Paper 2 and Paper 3 Predictions

AQA Higher
Very High Chance

Corbettmaths

Ensure you have: Pencil, pen, ruler, protractor, pair of compasses and eraser

You will need a calculator

Guidance

1. Read each question carefully before you begin answering it.
2. Don't spend too long on one question.
3. Attempt every question.
4. Check your answers seem right.
5. Always show your workings

Revision for this test

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1. Kevin is going on holiday to Japan.
He wants to change some money into yen.

The bank only stocks ¥1000 notes.
James wants to change up to £300 into yen.
He wants as many ¥1000 notes as possible.

The exchange rate is £1 = ¥168

How many ¥1000 notes should he get?

.....

(3)

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2. In 2000 the price of a house was £72,600.
By 2010 the price of the house had increased to £125,598

Find the percentage increase in the price of the house from 2000 to 2010.

.....%
(3)

---

3. Charlene and Danielle share some money in ratio 7 : 9
Danielle gets £48 more than Charlie.

How much does each woman receive?

Charlene £.....

Danielle £.....
(3)

---

4. £5200 is invested at 2.8% compound interest per annum.
How many years will it take for the investment to exceed £7000.

.....years
(3)

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5. Lauren is given a 12% pay rise.
Her new salary is £24,080

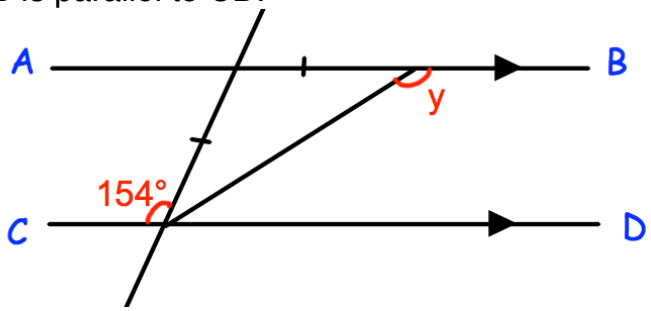
What was Lauren's salary before the pay rise?

£.....

(3)

---

6. AB is parallel to CD.



Work out the size of angle y.
Give reasons for your answer.

.....°

(4)

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7. The diagram shows the position of two people, A and B, who are on their Duke of Edinburgh expedition.

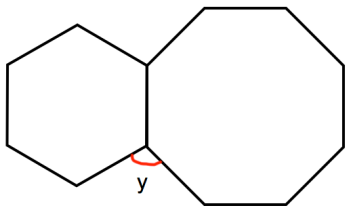
The bearing of person C from person A is 062^0
The bearing of person C from person B is 275^0

In the space above, mark the position of person C with a cross (x). Label it C.

(3)

---

8. Shown is a regular hexagon and a regular octagon.



Calculate the size of angle y.

y = ...^{0}

(3)

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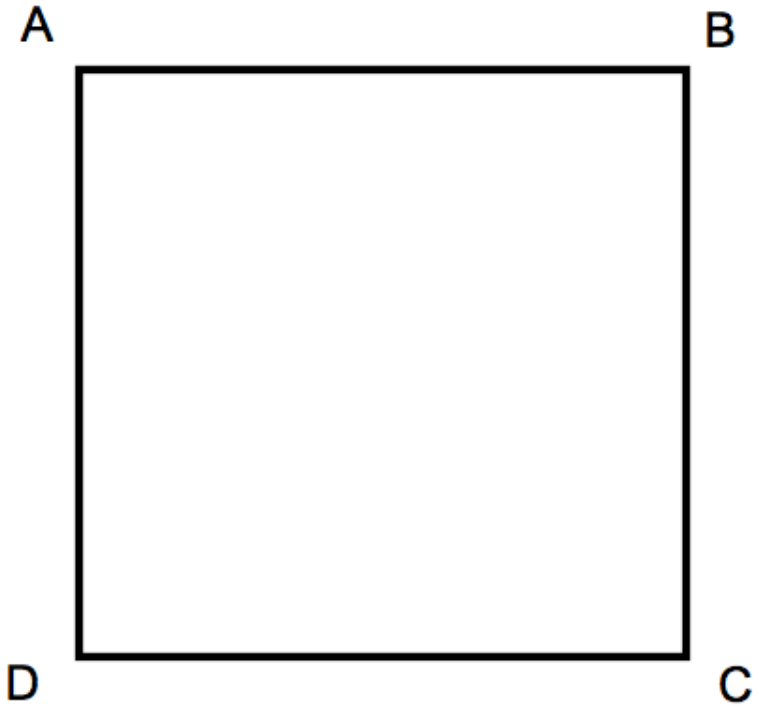
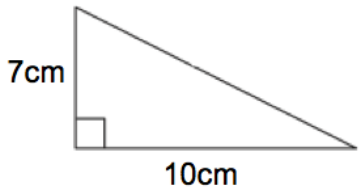
9.



