Paper 3 Preparation Paper

AQA Higher

Corbettmaths

You will need a calculator

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

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

www.corbettmaths.com/contents

1.   BEST BUYS (Video 210)

Two shops sell the same type of perfume.
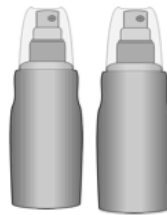A 100ml bottle of perfume normally costs £40.

Shop A

50% extra free

Only £40

Shop B

Buy one get the second HALF PRICE

Normal price £40 for 100ml

Rebecca says that both offers give the same value for money.
Is she correct? Show your working.

(5)

2.   CURRENCY (Video 214a)

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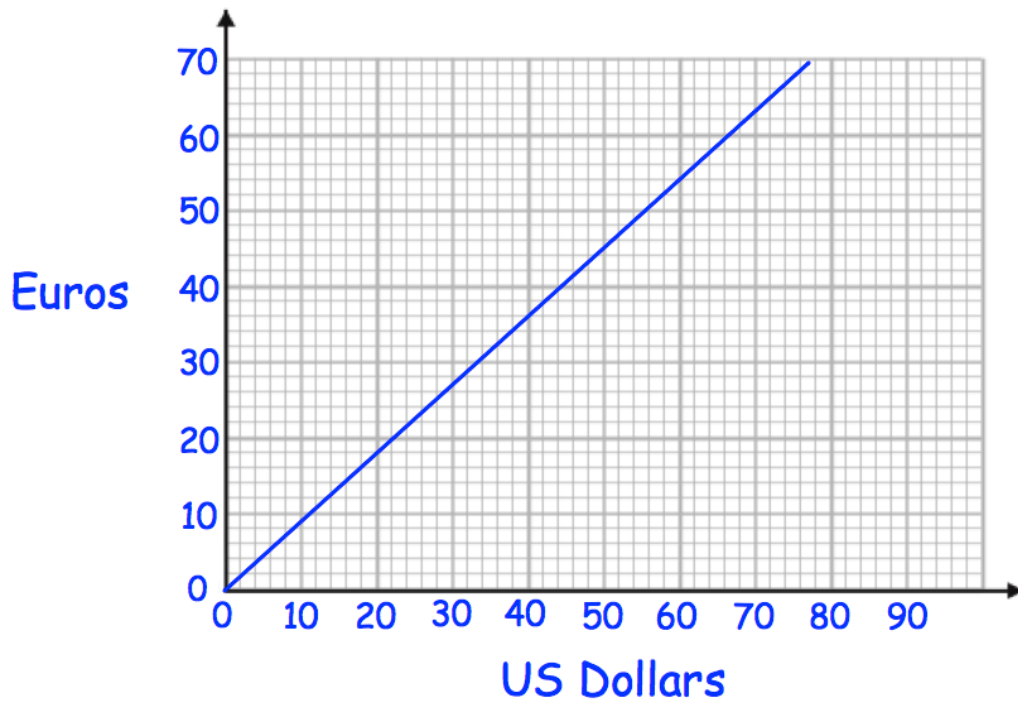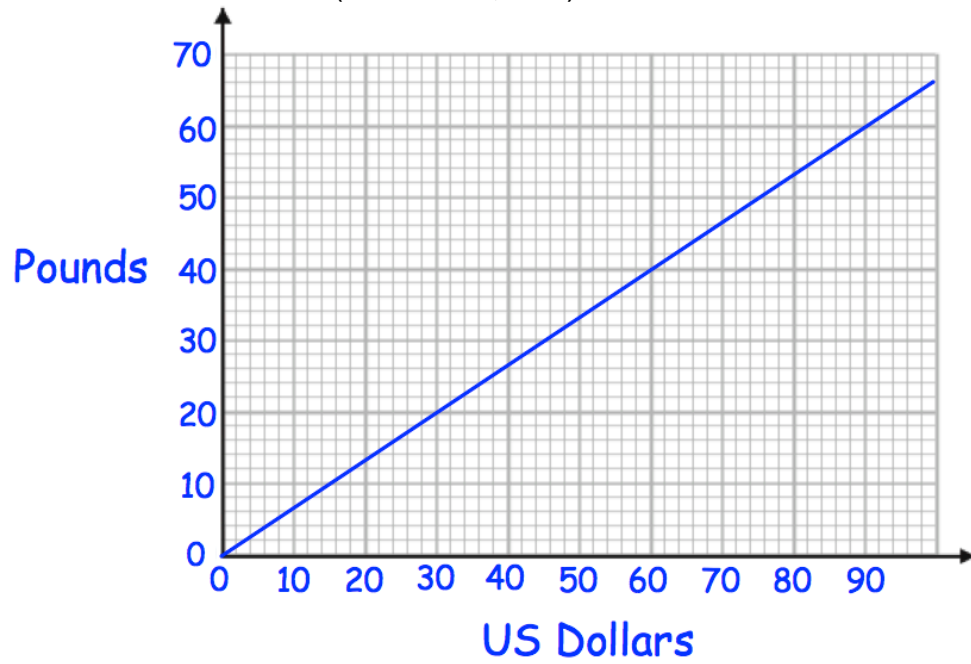He wants to change some money into yen.

