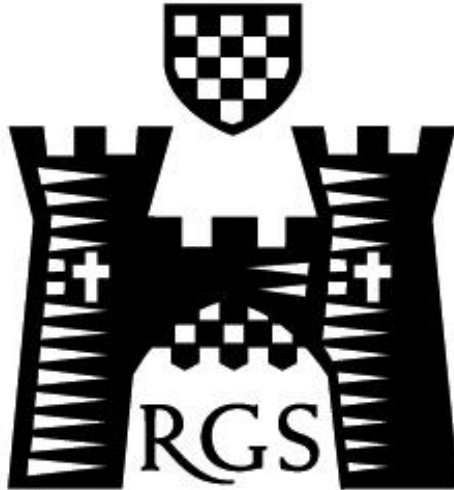# Reigate Grammar School

# 13+ Entrance Examination
# November 2014
## Calculator Paper
# MATHEMATICS

**Time allowed: 45 minutes**

NAME………………………………………………………………………

- Work through the paper carefully
- **You do not have to finish everything**
- Do not spend too much time on any single question
- Show any working in the spaces provided
- Use the blank left hand pages for rough work
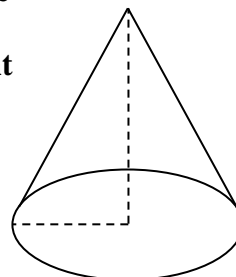- You may use a calculator, but must show sufficient working

**Given that** $a = \sqrt{b^2 - 2c}$, **find**

   **(i)**     $a$ **when** $b = 7$ **and** $c = 12$

..............................  **3**

   **(ii)**    $b$ **when** $a = 10$ **and** $c = $ **-18**

..............................  **4**

**Solve the equations**

   $5x = 2x - (12 - x)$

..............................  **3**

$$\frac{2x}{3} - \frac{x}{2} = 4$$

..............................  **3**

$$\frac{4x}{5} = \frac{8}{9}$$

..............................  **3**

$$\frac{15}{x} = 25$$

  **2**

..............................

You are given that the volume of a cone is
equal to the area of the circular base multiplied by the
height and divided by 3.
Given that the radius of the base is 6cm and the height
is 8cm, find the volume of the cone.

**4**

…………………………...

The cost of 3 pomegranates and 1 quince is £7. This information can be written as

$$3p + q = 7$$

The cost of 2 pomegranates and 2 quinces is £8.  Write down an equation to represent this information.

…………………………..

**2**

Assuming all pomegranates are the same price and all quinces are the same price, find the cost of each pomegranate and each quince.

1 Pomegranate = £…………………………...

1 Quince = £…………………………...

**3**

**Look at the pattern below**

|  |  | TOTAL |  |
|---|---|---|---|
| Row 1 | 1 | = 1 | $= \frac{1 \times 2}{2}$ |
| Row 2 | 1 + 2 | = 3 | $= \frac{2 \times 3}{2}$ |
| Row 3 | 1 + 2 + 3 | = 6 | $= \frac{3 \times 4}{2}$ |
| Row 4 | 1 + 2 + 3 + 4 | = 10 | $= \frac{4 \times 5}{2}$ |

**On the dotted line below complete Row 5**

2

**Row 5…………………………………………………………………………………**

**Which row will have a total of 45?**

2

………………………………

**What is the total of row 100?**

2

………………………………

**A second pattern shows teams in four leagues, where each team in league A plays each team in league B, and each team in league C plays each team in league D.**

| TEAMS | 4 | 8 | 12 |  |
|---|---|---|---|---|
| MATCHES | A1 vs B1 | A1 vs B1 | A1 vs B1 | C1 vs D1 |
|  | C1 vs D1 | A1 vs B2 | A1 vs B2 | C1 vs D2 |
|  |  | A2 vs B1 | A1 vs B3 | C1 vs D3 |
|  |  | A2 vs B2 | A2 vs B1 | C2 vs D1 |
|  |  | C1 vs D1 | A2 vs B2 | C2 vs D2 |
|  |  | C1 vs D2 | A2 vs B3 | C2 vs D3 |
|  |  | C2 vs D1 | A3 vs B1 | C3 vs D1 |
|  |  | C2 vs D2 | A3 vs B2 | C3 vs D2 |
|  |  |  | A3 vs B3 | C3 vs D3 |
| TOTAL | 2 | 8 | 18 |  |

**Each total is obtained by counting the number of matches.**

**What is the TOTAL number of league matches for 16 TEAMS?**

2

………………………………

**What number of TEAMS would there be in a league with a TOTAL of 98 matches?**

2

………………………………

**Give fractions in their lowest terms:**

A shipment of melons contains 20 Galias, 21 Honeydews and 15 Canteloupes. I select a melon at random from the shipment.

   (a) What is the probability that my melon is a Honeydew? ............

   (b) What is the probability that my melon is not a Galia? ............

I eat the first melon. I now select a second melon.

   (c) If my first melon was a Honeydew, what is the probability that my second melon is another Honeydew?

                         ..............

   (d) If my first melon was a Galia what is the probability that my second melon is a Canteloupe?

                         ..............

| Do not write in this box |
| :-: |
| 1 |
| 1 |
| 2 |
| 2 |

---

It is estimated that the population of Uruguay goes up by 1% every year. In January 2014, the population of Uruguay was 3,500,000.

   (i)      What is the expected population of Uruguay in January 2015?

                        ...........................

   (ii)     What is the expected population of Uruguay in January 2018 (nearest whole number)?

                        ...........................

   (iii)    What is the expected population of Uruguay in January 2100 (nearest whole number)?

                        ...........................

| Do not write in this box |
| :-: |
| 2 |
| 3 |
| 3 |

**END OF EXAMINATION**
**IF YOU HAVE TIME, CHECK YOUR WORK**