

# Pearson Edexcel Level 3 Certificate

## Mathematics in Context

### Paper 1: Comprehension

Wednesday 18 May 2016 – Morning

**Source booklet**

Paper Reference

**7MC0/01**

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**PEARSON**

## Formulae sheet

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

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

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

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

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

or

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

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

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

or

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

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

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

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

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

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

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

## **SECTION A : CARS**

### **Data source A**

#### **The cost of driving is keeping young people off the road**

Driving lessons, the test itself, buying and insuring a car all add to the expense, but there are ways to limit the damage.

Passing your driving test has long been seen as a rite of passage, but the rising cost of running a car is driving more and more young people off the roads. The Department for Transport's recent National Travel Survey shows a sharp drop over the past 18 years in the number of young people holding a full driving licence. While in 1995, some 43% of 17 to 20 year olds held a full driving licence, that has plunged to just 31%. The fall is sharpest among young men, where it has dropped from 51% to 30%, while the percentage of young women with a full driving licence has slipped from 36% to 31%. Over the same period the proportion of 21 to 29 year olds with full driving licences has also fallen.

The main reason fewer young people are driving is cost, says Stephen Glaister, director at the RAC Foundation. "Younger people were hit disproportionately hard by the downturn. Even though employment is now rising, incomes are stagnant, and many are only in part-time work, and find running a car too expensive."

Spiralling student debt and rising housing costs leave little money for driving lessons, at around £25 an hour, and the test itself. With the practical test costing up to £75, and the theory test adding another £31, the cost of buying a car is the least of the problems facing young drivers. In 1995 a five-year-old Ford Fiesta, a typical first car, cost £3,250, against £5,510 today, according to figures from motoring guide Glass's. That is a rise of nearly 70%, almost exactly in line with the increase in average earnings over the period, says Andrew Jackson, head of analytics at Glass's. "In real terms, the Fiesta isn't any more expensive than it was in 1995, even though the materials, technology and manufacturing quality are incomparably better."

