Surname TP Solutions	Centre Number	Candidate Number
First name(s)		0

wjec cbac

GCSE

C300U20-1

A20-C300U20-1

eduqas Part of WJEC

THURSDAY, 5 NOVEMBER 2020 – MORNING

MATHEMATICS – Component 2
Calculator-Allowed Mathematics
FOUNDATION TIER

2 hours 15 minutes

ADDITIONAL MATERIALS

A calculator will be required for this examination.

A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the additional page at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3·142 or use the π button on your calculator.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the need for good English and orderly, clear presentation in your answers.

NOV20C300U20101

For Examiner's Use Only		
Question	**Maximum Mark**	**Mark Awarded**
1.	4	
2.	5	
3.	6	
4.	4	
5.	4	
6.	4	
7.	3	
8.	6	
9.	3	
10.	7	
11.	6	
12.	7	
13.	2	
14.	6	
15.	5	
16.	6	
17.	3	
18.	4	
19.	4	
20.	4	
21.	3	
22.	3	
23.	5	
24.	5	
25.	5	
26.	6	
Total	**120**	

C300U201 01

PJ*(A20-C300U20-1)

Formula list

Area and volume formulae

Where r is the radius of the sphere or cone, l is the slant height of a cone and h is the perpendicular height of a cone:

Curved surface area of a cone = πrl

Surface area of a sphere = $4\pi r^2$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

Kinematics formulae

Where a is constant acceleration, u is initial velocity, v is final velocity, s is displacement from the position when $t = 0$ and t is time taken:

$$v = u + at$$

$$s = ut + \frac{1}{2}at^2$$

$$v^2 = u^2 + 2as$$

Examiner only

1.

18	29	94	108	162	343

÷4 = 23.5 ÷4 = 27

From the numbers in the list above, write down:

(a) a multiple of 4 [1]

108

(b) a prime number [1]

29

(c) the square root of 324 [1]

18

(d) a cube number. [1]

$\sqrt[3]{343} = 7$ so 343

C300U201
03

Examiner only

2. *(a)* Use $A = \frac{6B}{8}$ to find the value of A when B = 34. [2]

$A = \frac{6 \times 34}{8} = 25.5$

(b) The cost to hire a bike is given by the formula:

Cost = £14 + £5.75 × number of whole days hired

Tom has £80 to spend.
He wants to hire a bike for as many days as possible.

For how many whole days can Tom afford to hire a bike? [3]

$80 = 14 + 5.75n$
$-14 \quad -14$

$66 = 5.75n$
$\div 5.75 \quad \div 5.75$

$11.48... = n$

so 11 whole days

Examiner only

3.

Pack of sandwiches £2.74

Apples 62p each

(a) (i) Ami buys a pack of sandwiches and an apple for herself and the same for each of her three children.

How much does this cost altogether? [3]

4 (2·74 + 0·62) = £13·44

(ii) Ami pays with a £20 note.

How much change should she get? [1]

20 − 13·44 = £6·56

Drink £1.15

(b)

A 'Meal Deal' gives a pack of sandwiches, an apple and a drink for £3.79.
Alex buys one 'Meal Deal'.

How much cheaper is this than buying the three items separately? [2]

2·74 + 0·62 + 1·15 = 4·51

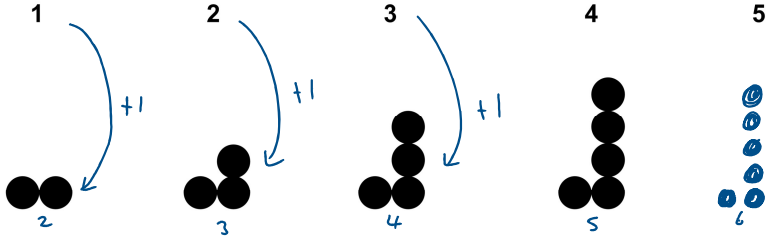
4·51 − 3·79 = £0·72

C300U201 05

Examiner only

4. *(a)* Here are the first four patterns in a sequence.

Pattern **1** **2** **3** **4** **5**



(i) Draw pattern 5. [1]

(ii) How many circles will be in pattern 6? [1]

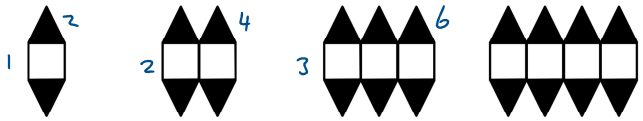
7

(iii) Which pattern uses exactly 99 circles? [1]

99 − 1 = 98

(b) Here are the first four patterns in a different sequence.

Pattern **1** **2** **3** **4**



Write down the rule connecting the number of triangles with the number of squares in each pattern. [1]

Number of triangles = 2 × number of squares

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5. *(a)*

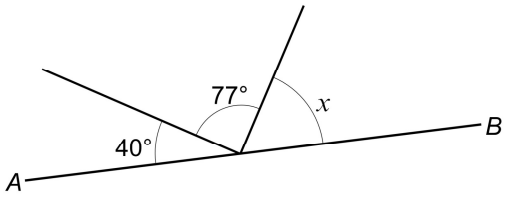

Diagram not drawn to scale

AB is a straight line.