Shade the region inside the rectangle, which is closer to AD that DC, and less that 4cm from D.

(3)

10.



Shown is a right-angled triangle.

Work out the perimeter of the triangle

..... cm

(4)

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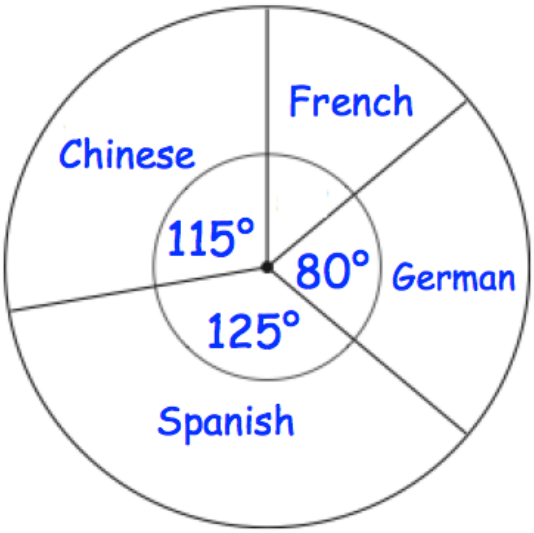
11. The pie chart shows information about the languages studied in a school.
There are 648 students in the school.
Each student studies one language.



How many more students study Chinese than French?

.....

(4)

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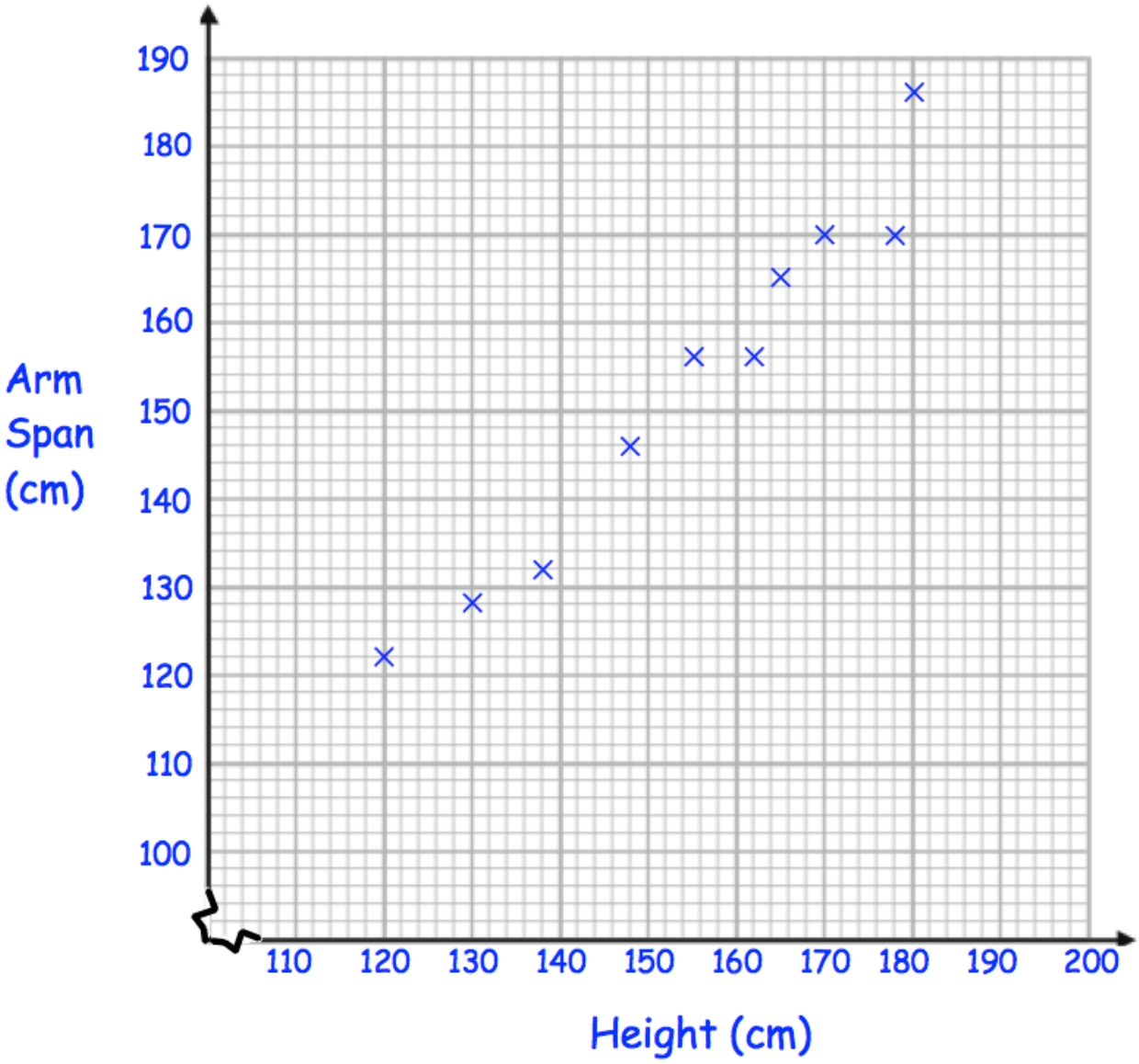
12. The scatter graph shows information about the heights and arm spans of ten students in a school.



