DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION
Department for Curriculum Management and eLearning
Educational Assessment Unit
**Annual Examinations for Secondary Schools 2013**

**FORM 5**          **MATHEMATICS SCHEME A**          **TIME: 20 minutes**
                    **Non Calculator Paper**

**Name:** _____                    **Class:** _____

Mark

## INSTRUCTIONS TO CANDIDATES

- **Answer all questions. There are 20 questions to answer.**

- **Each question carries 1 mark.**

- **Calculators, protractors and other mathematical instruments are not allowed.**

- **You are not required to show your working. However space for working is provided if you need it.**

| No. | Question | Space for Working |
|-----|----------|-------------------|
| **1** | Work out.<br><br>$4^2 - 2^4 =$ _____ | |
| **2** | Write down the **two prime numbers** between 30 and 40.<br><br>_____ | |
| **3** | **Subtract** 499 from 1000.<br><br>_____ | |
| **4** | If the first of January is a Thursday, what day will the first of February be?<br><br>_____ | |
| **5** | Work out the number of **minutes** in one day.<br><br>_____ minutes | |
| **6** | An aeroplane leaves Malta International Airport at quarter to nine and arrives at Gatwick airport at 11.35 (Malta time). How long does the flight take?<br><br>\_\_\_\_\_ hours \_\_\_\_\_ minutes | |
| **7** | A train travels at a speed of 120 km/h. How long does it take the train to travel 400 km?<br><br>\_\_\_\_\_ hours \_\_\_\_\_ minutes | |
| **8** | The mean of two numbers is 21. The range is 6. Work out the value of the **larger** number.<br><br>_____ | |

| No. | Question | Space for Working |
|-----|----------|-------------------|
| 9 | Write down the **largest** possible **even** number using each of the digits 8, 3, 2 and 1 only once.<br><br>_____ | |
| 10 | Work out the value of<br><br>$$2^3 \times \sqrt{2\frac{1}{4}}$$<br><br>_____ | |
| 11 | Work out the value of<br><br>$20^2 - 19^2$<br><br>_____ | |
| 12 | $a$, $b$ and $c$ are three different **fractions**. Write three possible values of $a$, $b$ and $c$ such that<br><br>$a + b + c = 1$<br><br>$a =$ _____, $b =$ _____, $c =$ _____ | |
| 13 | Work out<br><br>$20 \times 7.28 + 30 \times 7.28 + 50 \times 7.28$<br><br>_____ | |
| 14 | The distance of the earth from the sun is $1.488 \times 10^{11}$ metres. Change this distance to **kilometres**. Give your answer in **standard form**.<br><br>_____km | |
| 15 | Work out the **difference** between 10% of €143 and 10% of €93.<br><br>Difference = €_____ | |

| No. | Question | Space for Working |
|-----|----------|-------------------|
| **16** | Write down the next number as a **decimal number**.<br><br>25%, $\frac{1}{2}$, 0.75, 1, _____ | |
| **17** | Write down the **two roots** of the equation<br><br>$3x^2 = 48$<br><br>$x =$ _____, _____ | |
| **18** | The sides of a rectangle are 8 cm and 6 cm long.<br>Work out the length of a **diagonal** of the rectangle.<br><br>_____ cm | |
| **19** | A pool is filled at the rate of 18 litres per minute.<br>Write this rate in **millilitres per second**.<br><br>_____ ml/s | |
| **20** | 3 burgers and 7 drinks cost €13.<br>8 burgers and 4 drinks cost €9.<br>What is the **total cost** of 1 burger and 1 drink?<br><br>€_____ | |

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**FORM 5**  **MATHEMATICS SCHEME A**  **TIME: 1h 40min**
**MAIN PAPER**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | Main | NC | Total |
|---|---|---|---|---|---|---|---|---|----|----|----|----|------|----|-------|
|   |   |   |   |   |   |   |   |   |    |    |    |    |      |    |       |

**Name:** _____  **Class:** _____

> **Calculators are allowed but the necessary working must be shown.**
> **Answer all questions.**

**1**  Mr and Ms Borg are buying a washing machine during a sale.

Work out the **percentage reduction**.