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)

3.   CONVERSION GRAPHS (Video 151, 152)

(a) Change £30 into Euros.

........................Euros
(2)

(b) Change 200 Euros into Pounds (£)

£........................
(2)

4.   LCM/HCF (Video 218, 219)

Find the lowest common multiple (LCM) of 28 and 63.

....

(2)

5.   COMPOUND INTEREST (Video 236)

A radioactive substance decays over time.
Every year its mass decreases by 14%.

How many years will it take for 500kg of the substance to decay to a mass less than 200kg?

.........................years

(3)

6.   REVERSE PERCENTAGES (Video 240)

A fish tank sprung a leak and loses 45% of its water.
There is now 363 litres of water in the fish tank.

How much water was in the fish tank before the leak?

.........................l

(3)

7. PRODUCT RULE FOR COUNTING (video 383)

Jim picks a five digit even number.
The second digit is less than 5.
The fourth digit is a cube number.
The first digit is a prime number.
How many different numbers could he pick?

....
(3)

8. EXPANDING TWO/THREE BRACKETS (videos 14, 15)

(a) Expand and simplify $(x + 9)(x - 4)$

....
(2)

(b) Expand and simplify $(x + 1)(x + 2)(x - 3)$

....
(2)

9. FACTORISING QUADRATICS

(a) Factorise $x^2 - x - 30$

....
(2)

(b) Factorise $3y^2 + 10y - 8$

....
(2)

10. NTH TERM - LINEAR (video 288, 289)

The first 5 terms in a number sequence are

    2   2.5   3   3.5   4   ...   ...

(a) Work out the nth term of the sequence.

....
(2)

(b) Work out the 20th term of the sequence.

....
(2)

11. QUADRATIC NTH TERM (Video 388)

Here are the first 5 terms of a quadratic sequence

    4   10   18   28   40

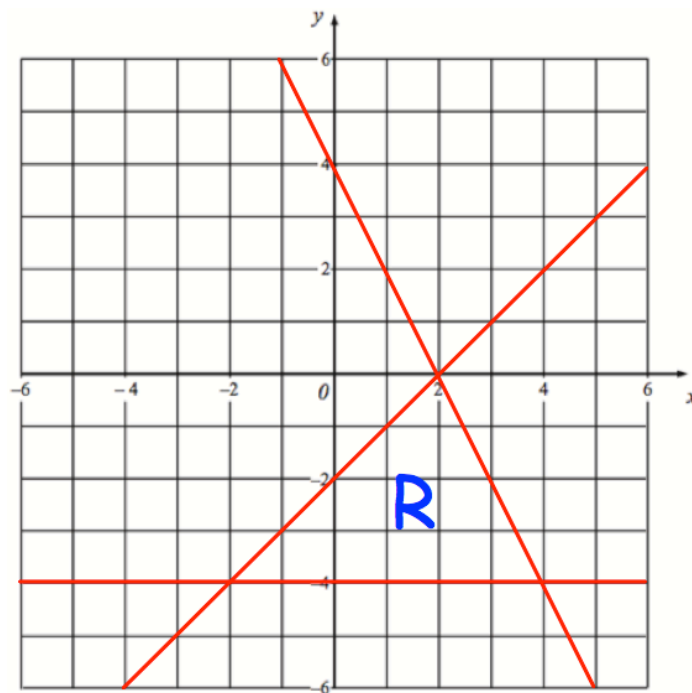Find an expression, in terms of n, for the nth term of this quadratic sequence.

....
(3)

12. CHANGING THE SUBJECT (videos 7, 8)

Rearrange $y + 3 = x(y + 2)$ to make y the subject of the formula.

y = ...

(4)

13. INEQUALITIES - REGIONS (video 182)

The region labelled R satisfies three inequalities.

State the three inequalities

....

....

....

(3)

14. QUADRATIC INEQUALITIES (video 378)

Solve the inequality $2x^2 + 9x + 10 > 0$

....

(4)

15. PARALLEL/PERPENDICULAR LINES (videos 196, 197)

The straight line K has equation $y = 2x - 5$
The straight line J is perpendicular to line K and passes through the point (−4, 8).

Find the equation of line J

....