(a) What type of correlation does this scatter graph show?

.....

(1)

Another student has a height of 150cm.

(b) Estimate the arm span of this student.

.....cm

(2)

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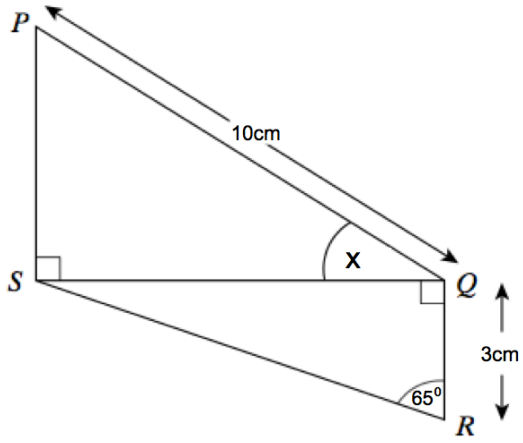
13. Two right-angled triangles are shown below.
PQ is 10cm.
QR is 3cm.
Angle QRS is 65^0



Calculate the size of angle PQS

.....^{0}

(5)

---

14. Timothy asked 30 people how long it takes them to get to school.
The table shows some information about his results.

Time (t minutes)	Frequency
$0 < t \leq 10$	2
$10 < t \leq 20$	8
$20 < t \leq 30$	12
$30 < t \leq 40$	7
$40 < t \leq 50$	1

Work out an estimate for the mean time taken.

.....minutes

(4)

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15. Solve $5(3c - 2) - 7c = 40 - 2c$

c = ...

(3)

---

16. The time taken, t, for passengers to be checked-in for a flight is inversely proportional to the square of the number of staff, s, working.

It takes 30 minutes passengers to be checked-in when 10 staff are working.

(a) Find an equation connecting t and s.

.....

(3)

(b) What is the minimum number of staff that must be working so that the time taken is under 60 minutes?

.....

(3)

---

17. Given that $a = 4$, $b = 9$ and $c = -5$

Work out the value of

$$\frac{ab + 24}{2c}$$

.....