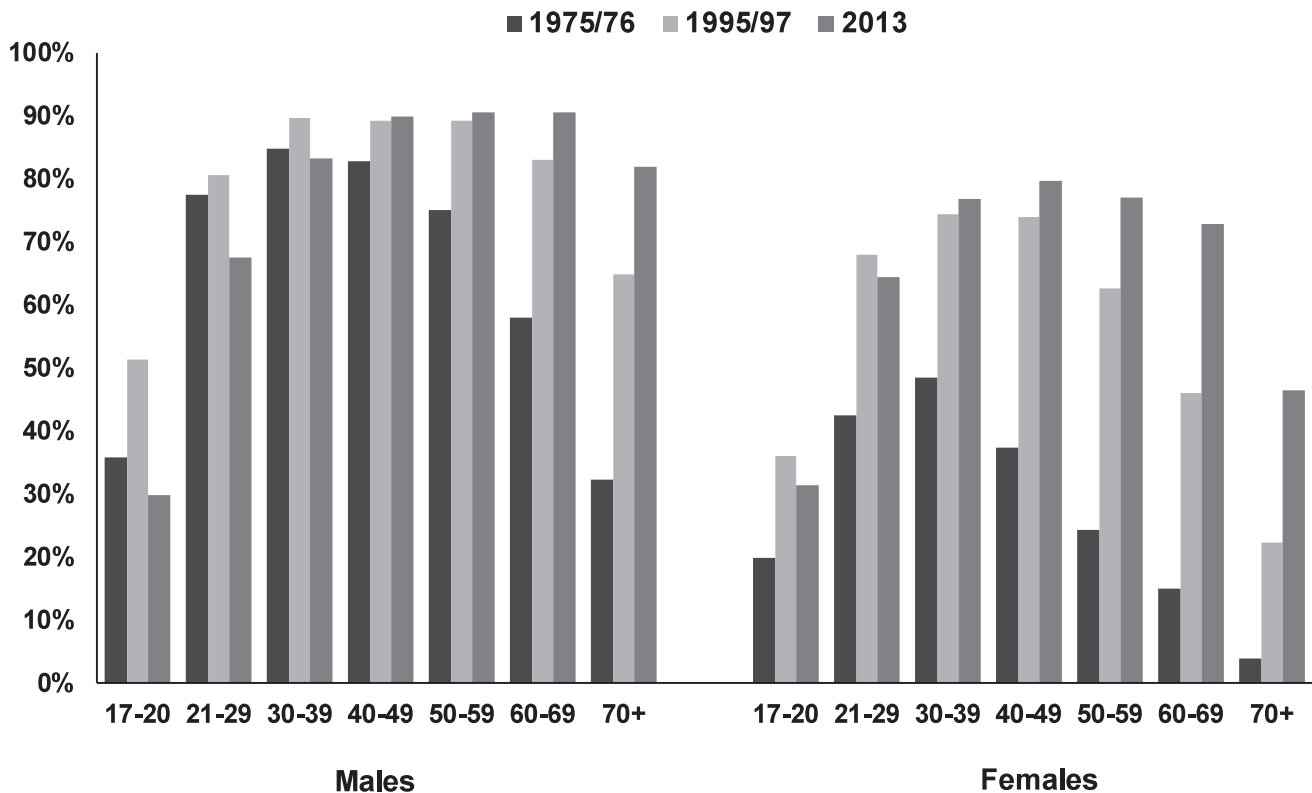
## Data source B

National Travel Survey is abbreviated to NTS throughout this document.

### Driving licence holding

The NTS estimates that 74% of all adults aged 17+ in England held a full car driving licence in 2013 – an estimated 32 million licence holders. Of these, 17 million were men and 15 million were women.

**Chart 18: Full car driving licence holders, by age and gender England: 1975/76 to 2013 [NTS0201]**



Over the long term there has been an increase in the proportion of both men and women holding a full driving licence for most age groups. In 1975/76, overall 69% of men and 29% of women had a licence. In 2013, 81% of men and 68% of women had a licence. While the proportion of men holding a full driving licence remained fairly stable since the early 1990s, the proportion of women with a licence continued to increase – now at its highest level.

### Data source C

Summary data for the lengths and widths of Honda Civic cars and VW Golf cars.

<b>Honda Civic</b>		
<b>Year</b>	<b>Length (inches)</b>	<b>Width (inches)</b>
1973	139.8	59.3
1982	148.0	61.6
1987	150.0	63.9
1990	157.1	66.3
1994	160.2	66.9
1999	164.5	67.1
2003	165.6	66.7
2008	168.1	70.3

<b>VW Golf</b>		
<b>Year</b>	<b>Length (inches)</b>	<b>Width (inches)</b>
1974	145.9	63.4
1983	158.0	65.6
1991	160.4	66.7
1997	163.3	68.3
2003	165.5	69.3
2009	165.3	70.0

**Data source D**

US Cars 1978–1979

<b>Car make and model</b>	<b>Fuel consumption (miles per gallon)</b>	<b>Horsepower</b>
Buick Estate Wagon	16.9	155
Ford Squire Wagon	15.5	142
Chevy Malibu Wagon	19.2	125
Chevette	30.0	68
Dodge Omni	30.9	75
Buick Century Special	20.6	105
Dodge Aspen	18.6	110
AMC Concord D/L	18.1	120
Chevy Caprice Classic	17.0	130
Ford LTD	17.6	129
Mercury Grand Marquis	16.5	138
Dodge St Regis	18.2	135
Ford Mustang 4	26.5	88
Ford Mustang Ghia	21.9	109
AMC Spirit	27.4	80
Buick Skylark	28.4	90
Chevy Citation	28.8	115
Pontiac Phoenix	33.5	90
Plymouth Horizon	34.2	70

non-US Cars 1978–1979

<b>Car make and model</b>	<b>Fuel consumption (miles per gallon)</b>	<b>Horsepower</b>
Toyota Corona	27.5	95
Audio 500	20.3	103
Volvo 240 GL	17.0	125
Saab 99 GLE	21.6	115
Peugeot 694 SL	16.2	133
Mazda GLC	34.1	65
Dodge Colt	35.1	80
VW Scirocco	31.5	71
Honda Accord LX	29.5	68
Datsun 210	31.8	65
Fiat Strada	37.3	69
VW Dasher	30.5	78
Datsun 810	22.0	97
BMW 320i	21.5	110
VW Rabbit	31.9	71