(3)

16. ITERATION (video 373)

(a) Show that the equation $3x - x^3 = -11$ can be rearranged to give
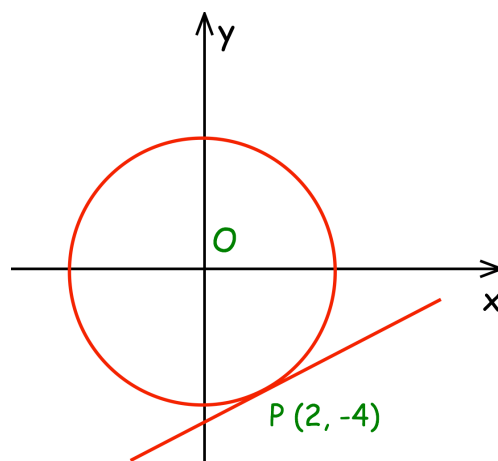
$$x = \sqrt[3]{3x + 11}$$

(2)

(b) Starting with $x_0 = 3$, use the iteration formula $x_{n+1} = \sqrt[3]{3x_n + 11}$
three times to find an estimate for the solution of $3x - x^3 = -11$

(3)

17.   EQUATION OF A TANGENT (video 372)

Here is a circle, centre O, and the tangent to the circle at the point (2, −4).
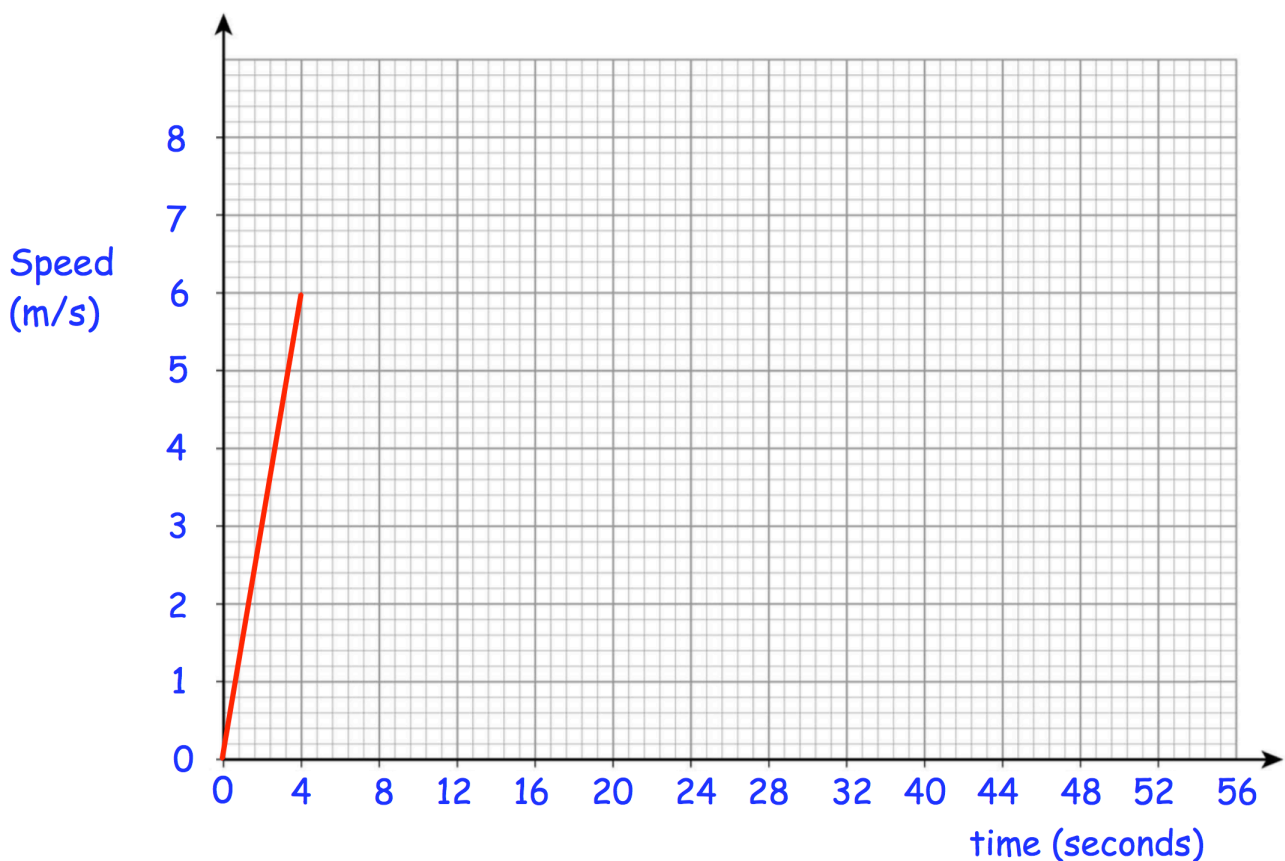

Find the equation of the tangent at the point P.