(3)

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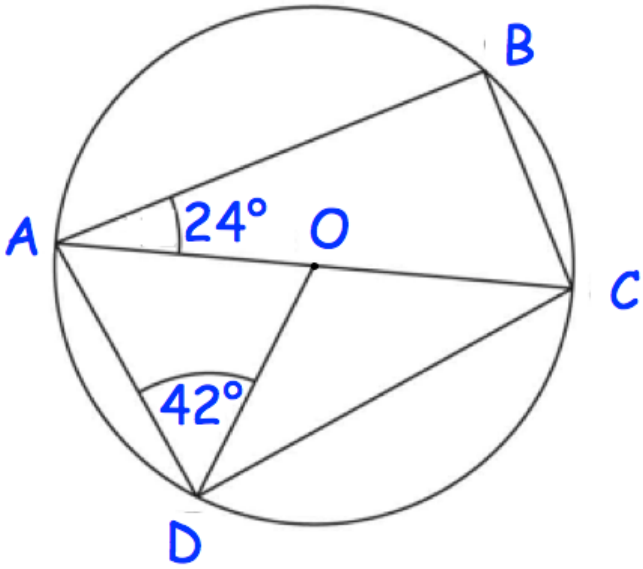
18.



In the diagram O is the centre of the circle.
AOC is a straight line.
Angle BAO is 24° and Angle ADO is 42°

(a) Find the size of angle CAD.

.....°

(1)

(b) Find the size of angle ACB.

.....°

(1)

(c) Find the size of angle BCD.

.....°

(1)

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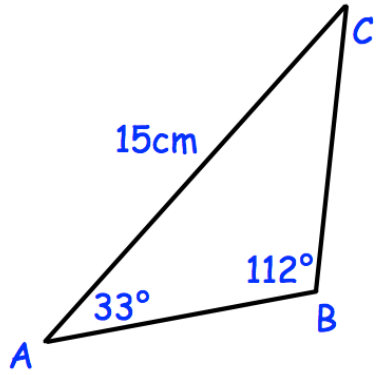
19. Make w the subject of the formula

$$g = \frac{w}{w - 5}$$

w = ...

(3)

20.



In triangle ABC the length of AC is 15cm.
Angle ABC = 112°
Angle BAC = 33°

Work out the length of BC.

.....cm

(3)

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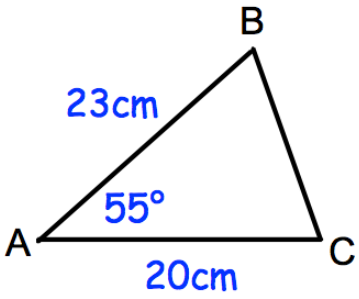
21.

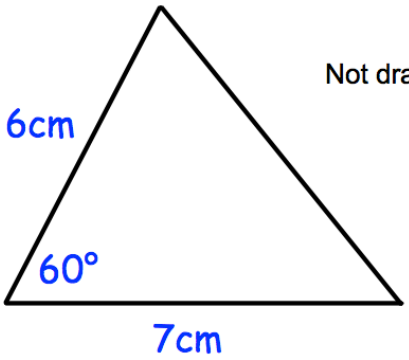


Calculate the length of BC.

.....cm

(3)

22.



Not drawn is scale.

Calculate the area of the triangle.

.....cm²

(2)

