

Y9 DECEMBER ASSESSMENT

Non-Calculator

Time allowed: 50 mins

SOLUTIONS

Name:..... Form:.....

1 Complete the sentences with the words **primary** and **secondary**.

- a If I were collecting data about the number of brothers and sisters of all 15-year-olds in Great Britain, I would use the internet and collect secondary data.
- b If I were collecting data about the number of brothers and sisters of people in my class, I would collect primary data.

(1 mark)

2 Which is bigger – the reciprocal of 10 or 10^0 ? Show your working.

$$\frac{1}{10} = 0.1$$

$$\frac{1}{10^0} = \frac{1}{1} = 1$$

Reciprocal of 10^0 bigger

.....
(1 mark)

3 a Find the next two terms in this sequence.

0, 5, 5, 7, 12, 9, 21, 11, 32, 13, 45

b Find the 5th term in the sequence where the n th term = $3n^2 + 7$

$$3 \times 5^2 + 7$$
$$= 3 \times 25 + 7$$

.....
82

(3 marks)

- 4 The information given in the stem and leaf diagram below shows the amount of money in the pockets of 15 boys in Year 9 before lunch last Tuesday.

0	50	95	
1	45	80	92
2	00	05	30 30
3	10	18	50
4	30	45	62

where 4|30 represents £4.30

Find the median amount of money in the boys' pockets.

£ 2.30.....

(1 mark)

- 5 Solve this pair of inequalities.

$$3n + 4 > -2 \quad \text{AND}$$

$$6 - 2n \geq 4$$

$$3n > -6$$

$$6 \geq 4 + 2n$$

$$n > -2$$

$$2 \geq 2n$$

$$1 \geq n$$

$$\text{.....} \underline{-2 < n \leq 1}$$

(4 marks)

6 Evaluate

a $64^{\frac{1}{2}} = \sqrt{64}$

8

b $(\frac{5}{8})^2 = \frac{5^2}{8^2}$

$\frac{25}{64}$

c $\frac{3^4 \div 3^3}{(3^2 + 3^5 \div 3^3)} = \frac{3^1}{3^2 + 3^2} = \frac{3}{9+9}$
 $= \frac{3}{18} = \frac{1}{6}$

$\frac{1}{6}$

(4 marks)

7 Multiply out and simplify these expressions

a $(x+2)(x+4)$

$$= x^2 + 4x + 2x + 8$$

$$= x^2 + 6x + 8$$

$x^2 + 6x + 8$

b $(m-5)^2$

$$= (m-5)(m-5)$$

$$= m^2 - 5m - 5m + 25$$

$$= m^2 - 10m + 25$$

$m^2 - 10m + 25$

(4 marks)

8 The level crossing is monitored for a day.

This table summarises the length of time that the level crossing is closed.

Time (t minutes)	Frequency (f)	Midpoint (x)	fx
$0 < t \leq 2$	8	1	8
$2 < t \leq 4$	14	3	42
$4 < t \leq 6$	18	5	90
$6 < t \leq 10$	10	8	80
	<u>50</u>		<u>220</u>

Calculate an estimate of the mean time that the level crossing is closed.

$$\frac{220}{50} = \frac{22}{5} = 4.4$$

..... 4.4 minutes (4 marks)

9 Solve these equations.

a $5(2x - 4) = 2(3x + 1)$

$$10x - 20 = 6x + 2$$

$$4x - 20 = 2$$

$$4x = 22$$

$$x = \frac{22}{4}$$

$$x = 5.5$$

b $\frac{3x}{5} = \frac{(2x + 6)}{3}$

$$\frac{9x}{15} = \frac{10x + 30}{15}$$

$$9x = 10x + 30$$

$$x = -30$$

$$x = -30$$

(4 marks)

10 a Write 0.0002517 in standard form.

$$2.517 \times 10^{-4}$$

b Write these numbers in ascending order, leaving your answers in standard form.

$$7.16 \times 10^{-1}$$

$$0.716$$

$$3.61 \times 10^{-2}$$

$$0.0361$$

$$3.6 \times 10^{-2}$$

$$0.036$$

$$3.6 \times 10^{-2}, 3.61 \times 10^{-2}, 7.16 \times 10^{-1}$$

(3 marks)

11 Factorise these expressions.

a $x^2 + 7x - 8$

$$(x + 8)(x - 1)$$

b $x^2 - 49$

$$(x + 7)(x - 7)$$

(3 marks)

12 The data about the BMI (body mass index) of 70 people in is given in the table below.

BMI	Frequency	Cumulative frequency
$10 \leq d < 14$	1	1
$14 \leq d < 18$	8	9
$18 \leq d < 22$	15	24
$22 \leq d < 26$	16	40
$26 \leq d < 30$	16	56
$30 \leq d < 34$	9	65
$34 \leq d < 38$	5	70

- a Complete the cumulative frequency column.
- b Draw the cumulative frequency curve on the grid provided on the next page.
- c What is the median BMI score?

.....
25
.....

- d What is the interquartile range of the BMI scores?

29-19

.....
10
.....