....
(3)

18.   AREA UNDER A CURVE (video 389)

Harry and Jack ran a 300 metre race.

Here is a graph for the first 4 seconds of Harry's race.

Harry completed the race at a constant speed of 6 m/s

Speed (m/s)

8
7
6
5
4
3
2
1
0

0   4   8   12   16   20   24   28   32   40   44   48   52   56

time (seconds)

Jack completed the race in 51 seconds.

Did Harry finish before Jack?
You **must** show your working.

....

....
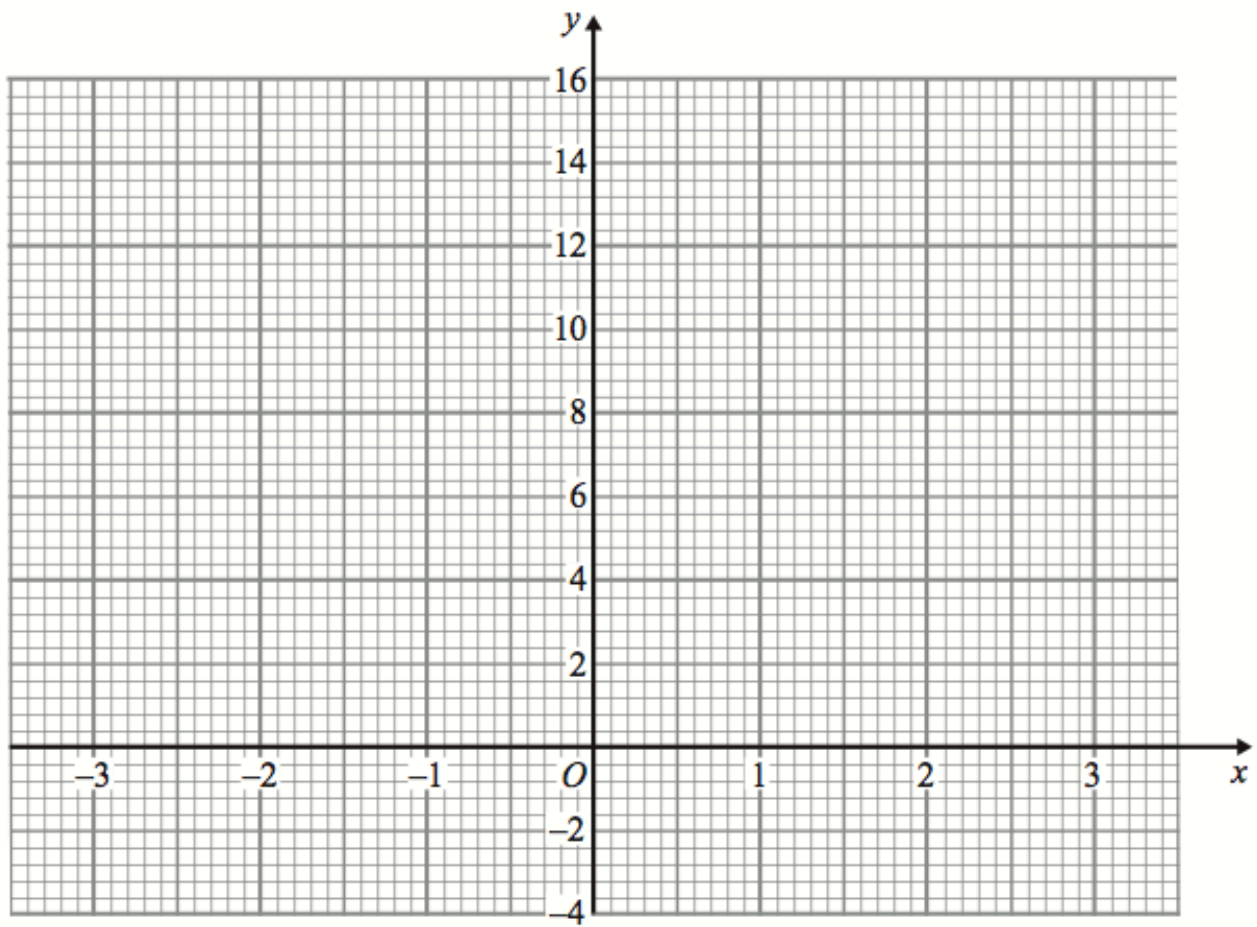
(3)

19. QUADRATIC GRAPHS (video 264)

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

(2)

20. ALGEBRAIC PROOF (video 365)

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

(4)