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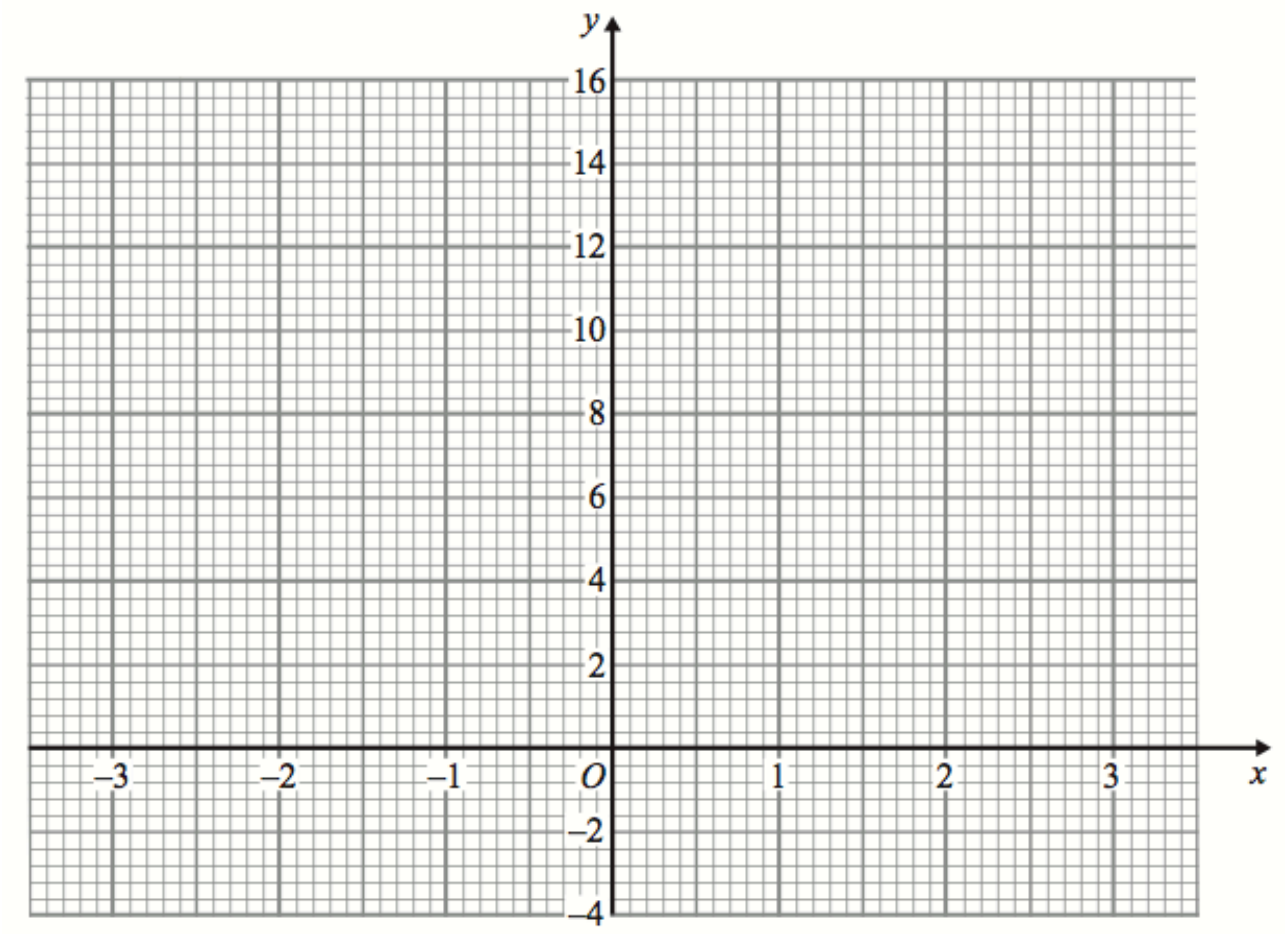
23. (a) Complete the table of values for $y = x^2 + 2x + 1$

x	-3	-2	-1	0	1	2	3
y							

(2)

(b) On the grid, draw the graph of $y = x^2 + 2x + 1$ for the values of x from -3 to 3.



(2)

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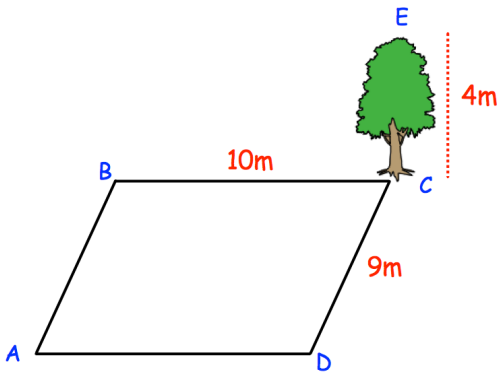
24. A tree is located in the corner of a rectangular field.



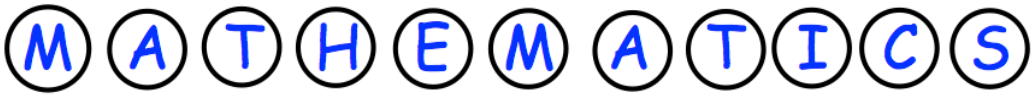
The field is 10 metres long and 9 metres wide.
The tree is 4 metres tall.

Calculate the length AE

.....m
(3)

---

25. A bag contains discs, each with a letter written on it.



One disc is taken at random from the bag.
The disc is not replaced.
Another disc is taken at random from the bag.

Calculate the probability that exactly one M is taken from the bag.