## SECTION B: EDUCATION

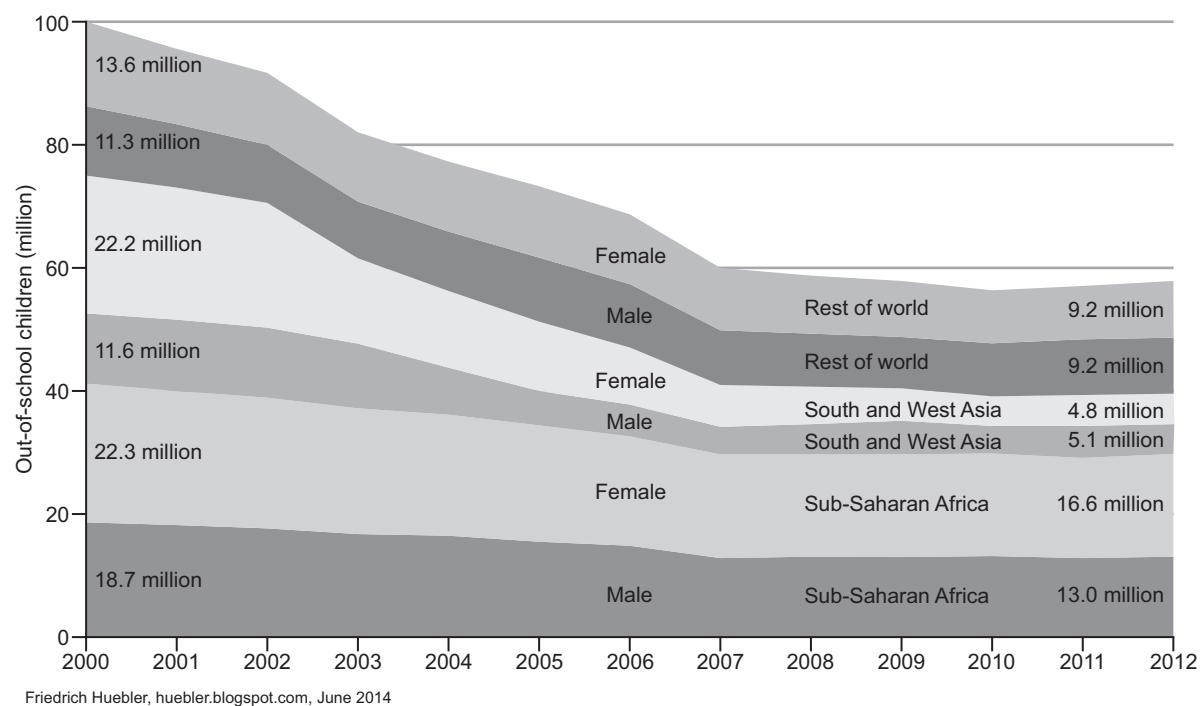
### Data Source E

#### International Education Statistics

#### Out-of-school children of primary school age, 2000–2012

The Education for All goal and Millennium Development Goal of universal primary education by 2015 is the most prominent international goal in the field of education. Over the past years it has become increasingly apparent that the world will not reach this goal by the target year. New statistics, released by the UNESCO Institute for Statistics on 26 June 2014, confirm that the number of out-of-school children has remained at nearly the same level since 2007.