**SALE**

Washing Machine

**Was €400**

**Now €320**

Percentage reduction = _____%

3 marks

**2**  These four numbers are written in **standard form**.

$7.6 \times 10^{3}$   $1.57 \times 10^{6}$   $9.8 \times 10^{-3}$   $4.9 \times 10^{-2}$

(i)  Write down the **largest** number. _____

(ii)  Write down the **smallest** number. _____

(iii)  Write $4.9 \times 10^{-2}$ as an **ordinary number**. _____

(iv)  **Multiply** $7.6 \times 10^{3}$ by $1.57 \times 10^{6}$. Give your answer in **standard form**.

_____

4 marks

**3** (i) Two triangles are **congruent**. **Underline** the statement that is **true**.

A. The areas of the two triangles are **always** equal.

B. The areas of the two triangles are **sometimes** equal.

C. The areas of the two triangles are **never** equal.

(ii) In the diagram the straight lines PRT and QRS intersect at R. PQ is **parallel** and **equal** to ST. Prove that R is the midpoint of PT.
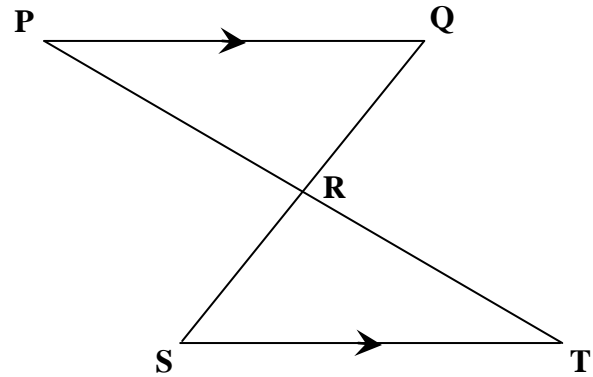


4 marks

**4** The heights of six boys are 1.53 m, 1.49 m, 1.60 m, 1.65 m, 1.90 m and 1.43 m.

(i) Work out the **mean** height of the six boys.

Mean = _____ metres

(ii) Five other boys join the six boys to form a football team. The mean of these five boys is 1.55 m. Work out the **mean** of the eleven boys.
Give your answer correct to **2 decimal places**.

Mean = _____ metres

5 marks

Name: _____      Class: _____

**5**   (i)   The angles of a triangle are $x°$, $y°$ and $z°$. Write a **formula** for $x$ in terms of $y$ and $z$.

$x =$ _____

(ii)   The formula

$$c = \sqrt{a^2 + b^2}$$

is used to find the length of the hypotenuse, $c$, in a right-angled triangle.

(a)   Work out the value of $c$ when $a = 12$ cm and $b = 35$ cm.

$c =$ _____ cm

(b)   Make $a$ the **subject** of the formula.

$a =$ _____

5 marks

**6** A surveyor is 125 metres from the foot of a building. He measures the angle of elevation of the top of the building as 15°. The sighting device is 1.8 metres above ground.
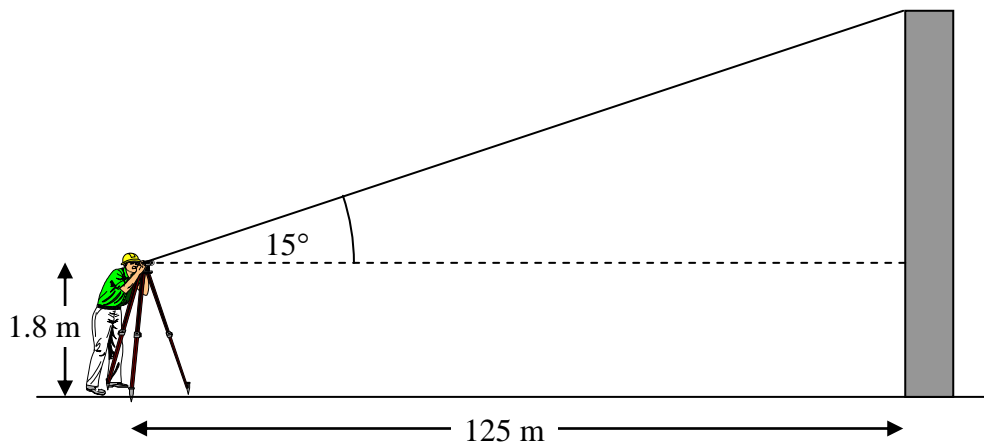


