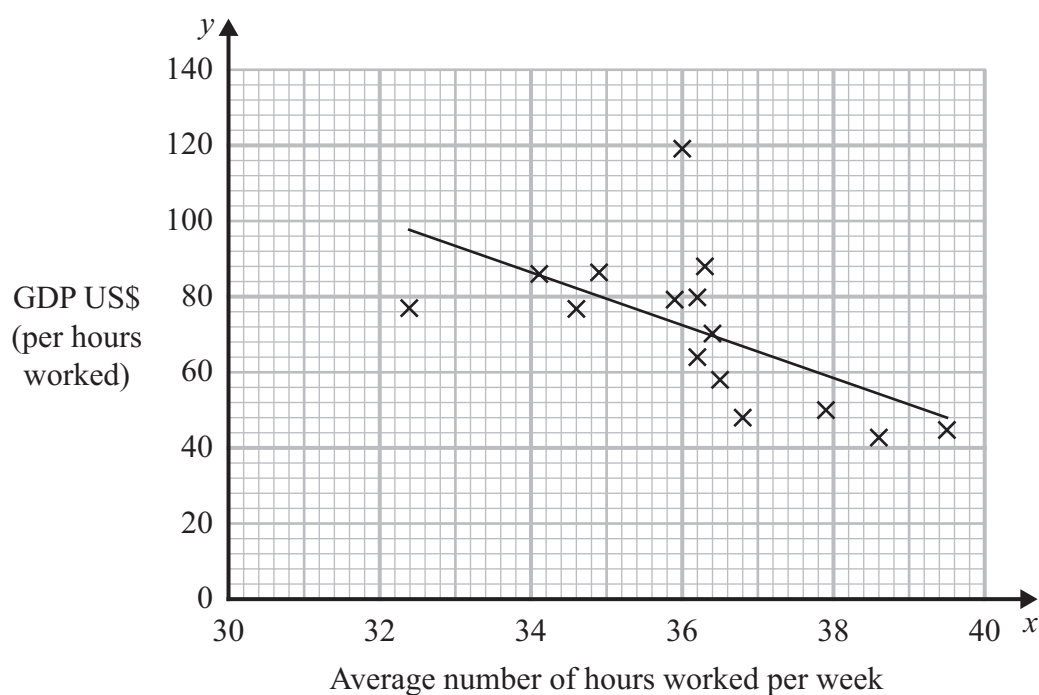
For the data in Table 1 in the source booklet,
the equation of the regression line of y on x is $y = 322 - 6.95x$

- (a) Explain how the gradient of this equation supports the theory that productivity increases when fewer hours are worked.

(1)

The scatter graph shows this data for the countries given in Table 1 in the source booklet.

The regression line with equation $y = 322 - 6.95x$ has been drawn on the grid.



Theo decides to recalculate the equation of the regression line for y on x excluding the data for Ireland.

- (b) Give a reason why excluding the data for Ireland would be suitable.

(1)

Given that for the data in Table 1, excluding Ireland,

$$\sum x = 506.3 \quad \sum y = 951 \quad \sum xy = 34\,099.76 \quad S_{xx} = 43.21 \quad n = 14$$

- (c) show that the equation of the regression line of y on x excluding Ireland can be written as

$$y = 313 - 6.77x$$

(5)

With the data for Ireland,
the equation of the regression line of y on x is $y = 322 - 6.95x$

Without the data for Ireland,
the equation of the regression line of y on x is $y = 313 - 6.77x$

For 2022 in Greece,
the average number of hours worked per week was 39.7
the productivity was 37.4 US\$ per hour worked.

- (d) Which of the regression lines above is a better fit for the data for Greece?
Justify your answer.

(3)

(Total for Question 3 is 10 marks)



Refer to **data source C** in the source booklet for Question 4.

- 4 The table shows the data from Table 2 in the source booklet ordered by the number of people mainly working from home.