- e Using the information in the table below and the cumulative frequency graph, find how many people in this survey are

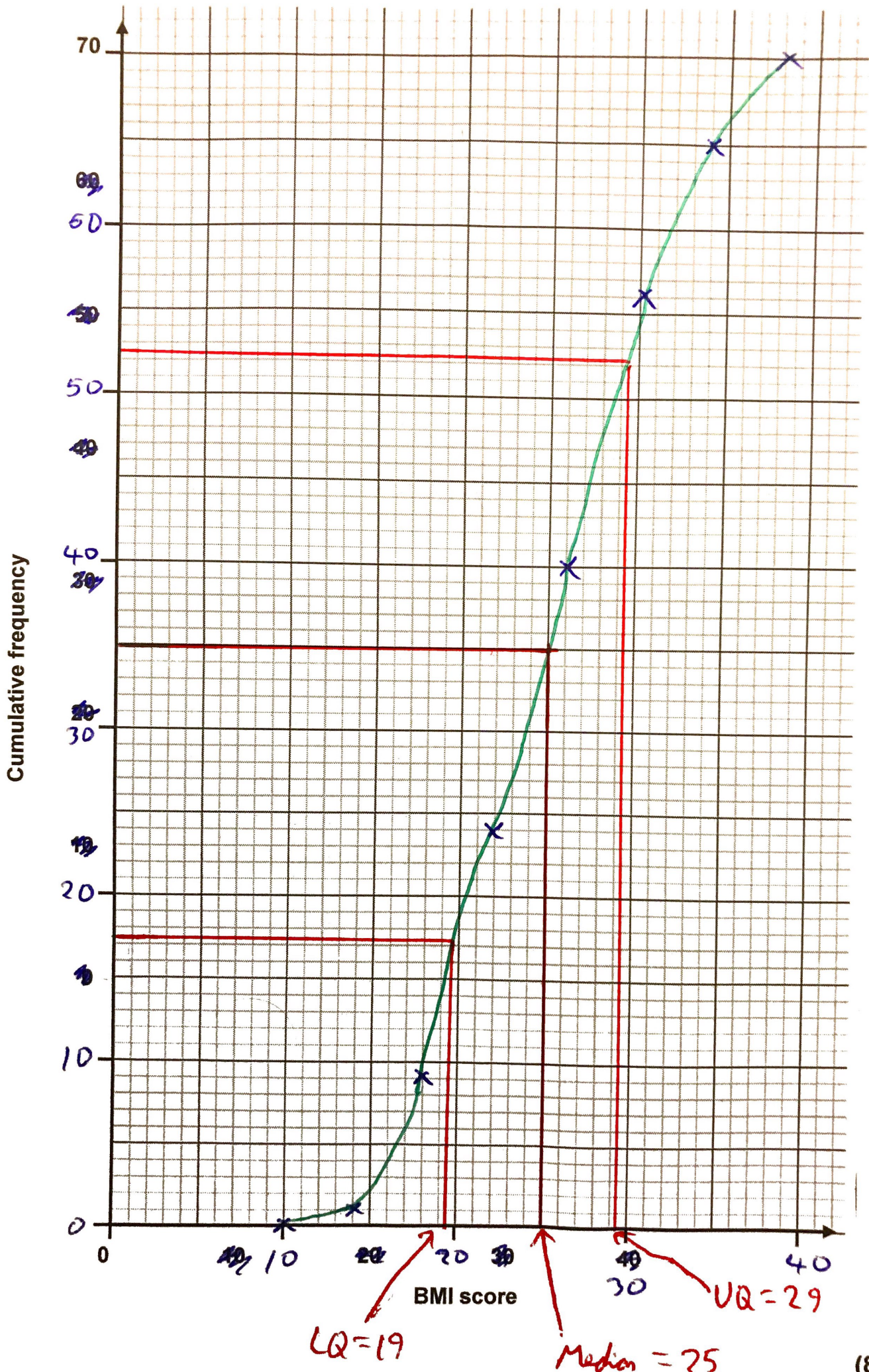
Weight classification	BMI score
very overweight	≥ 30
overweight	25 to 29
healthy	18.5 to 24
underweight	< 18.5

- i underweight

.....
10
.....

- ii very overweight.

.....
5
.....



(8 marks)

13 Change these formulae to make r the subject.

a $A = \pi r^2$

$$r^2 = \frac{A}{\pi}$$

$$r = \sqrt{\frac{A}{\pi}}$$

$$r = \sqrt{\frac{A}{\pi}} \dots\dots\dots$$

b $ar = 3r - 14$

$$ar - 3r = -14$$

$$r(a - 3) = -14$$

$$r = \frac{-14}{a-3} \text{ or } \frac{14}{3-a}$$

$$r = \dots\dots\dots$$

(4 marks)

14 Use some of the numbers in the box below to illustrate the examples of the rules of indices by filling in the gaps. You can use a number more than once.

$\frac{1}{9}$	3	4	5	16	20
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a $x^{\frac{1}{2}} = \sqrt{x}$

$$16^{\frac{1}{2}} = \sqrt{16}$$

$$= 4$$

b $y^{-2} = \frac{1}{y^2}$

$$3^{-2} = \frac{1}{3^2}$$

$$= \frac{1}{9}$$

(2 marks)

15 a Write each of these algebraic fractions with a denominator of $6x$.

$$\text{i } \frac{(7x+2)}{2x} = \frac{3(7x+2)}{6x} = \frac{21x+6}{6x}$$

$$\text{ii } \frac{(5x+1)}{3x} = \frac{2(5x+1)}{6x} = \frac{10x+2}{6x}$$

b Now calculate

$$\frac{(7x+2)}{2x} + \frac{(5x+1)}{3x}$$

$$\frac{21x+6}{6x} + \frac{10x+2}{6x} = \frac{21x+6+10x+2}{6x}$$

$$= \frac{31x+8}{6x}$$

(4 marks)