(i) Work out the **height** of the building, correct to **1 decimal place**.




height = _____ metres

(ii) The surveyor moves 30 metres closer to the building. Work out the new **angle of elevation**, correct to the **nearest degree**.




Angle of elevation = _____°

6 marks

Name: _____     Class: _____

**7**   Simplify $\dfrac{1}{2x} + \dfrac{x-3}{x^2 - 2x}$

4 marks

**8**   The functions $f$ and $g$ are defined by

$$f(x) = 3x^2 + 2x \text{ and } g(x) = 3x + 2$$

(i)   Find the value of $x$ for which $f(1) = g(x)$.

$x =$ _____

(ii)   Determine $g^{-1}(x)$.

$g^{-1}(x) =$ _____

(iii)   Find the values of $x$ given that $f(x) = g(x)$.

$x =$ _____

8 marks

**9** (i) Explain why triangles PQR and LMN are similar.
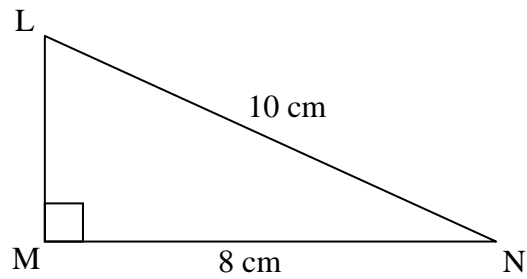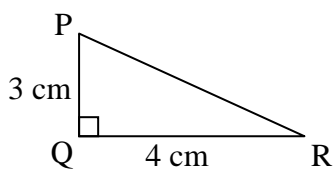


(ii) A water company manufactures two **similar** bottles. The smaller bottle has a volume of 250 ml and the larger bottle has a volume of 2 litres. The height of the smaller bottle is 20 cm. Work out the **height** of the larger bottle.



Height = _____ cm

7 marks

**10** The mass, *M*, of a solid sphere is **directly proportional** to the **cube** of its ra
A sphere with radius 2 cm has a mass of 100 grams. Work out

(i) the **mass** of a sphere whose radius is 1.2 cm

Mass = _____ grams

(ii) the **radius** of a sphere having a mass of 34.3 grams.

Radius = _____ cm

7 marks

**11** (i) Mark says: "For any number *n*, then $n^2$ will always be positive." Is Mark correct? Give a reason for your answer.

_____

_____

(ii) Maria says: "The square root of a number is always smaller than the number." Is Maria correct? Give a reason for your answer.