Year	Number of people mainly working from home (millions)	Carbon dioxide emissions from the transport sector (MtCO ₂ e)		
2010	3.670	124.0		
2009	3.679	125.6		
2011	3.698	121.7		
2012	3.800	120.6		
2013	3.998	119.3		
2014	4.202	120.7		
2015	4.351	122.8		
2017	4.378	125.5		
2016	4.388	125.4		
2018	4.481	123.9		
2019	4.607	121.9		
2020	5.641	98.3		

- (i) Calculate Spearman's rank correlation coefficient for the number of people mainly working from home and the carbon dioxide emissions from the transport sector.

(6)



It is claimed that there is a causal relationship between the number of people who mainly work from home and the carbon dioxide emissions from the transport sector.

- (ii) Does your answer to part (i) support this claim?
Give a reason for your answer.

(1)

- (iii) Write down another factor that could influence carbon dioxide emissions from the transport sector.

(1)

(Total for Question 4 is 8 marks)
(Total for EMPLOYMENT is 30 marks)

TOTAL FOR SECTION A IS 30 MARKS



SECTION B

Answer ALL questions. Write your answers in the spaces provided.

TV VIEWING

Refer to **data source D** in the source booklet for Question 5.

- 5 (a) (i) What was the average total time people spent watching TV and video content across all devices in 2020?

(2)

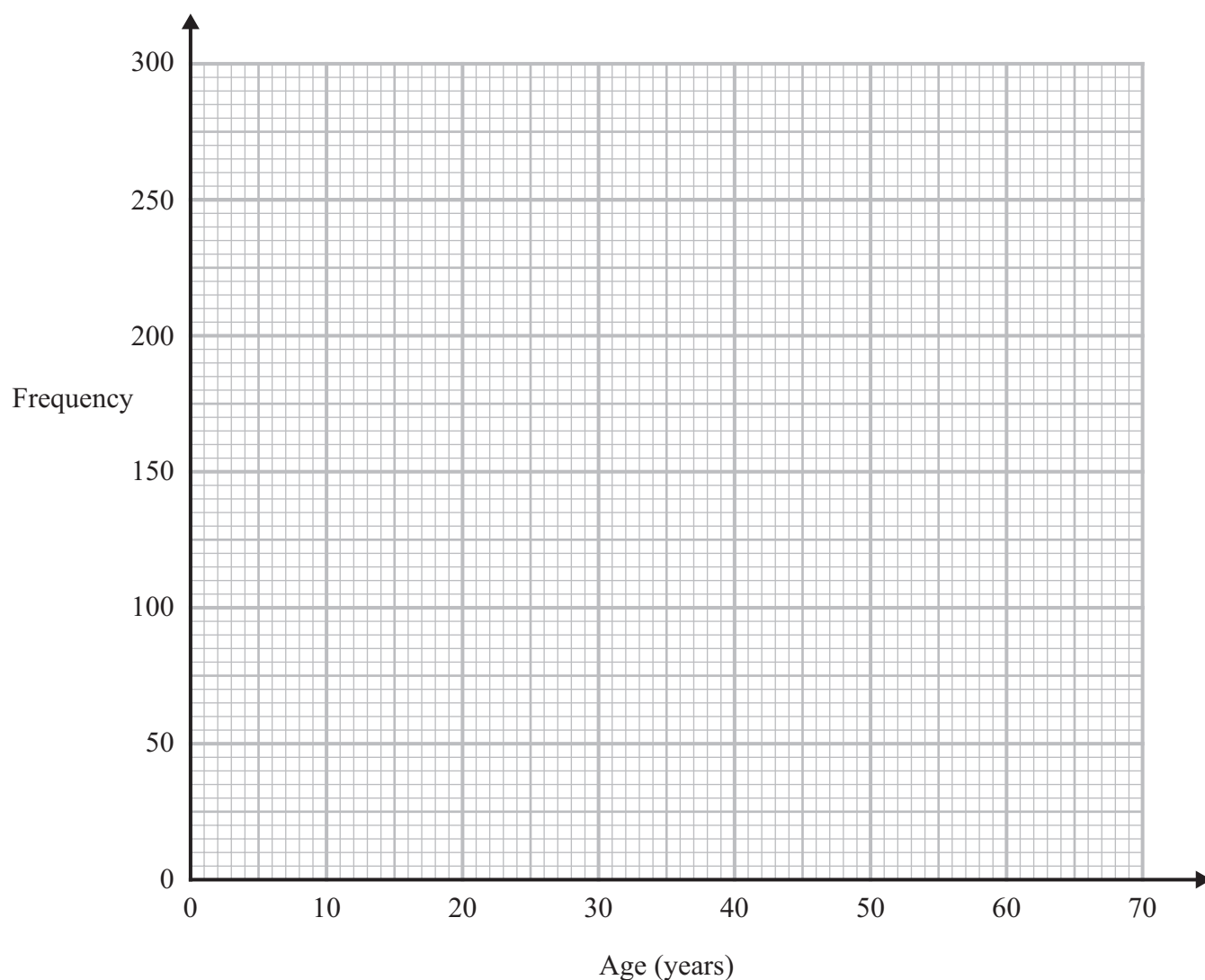
The article claims that more than 18% of total viewing time was spent watching SVoD in 2020.