21. QUADRATIC FORMULA (video 267)

Solve the equation $4x^2 + x - 7 = 0$
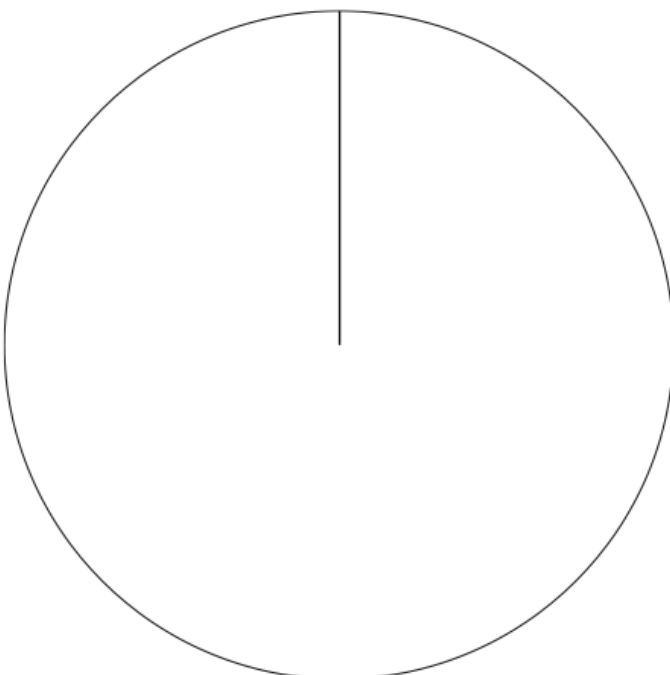
Give your answers to two decimal places.

x = ... or x = ...

(3)

22. PIE CHARTS (video 163, 164)

The table gives information about the dogs in a village

Breed	Frequency
Spaniel	11
Poodle	7
Greyhound	4
Jack Russell	14

Draw an accurate pie chart to show this information.

(4)

23. SCATTER GRAPHS (Video 165, 166)

The table shows the time spent revising and the test scores of ten students.

Time spent revising (hours)	9	0.5	1	4	6	2	3	7	5	8
Test result (%)	90	20	38	62	68	32	46	70	60	86

The first seven points have been plotted on this scatter diagram.
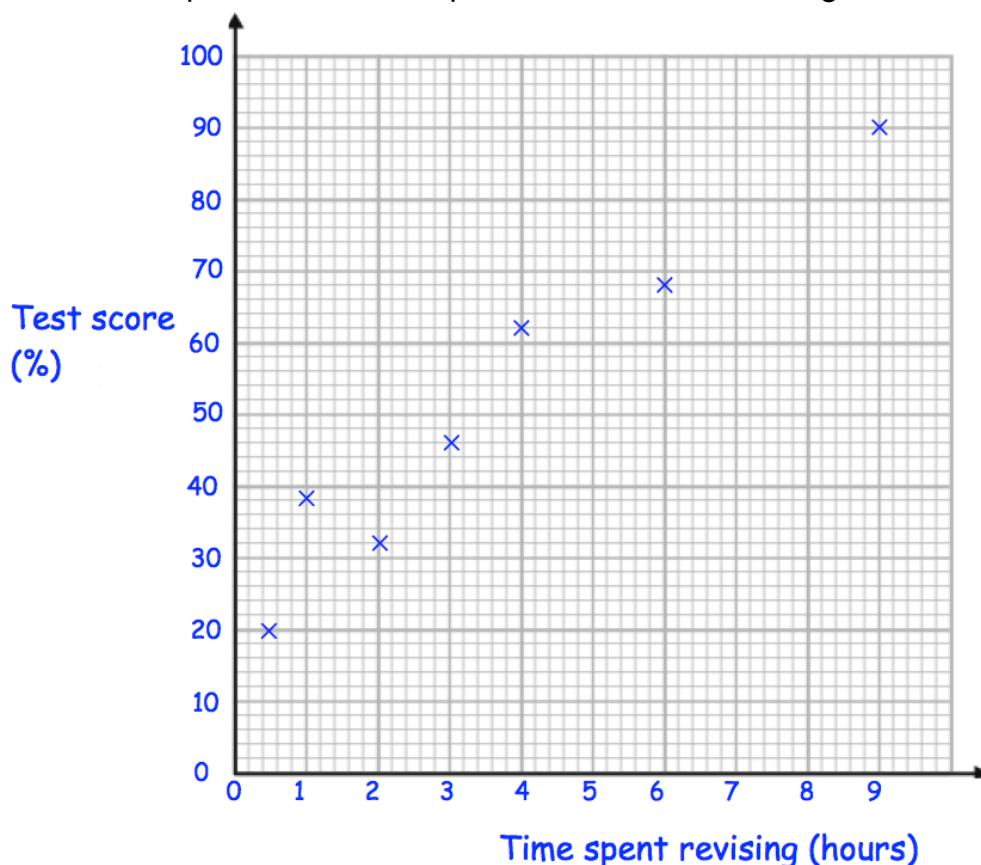
(a) Complete the scatter diagram.