_____

_____

(iii) Solve: $\begin{array}{l} x^2 + y^2 = 9 \\ x - y + 3 = 0 \end{array}$
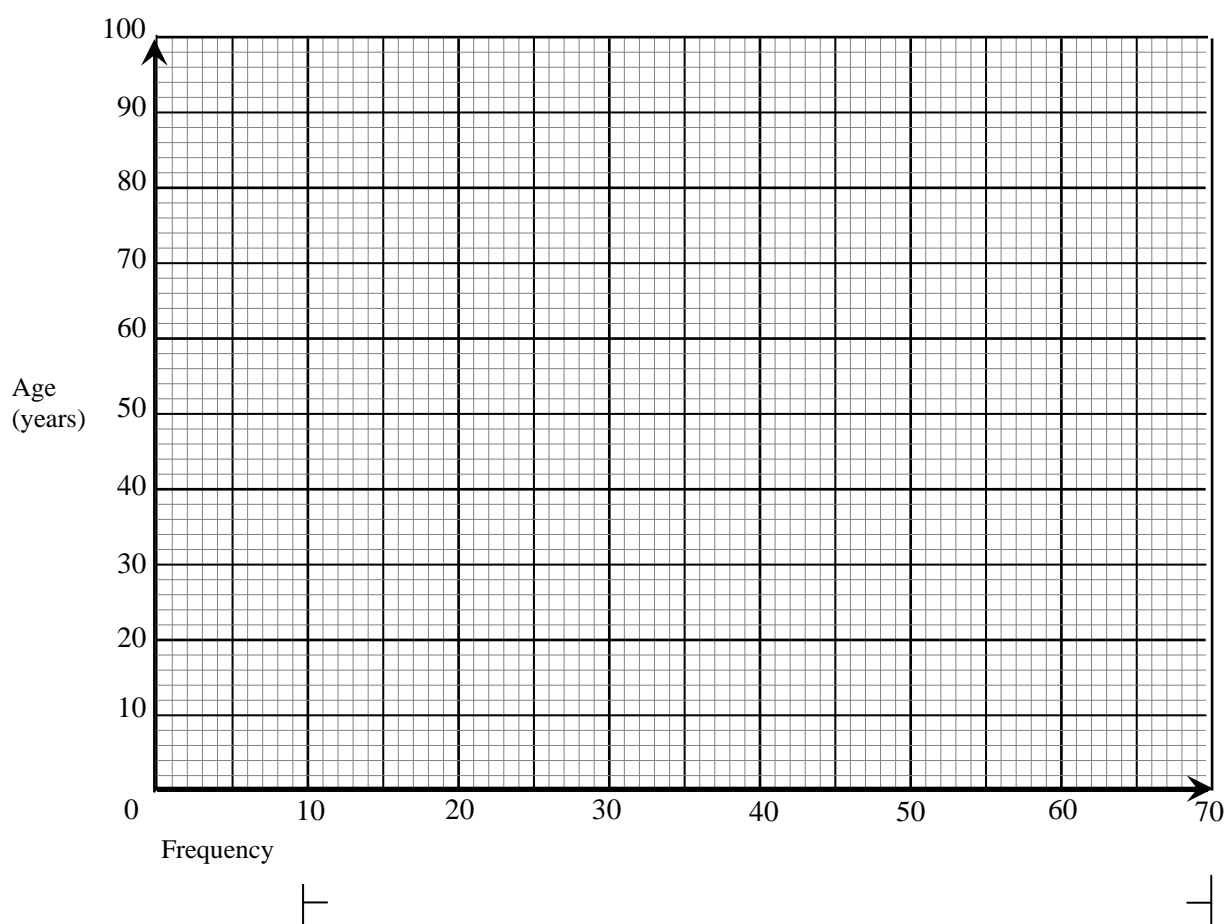
$x =$ _____ , $y =$ _____

8 marks

**12**   The table below shows the ages of people in a basketball club.

(i)   Complete the cumulative frequency table, below on the right.

| Age (years) | Frequency | Age (*y* years) | Cumulative Frequency |
|---|---|---|---|
| 10–19 | 12 | < 10 | 0 |
| 20–29 | 20 | <20 | 12 |
| 30–39 | 32 | <30 | |
| 40–49 | 15 | <40 | |
| 50–59 | 12 | <50 | |
| 60–69 | 5 | <60 | |
| **Total** | **96** | <70 | |