.....
(5)

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26. Prove the sum of four consecutive odd numbers is always a multiple of 8

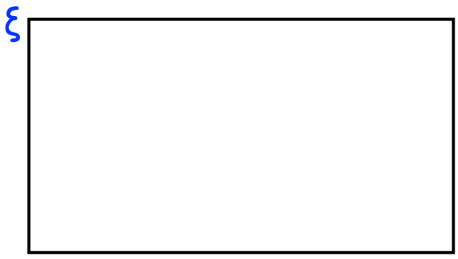
(4)

---

27. A PE test has two sections, theory and practical.

Everyone in a class who took the PE test passed at least one section.
62% passes the theory section and 83% passed the practical section.

(a) Represent this information on a Venn diagram



(3)

A student is selected at random.

Work out the probability that this person

(a) passed the theory section, given they passed the practical section.

.....

(2)

(b) passed the practical section, given they passed only one section.

.....

(2)

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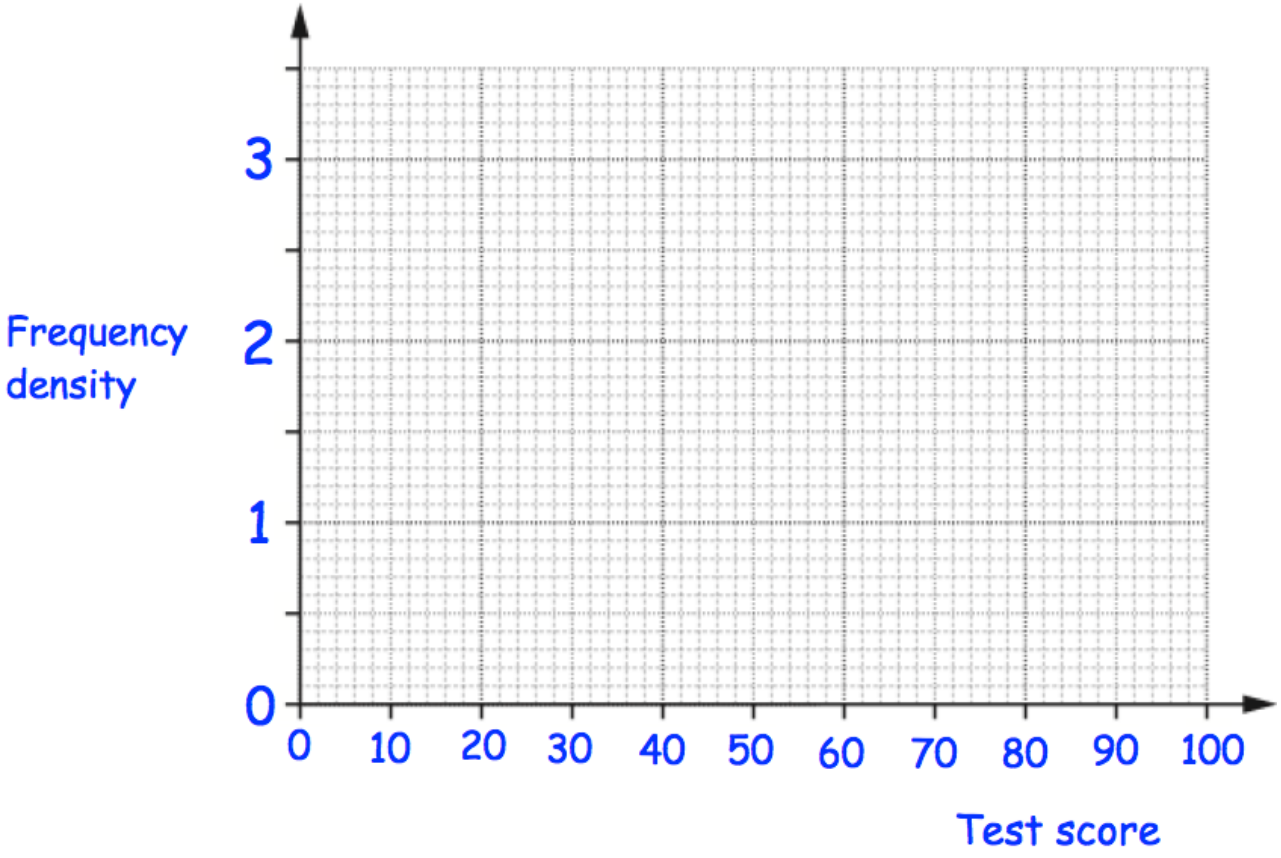
28. The test scores from the students in a school are summarised in the table.