(1)

(b) Describe the relationship shown in the scatter diagram.

....

....

(1)

(c) Draw a line of best fit on your scatter diagram.
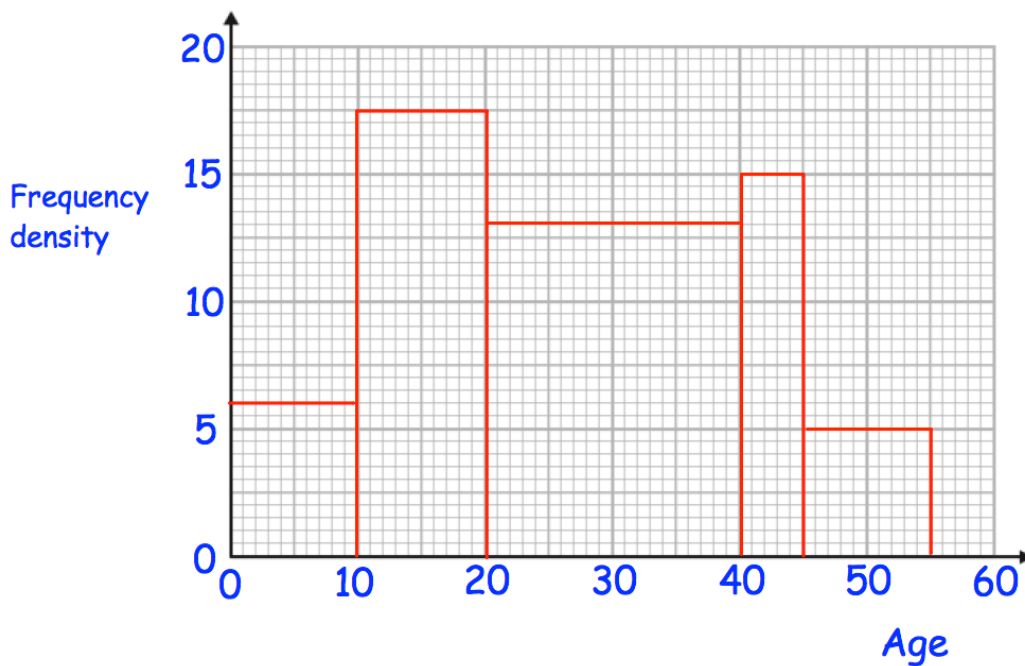
(1)

(d) Another student has spent 4.5 hours revising.
Use your line of best fit to estimate their test result.

.........................%

(1)

24. HISTOGRAMS (Videos 157, 158, 159)

The histogram shows the ages of visitors to a library on one morning.

What percentage of visitors were over 40 years old?

....

(3)

25. ESTIMATED MEAN (Video 55)

Height	Frequency
120 < h ≤ 130	51
130 < h ≤ 140	120
140 < h ≤ 150	66
150 < h ≤ 160	59
160 < h ≤ 170	4

Work out an estimate of the mean height

....

(3)

26. CONDITIONAL PROBABILITY (Video 247)

There are x apples in a crate.
4 of the apples are bad.

Fiona chooses two apples from the crate, without replacement.
The probability she selects two bad apples is $^1/_{11}$

(a) Prove $x^2 - x - 132 = 0$

(3)

(b) Find x, the number of apples in the crate.

....

(2)

27. ANGLES IN PARALLEL LINES (videos 25, 39)
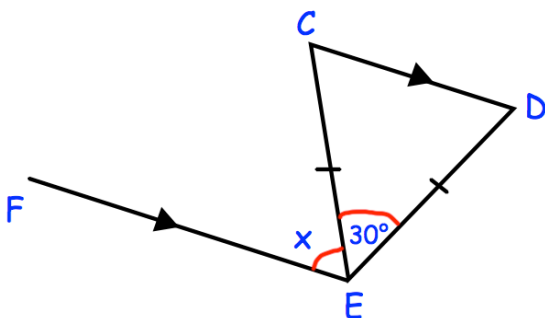
Triangle CDE is isosceles.
CD is parallel to FE.
Angle CED = 30°

Work out the size of angle x.

.........................°

(3)

28. AREA OF A TRAPEZIUM (video 48)

A design is shown below.