- (ii) Show that this claim is correct.

(2)

(b) Draw a frequency polygon for the information in Table 3 in the source booklet.

(2)



For people aged 65 years and over,
the average time spent viewing broadcast TV per day was 336 minutes.

(c) Show that this average time is more than 6 times the average time spent viewing
broadcast TV by people aged 16 to 24 years.

(1)



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- (d) (i) Calculate an estimate for the total number of households in the UK.
Give your answer correct to 3 significant figures.

(3)

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Alan wants to use a spreadsheet to calculate an estimate for the number of households subscribing to each of the providers shown in Table 4 in the source booklet.

	A	B	C
1	Provider	Percentage of all UK households with subscription	Estimated number of UK households (in millions, correct to 1dp)
2	Netflix	60	
3	Amazon Prime Video	47	
4	Disney+	23	
5	Now	7	
6	Apple TV+	6	
7	Other	6	

(ii) Write down a suitable formula for cell C2 in terms of B2

(2)

(iii) Calculate the value of cell C2

(1)

(Total for Question 5 is 13 marks)



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Please turn over for Question 6



Refer to **data source E** in the source booklet for Question 6.

- 6 (a) (i) Complete the table.

(1)

Monthly spend on video streaming services (US\$)	Percentage of the population surveyed	Cumulative percentage
$0 \leq m < 5$	5	
$5 \leq m < 10$	11	
$10 \leq m < 15$	16	
$15 \leq m < 20$	15	
$20 \leq m < 30$	21	
$30 \leq m < 50$	17	
$50 \leq m < 60$	15	

- (ii) On the grid opposite, use the information in your completed table to draw a suitable graph to show the cumulative percentages.

(2)

- (b) Find an estimate for the median monthly spend.

(2)

- (c) Find an estimate for the interquartile range of the monthly spend.