(ii)   On the graph paper (below) draw the **cumulative frequency graph**.
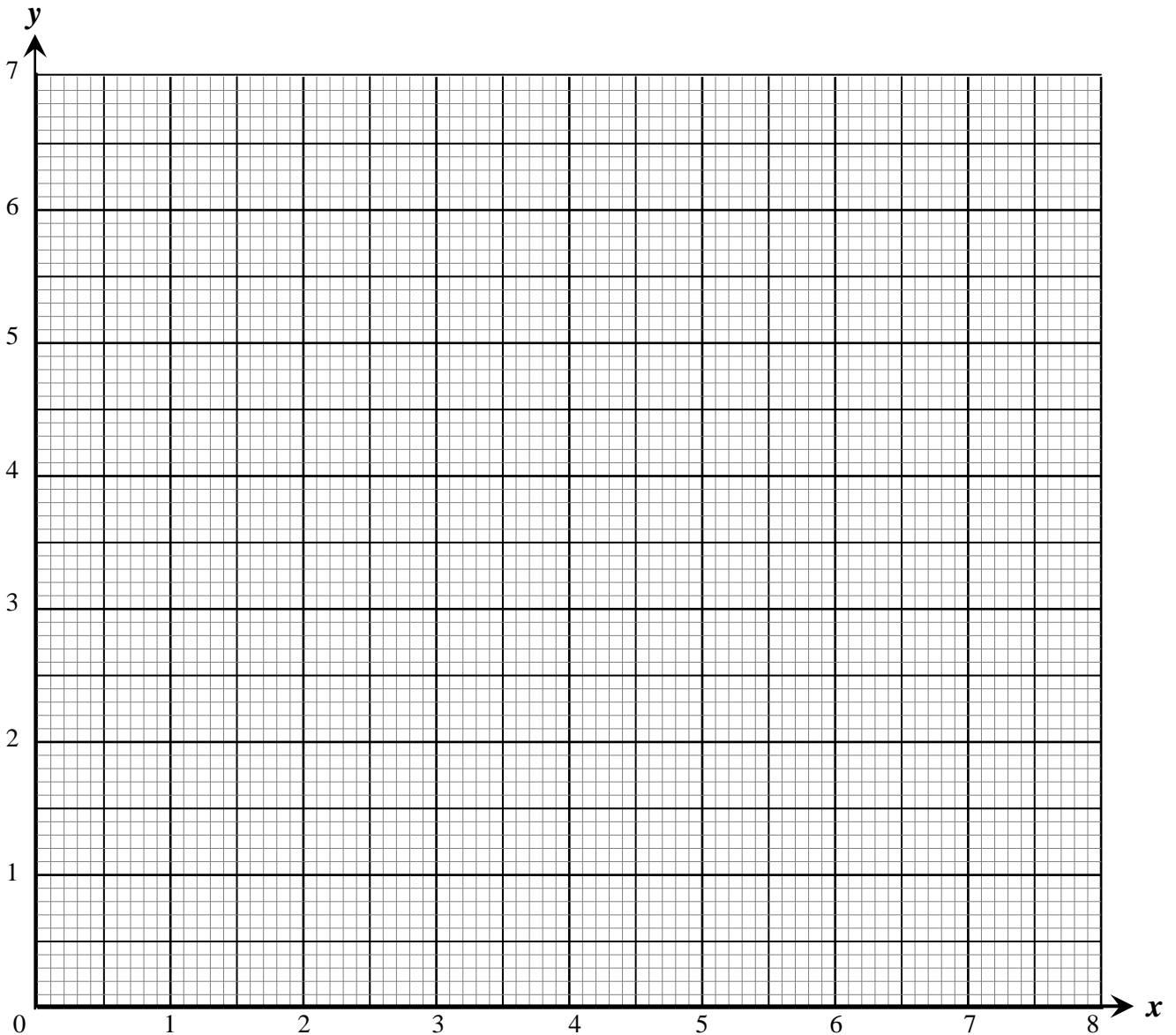


(iii)   Use the graph to complete the **box plot**.

10 marks

**13** (i) Complete the table for $y = \dfrac{12}{x} + x - 6$.

| $x$ | 1 | 1.5 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----|---|-----|---|---|---|---|---|---|---|
| $y$ | 7 |     | 2 | 1 |   |   |   |   |   |

(ii) On the graph paper (below) draw the graph of $y = \dfrac{12}{x} + x - 6$ for values of $x$ from 1 to 8.

**13** (iii) Use the graph to

(a)  find the minimum value of $\dfrac{12}{x} + x - 6$

_____

(b)  find the roots of the equation $\dfrac{12}{x} + x - 8.5 = 0$

$x =$ _____

9 marks

# END OF PAPER