Not drawn accurately

20cm

10cm

12cm
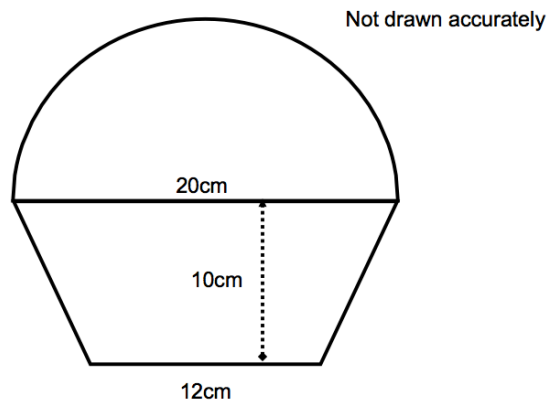
Find the area of the design.
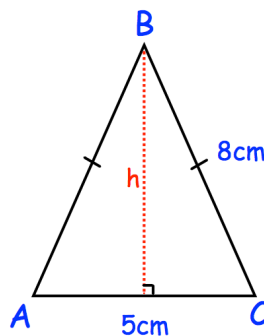
.............................cm²

(5)

29. PYTHAGORAS (Video 257)

ABC is an isosceles triangle.
AB = BC = 8cm
AC = 5cm

B

h

8cm

A   5cm   C

Calculate the area of the triangle.

........................cm²

(3)

30.   3D TRIGONOMETRY/PYTHAGORAS (Videos 259, 332)

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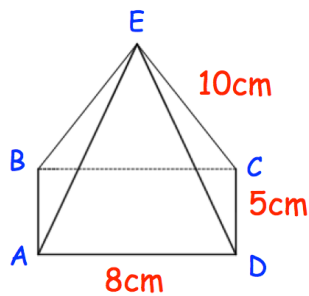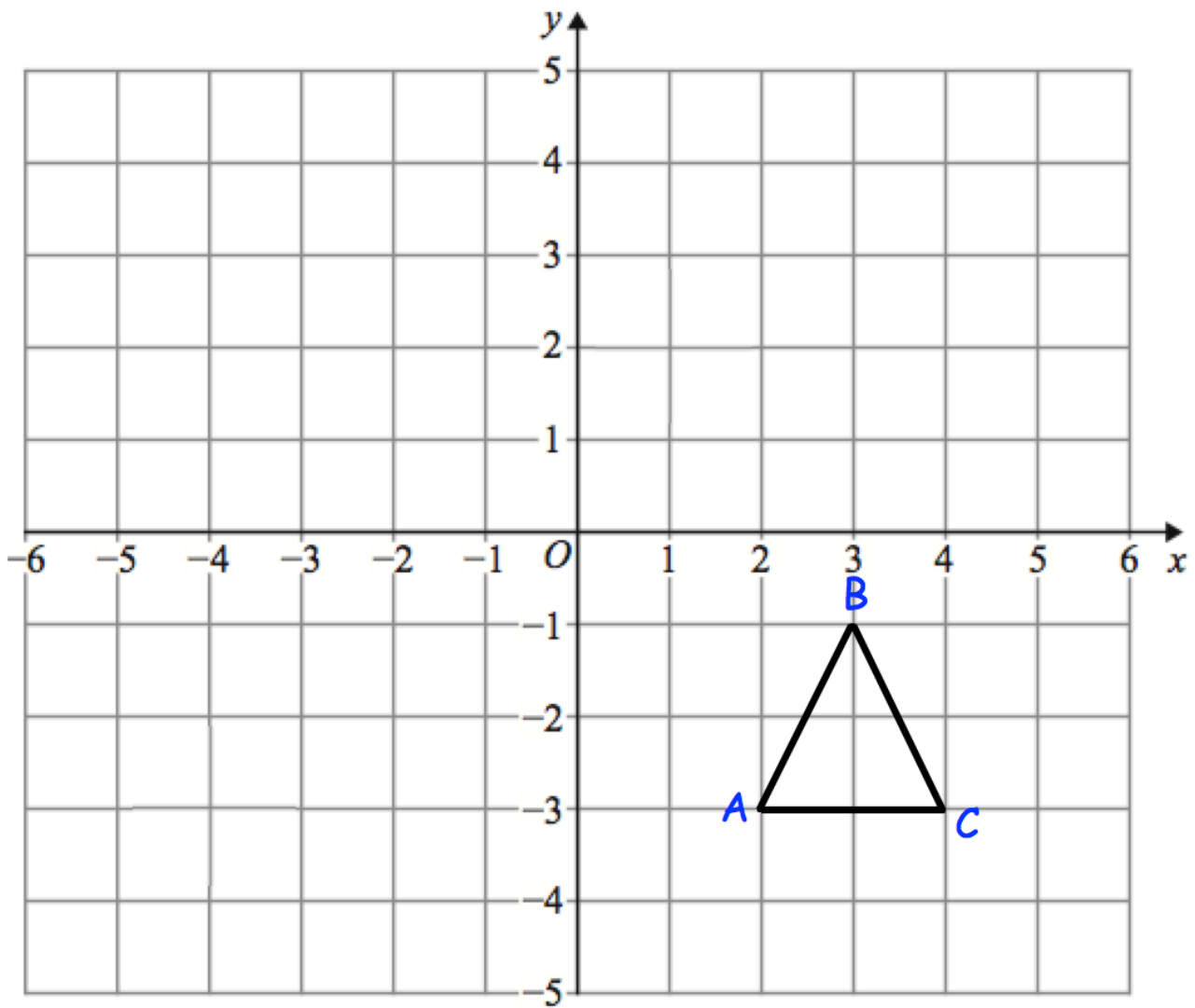