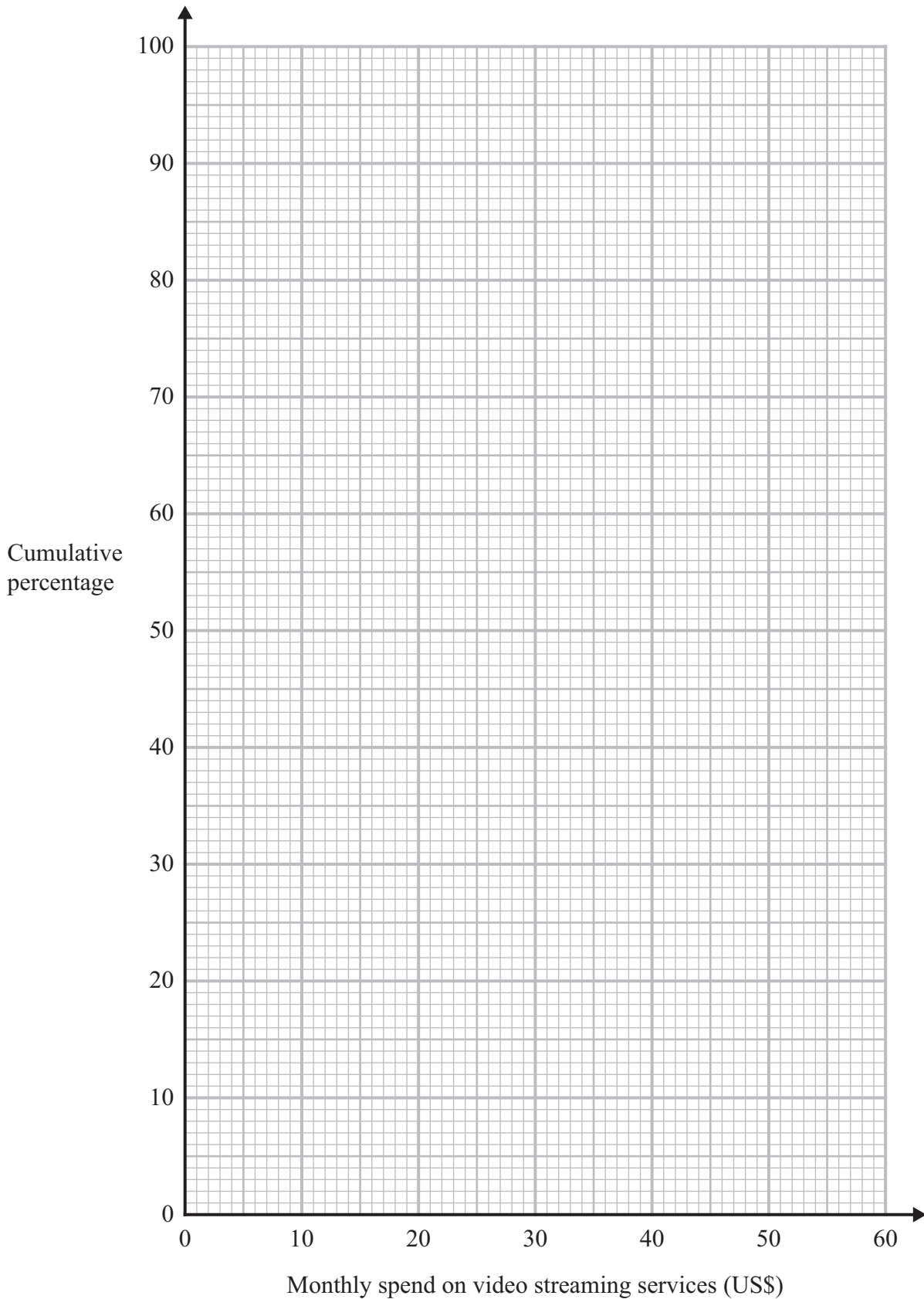
(2)



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(Total for Question 6 is 7 marks)



Refer to **data source F** in the source booklet for Question 7.

- 7 In July 2022, Netflix changed the cost of a standard plan.
The exchange rate in July 2022 was 1 US\$ = £0.832

- (a) (i) Compare the cost of a standard plan in the UK with the cost of a standard plan in the US in July 2022.

(2)

For January 2022 to July 2022,

- (ii) compare the percentage change in the cost (£) of a standard plan in the UK with the percentage change in the cost (US\$) of a standard plan in the US.

(3)



Trevor is writing an article.

He wants to model the growth of Netflix subscriptions.

Trevor suggests a model where the number of subscribers grows globally at a constant rate of $x\%$ each year from the end of 2022.

Using this model, Trevor predicts that the number of subscribers will first exceed 300 million by the end of 2028.

- (b) (i) Calculate the value of x .
Give your answer correct to 2 decimal places.

(3)

- (ii) State **two** assumptions that Trevor must make to ensure his model is valid.

(2)

(Total for Question 7 is 10 marks)
(Total for TV VIEWING is 30 marks)

TOTAL FOR SECTION B IS 30 MARKS
TOTAL FOR PAPER IS 60 MARKS



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