Test score, x	Frequency
$0 < x \leq 30$	15
$30 < x \leq 40$	22
$40 < x \leq 50$	28
$50 < x \leq 70$	30
$70 < x \leq 100$	9

Draw a histogram for this data.



(3)

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29. Mrs Hampton is potting plants.
She is using two mathematically similar pots, the smaller is 10cm tall and the larger 14cm tall.

She has two bags of soil, each containing 30 litres of soil.

With the first bag, Mrs Hampton fills 20 small pots using all of the soil in the bag.

How many large pots can be filled completely using the second bag of soil?

.....

(5)

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30. Sophie estimated that the distance between Bristol and Newcastle is about 290 miles and that her average driving speed would be 60 mph.

She estimated the distance to the nearest 10 miles and the speed to the nearest 10 mph.

Calculate the lower bound of the time the journey should take.
Give your answer in hours and minutes.
Give your answer to the nearest minute.

.....hours .....minutes
(4)

---

31. Factorise fully

$9m^2 - 12mp$

.....
(2)

---

32. (a) Factorise $y^2 - 12y - 64$

.....
(2)

(b) Factorise $2y^2 + 7y - 15$

.....
(2)

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(c) Factorise fully $4y^2 - 49$

.....

(2)

---

33. (a) Solve $m^2 + 24m + 63 = 0$

.....

(2)

(b) Solve $5y^2 + 8y - 100 = y^2 + 4y - 37$

.....

(2)

34, Solve the equation $4x^2 + x - 7 = 0$

Give your answers to two decimal places.

x = ... or x = ...

(3)

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35. The first 5 terms in a number sequence are

10 7 4 1 -2 ... ...

(a) Work out the *n*th term of the sequence.

.....

(2)

(b) Find the 50^{th} term of the sequence.

.....

(2)

---

36. Here are the first 5 terms of a quadratic sequence

4 10 18 28 40

Find an expression, in terms of n, for the nth term of this quadratic sequence.

.....

(3)

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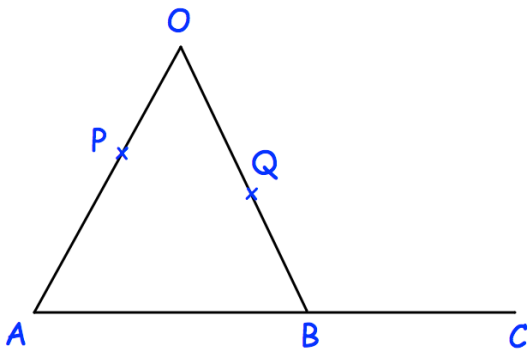
37.



AOB is a triangle.
P is a point on AO.

$\overrightarrow{AB} = 2\mathbf{a}$ $\overrightarrow{AO} = 6\mathbf{b}$ $AP:PO = 2:1$

(a) Find the vector $\overrightarrow{OB}$ in terms of **a** and **b**

.....

(1)

Q is the midpoint of OB.
B is the midpoint of AC.

Show PQC is a straight line.

(3)

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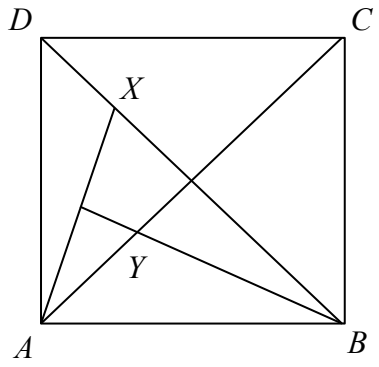
38. ABCD is a square, X is a point in the diagonal BD and the perpendicular from B to AX meets AC in Y.



Prove that triangles AXD and AYB are congruent.

(4)

---

39. Solve the inequality $x^2 + 6x + 8 < 0$

.....

(3)

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40. (a) Simplify

$$\frac{x^2 - 3x + 2}{x^2 + 5x - 6}$$

.....

(3)

(b) Simplify fully.

$$\frac{v + 3}{2} \div \frac{3v + 9}{5}$$

.....

(2)

(c) Solve

$$\frac{7}{x + 2} + \frac{10}{2x - 5} = 3$$

.....

