NON-CALC H

# GCSE Mathematics · Higher Tier

40 marks · 45 minutes · Non-calculator

**Name** ..... **Class** .....

**Answer all questions. Show all your working. Diagrams are NOT accurately drawn unless stated.**

**1** The price of a coat is £80 plus VAT.

VAT is charged at 20%.

In a sale, the price of the coat including VAT is reduced by 15%.

Work out the sale price of the coat.

£ .....

**(Total for Question 1 is 3 marks)**

---

**2** $n$ is an integer.

Write down all the values of $n$ that satisfy $-9 \leqslant 3n - 3 < 6$

.....

**(Total for Question 2 is 2 marks)**

---

**3** Amir and Beth share some stickers in the ratio 5 : 3

Amir then gives 12 of his stickers to Beth.

The ratio of the number of Amir's stickers to the number of Beth's stickers is now 3 : 5

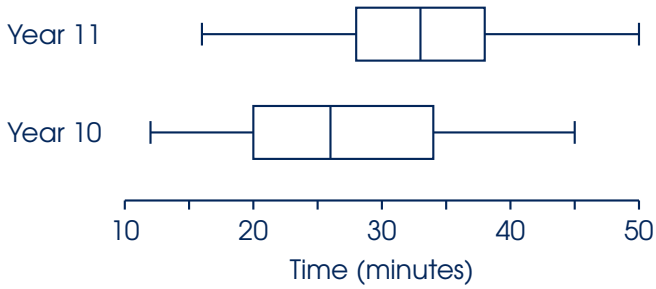
Work out how many stickers Amir had at the start.

.....

**(Total for Question 3 is 3 marks)**

---

**4** The box plots show information about the times, in minutes, that some Year 10 students and some Year 11 students took to complete a puzzle.




**(a)** Compare the distribution of the times for Year 10 with the distribution of the times for Year 11.

.....

.....

**(2)**

**(b)** Ali says,

*"More than half of the Year 11 students took longer than 30 minutes."*

Is Ali correct? Give a reason for your answer.

.....

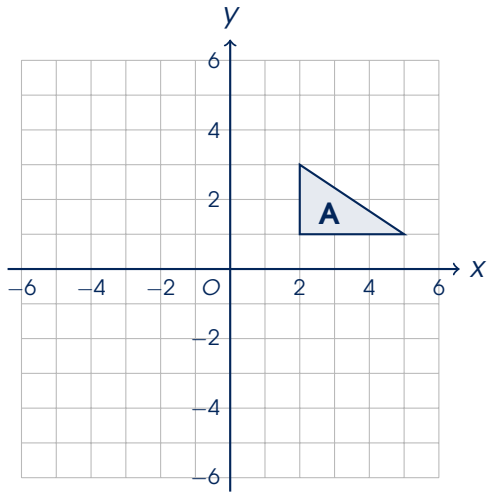
.....

**(1)**

**(Total for Question 4 is 3 marks)**

---

**5** Triangle **A** is drawn on the grid.




**(a)** Rotate triangle **A** 90° clockwise about the origin *O*.
Label the new triangle **B**.

**(2)**

**(b)** Triangle **B** is reflected in the *x*-axis to give triangle **C**.
Describe fully the single transformation that maps triangle **A** onto triangle **C**.

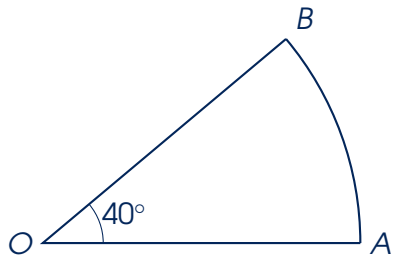
.....

.....

**(2)**

**(Total for Question 5 is 4 marks)**

**6** The diagram shows a sector $OAB$ of a circle, centre $O$.




The angle of the sector is 40°.

The length of the arc $AB$ is $2\pi$ cm.

Work out the perimeter of the sector.

Give your answer in terms of $\pi$.

..... cm

**(Total for Question 6 is 3 marks)**

**7** Here are the first five terms of a sequence.

| 31 | 28 | 21 | 10 | –5 |
|---|---|---|---|---|

The second differences of the sequence are constant.

Find an expression, in terms of $n$, for the $n$th term of the sequence.

.....

**(Total for Question 7 is 3 marks)**

**8** Some identical machines are used to make an order of bottles.

All the machines work at the same rate.

6 machines would take 20 hours to make the whole order.

The 6 machines start making the order. After 5 hours, another 4 of these machines join them.

Work out the total time taken to make the whole order.

..... hours

**(Total for Question 8 is 3 marks)**

---

**9** **(a)** Simplify fully $\sqrt{75} - \sqrt{12}$

.....

**(2)**

**(b)** Show that $\left(5 - \sqrt{3}\right)\left(2 + \sqrt{3}\right) = 7 + 3\sqrt{3}$

**(2)**

**(Total for Question 9 is 4 marks)**

---

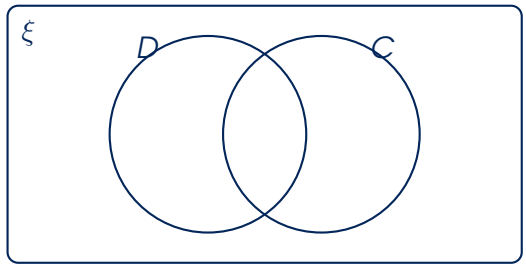
**10** There are 50 people in a club.

28 of the people have a dog. 19 of the people have a cat. 9 of the people have neither a dog nor a cat.

One of the people who have a cat is chosen at random.

Work out the probability that this person also has a dog.

You may use the Venn diagram to help you.




.....

**(Total for Question 10 is 3 marks)**

**11** Make $x$ the subject of $y = \dfrac{3x + 2}{x - 4}$

$x =$ .....

**(Total for Question 11 is 3 marks)**

**12** A circle has equation $x^2 + y^2 = 50$

**(a)** Show that the point $(-1,\ 7)$ lies on the circle.

**(1)**

**(b)** Write down the radius of the circle. Give your answer in the form $a\sqrt{2}$, where $a$ is an integer.

.....

**(1)**

**(c)** Does the point $(6,\ 4)$ lie inside the circle, on the circle or outside the circle? Give a reason for your answer.

.....

.....

**(1)**

**(Total for Question 12 is 3 marks)**

---

**13** Prove algebraically that the product of any two consecutive odd numbers is always 1 less than a multiple of 4

**(Total for Question 13 is 3 marks)**

---

**TOTAL FOR PAPER IS 40 MARKS**