**Figure 1: Out-of-school children of primary school age, 2000–2012**



## Data source F

Country	Indicator   Number of pupils per teacher													
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Mexico	14.18	14.19	14.07	14.22	14.09	14.92	14.98	14.96	15.11	15.15	15.02	15.77	15.75	15.84
Myanmar	37.92	39.69	36.01	34.98	36.86	33.00	33.11	32.47	28.36	29.90	29.70	28.30	..	..
New Zealand	13.35	13.47	13.39	..	11.87	11.18	14.14	14.29	14.50	14.21	13.77	14.19	13.94	13.92
Palestine	19.24	25.13	24.04	25.79	22.08	24.78	26.64	22.49	20.70	20.93	20.14	20.40	18.42	17.81
Panama	14.79	14.69	14.97	14.74	..	14.77	14.67	14.76	14.37	13.95	12.80	13.19	12.72	12.77
Portugal	..	8.74	9.02	8.28	8.05	6.20	..	6.07	6.93	6.52	6.39	6.83	6.98	7.30
Education For All Regions	..	..	..	..	..	..	..	..	..	..	..	..	..	..
World	16.15	16.50	17.14	17.05	16.65	16.77	16.58	16.53	16.00	15.84	15.80	15.67	15.96	15.95
Developed countries	12.89	12.60	12.71	12.87	12.86	12.76	12.55	12.54	12.40	12.46	12.24	12.23	12.24	12.23
Developing countries	19.09	19.95	20.97	20.41	19.50	19.63	19.30	19.07	18.13	17.71	17.68	17.38	17.71	17.67
Countries in transition	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Arab States	13.12	13.24	13.49	13.68	14.36	14.65	14.22	13.63	..	..	..	..	..	..
Central and Eastern Europe	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Central Asia	..	..	..	..	..	..	..	..	..	..	..	..	..	..
East Asia and the Pacific	15.13	16.02	17.79	17.62	16.09	16.59	16.89	17.02	15.89	15.74	15.80	15.71	16.29	16.09
Latin America and the Caribbean	17.04	17.74	18.17	17.20	16.03	15.72	15.29	15.60	15.71	15.13	14.59	14.24	14.06	13.99
North America and Western Europe	12.74	12.48	12.59	12.83	12.81	12.92	12.77	12.78	12.64	12.76	12.52	12.52	12.60	12.63
South and West Asia	29.43	29.74	29.56	27.52	27.32	27.40	25.79	24.79	23.41	22.41	21.36	20.92	20.94	20.99
Sub-Saharan Africa	..	..	..	..	..	23.73	24.15	22.57	21.62	20.28	27.26	22.94	22.82	..

## Data source G

Indicator	Jobs				Education			Health		Life Satisfaction		Work-Life Balance	
	Employment rate	Job security	Long-term unemployment rate	Personal earnings	Educational attainment	Student skills	Years in education	Life expectancy	Self-reported health	Life satisfaction	Employees working very long hours	Time devoted to leisure and personal care	
Unit	Percentage	Percentage	Percentage	US Dollar	Percentage	Average score	Years	Years	Percentage	Average score	Percentage	Hours	
<b>Country</b>													
Australia	72	4.8	1.08	50449	76	512	19.4	82.1	85	7.3	14.02	14.41	
Austria	72	3.9	1.19	45199	83	500	17	81	69	6.9	7.61	14.46	
Chile	62	4.4	1.59	22101	57	436	16.5	78.9	59	6.7	15.42	14.41	
Denmark	73	5.6	1.78	48347	78	498	19.4	80.1	72	7.5	2.03	16.06	
Estonia	68	5.2	3.82	18944	90	526	17.5	76.5	54	5.6	3.3	14.9	
Finland	69	6.9	1.73	40060	85	529	19.7	80.7	65	7.4	3.58	14.89	
France	64	6.5	3.99	40242	73	500	16.4	82.1	67	6.5	8.15	15.33	
Greece	49	12.2	18.39	25503	68	466	18.6	80.7	74	4.8	6.16	14.91	
Japan	72	2.4	1.67	35405	94	540	16.3	83.2	30	5.9	22.26	14.93	
Mexico	61	4.9	0.08	16193	37	417	14.4	74.6	66	6.7	28.83	13.89	
Netherlands	74	4.5	2.4	47590	73	519	18.7	81.2	76	7.3	0.45	15.44	
Norway	75	3.1	0.32	50282	82	496	17.9	81.5	76	7.4	2.82	15.56	
Portugal	61	8.6	9.11	23688	38	488	17.6	80.5	46	5.1	9.62	14.95	
United Kingdom	71	5.2	2.77	41192	78	502	16.4	81	74	6.8	12.7	14.83	
United States	67	5.9	1.91	56340	89	492	17.2	78.7	88	7.2	11.3	14.27	

Data extracted on 31 May 2015 16:49 UTC (GMT) from OECD.Stat

## Source information

Data source A is taken from:

<http://www.theguardian.com/money/blog/2014/sep/16/cost-driving-young-people-off-road>  
Motoring  
Money blog

Data source B is taken from:

Department of Transport  
National Travel Survey 2013

Data source C is taken from:

<http://oppositelock.jalopnik.com/graph-of-car-size-increases-over-the-years-508901988>

Data source D is taken from:

The Data and Story Library (adapted)  
<http://lib.stat.cmu.edu/>

Data source E is taken from:

UNESCO Institute for Statistics, June 2014.

Data source F is taken from:

<http://data.uis.unesco.org/>

Data source G is taken from:

<http://stats.oecd.org/>

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