(5)

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41. The functions $f(x)$ and $g(x)$ are given by the following:

$$f(x) = 3x - 1$$
$$g(x) = 2x + 4$$

(a) Calculate the value of $fg(2)$

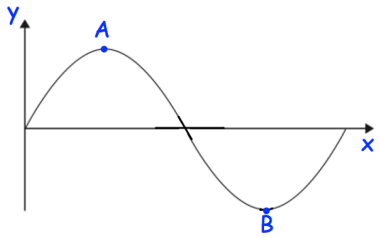
.....
(2)

(b) find $f^{-1}(x)$

.....
(2)

---

42. Shown is part of the curve y = sin x



(a) Write down the coordinates of the point A.

(..... , ...)
(1)

(b) Write down the coordinates of the point B.

(..... , ...)
(1)

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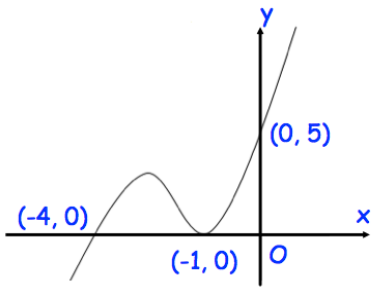
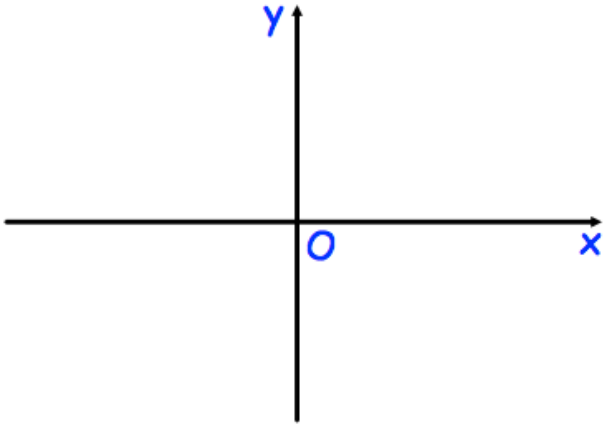
43. Shown below is the curve with equation y = f(x).
The curve passes through the points (-4, 0), (-1, 0) and (0, 5)



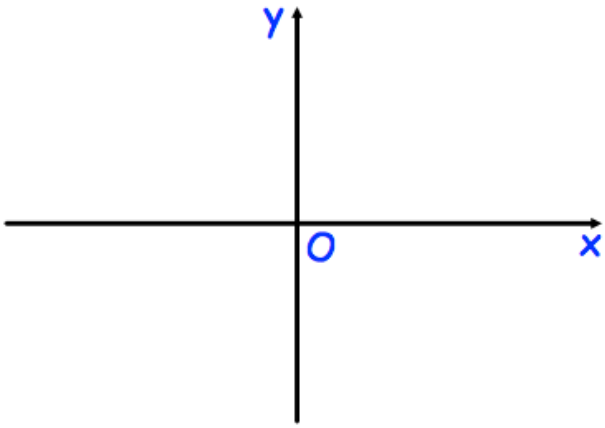
Sketch the curve with equation:

(a) y = f(x – 1)



(2)

(b) y = f(–x)



(2)

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44. Write $x^2 + 8x + 6$ in the form $(x + a)^2 + b$, where a and b are constants.

.....

(3)

---

45. (a) Show the equation $3x^3 + 7x = 5$ has a solution between 0 and 1

(2)

(b) Show that $3x^3 + 7x = 5$ can be rearranged to give

$$x = \frac{5}{7} - \frac{3x^3}{7}$$

(2)

(c) Starting with $x_0 = 0$ use the iteration formula

$$x_{n+1} = \frac{5}{7} - \frac{3x_n^3}{7}$$

three times to find an estimate for the solution to $3x^3 + 7x = 5$

(2)

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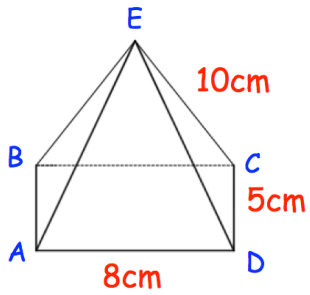
46. Shown below is a rectangular based pyramid.
The apex E is directly over the centre of the base.



AD = 8cm
CD - 5cm
CE = 10cm

(a) Calculate the height of the pyramid

.....cm
(4)

(b) Calculate angle between the face ABE and the base ABCD

..... °
(3)

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