AD = 8cm
CD - 5cm
CE = 10cm

(a) Calculate the height of the pyramid

........................cm

(4)

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

.... °

(3)

31.   ROTATIONS (Video 275)

Rotate triangle ABC 90° clockwise about centre (1, 2)

(3)

32.   CIRCLE THEOREMS (Videos 64, 65)
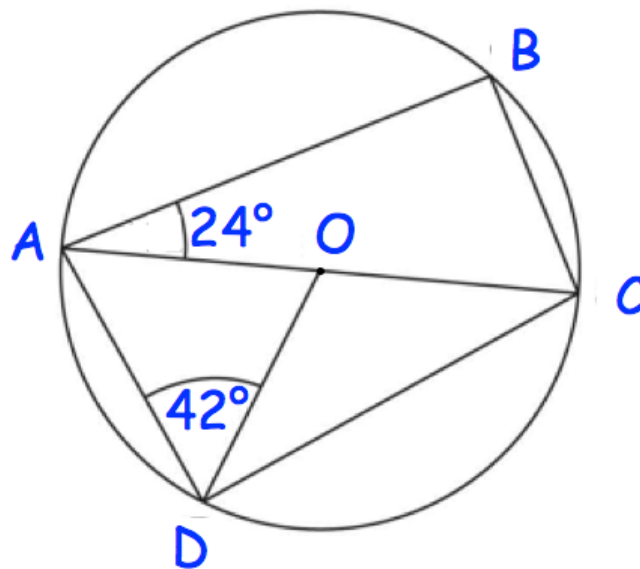
In the diagram O is the centre of the circle.
AOC is a straight line.
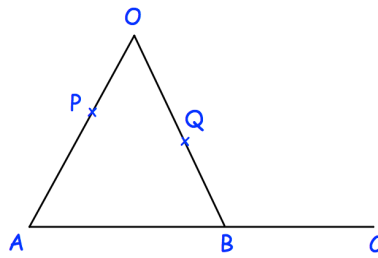Angle BAO is 24° and Angle ADO is 42°

(a) Find the size of angle CAD.

.........................°
(1)

(b) Find the size of angle ACB.

.........................°
(1)

(c) Find the size of angle BCD.

.........................°
(1)

33.   VECTORS (Video 353)

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

$\overrightarrow{AB} = 2a$ $\overrightarrow{AO} = 6b$ 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)

34.   SPEED (Video 299)

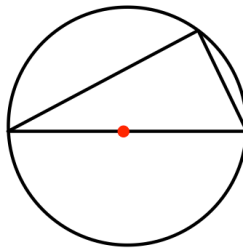The speed limit on a road is 50 mph.

A car drives 19 miles in 22 minutes.

Is the car breaking the speed limit?
You must show your workings.

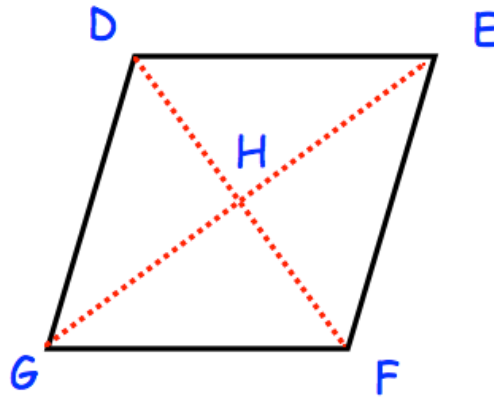**(3)**

35.   GEOMETRIC PROOF (Video 366)

Prove that the angle in a semi-circle is always 90°

(3)

36. CONGRUENT TRIANGLES (Video 67)

The diagram shows a rhombus DEFG.
The diagonals intersect at H.

Prove triangles DGH and EFH are congruent.

(4)