Calculate the size of angle x. [2]

$180 - 40 - 77 = 63$

$x =$ 63 °

(b)

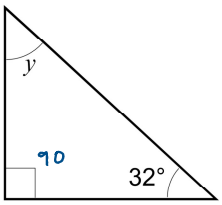

Diagram not drawn to scale

Calculate the size of angle y. [2]

$y = 180 - 90 - 32$

$= 58$

$y =$ 58 °

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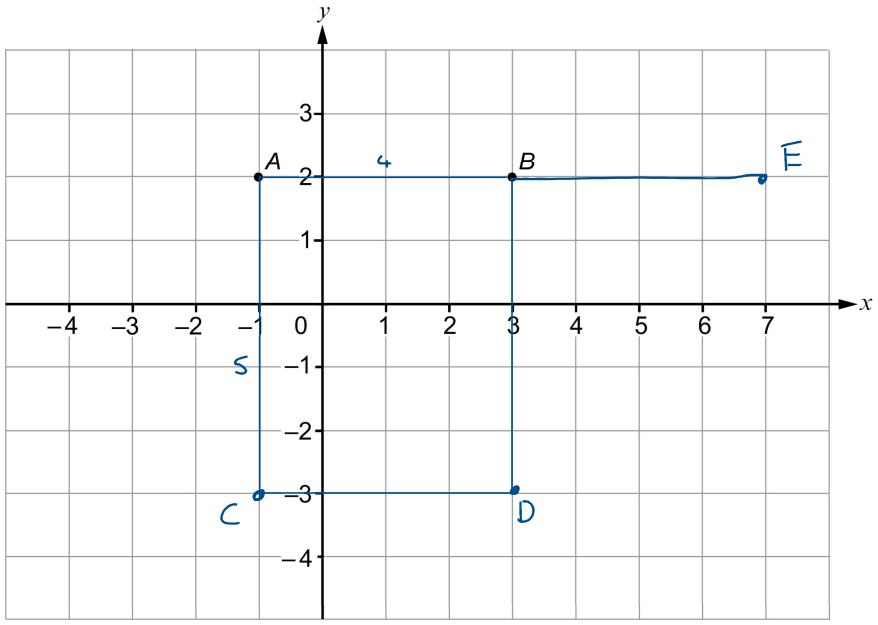
07

Examiner only

6. Points *A* and *B* are shown on the 1 cm grid below.



(a) *ABCD* is a rectangle with area 20 cm^2.

Mark the points *C* and *D* on the grid. [2]

.....

.....

(b) (i) *B* is the midpoint of *AE*.

Mark the point *E* on the grid. [1]

(ii) Write down the coordinates of the point *E*. [1]

.....

.....

.....

E is the point (7 , 2)

Examiner only

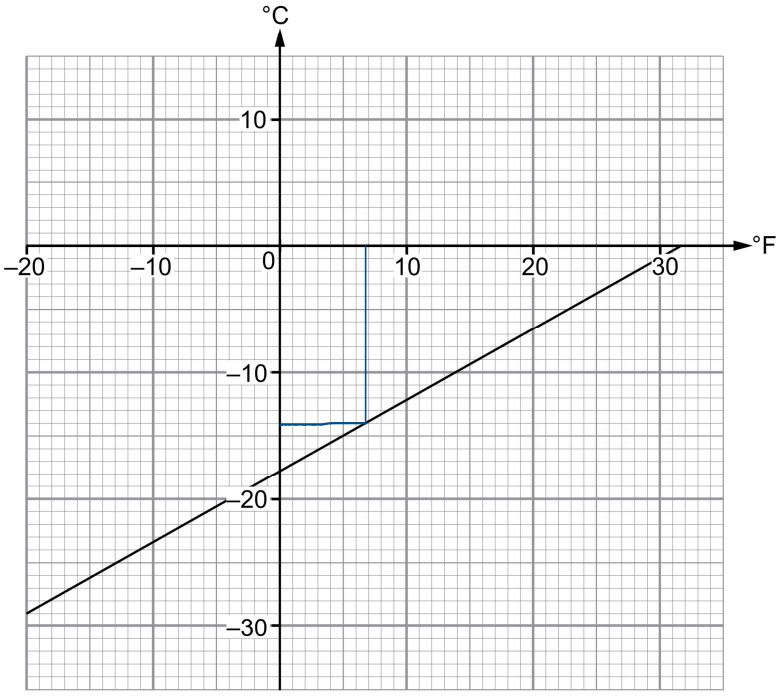
7. *(a)* At 8 a.m. the temperature in a new freezer is 22 °C.
The temperature decreases at 4 °C per hour.

At what time will it reach −14 °C? [2]

17:00

8	22
9	18
10	14
11	10
12	6
13	2
14	−2
15	−6
16	−10
17	−14

(b) The graph below can be used to convert between degrees Fahrenheit (°F) and degrees Celsius (°C).



Use the graph to convert the temperature −14 °C to °F. [1]

6.9 °F

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09

Examiner only

8. A set of raffle tickets numbered 1 to 500 are all sold at a charity event.
A ticket, picked at random, wins the only prize.

(a) What is the probability that the number on the winning ticket is 20? [1]

$\frac{1}{500}$

(b) What is the probability that the number on the winning ticket is greater than 200? [1]

$\frac{300}{500}$

(c) Ben has bought 8 of the tickets.
He says,

"I have a 50% chance of winning because either I win or I don't win."

Is Ben correct?

Yes ☐ No ☑

Explain your answer. [1]

He has an $\frac{8}{500}$ chance which is less than 50%

(d) The probability that Zac wins the prize is 0.01.

(i) What is the probability that Zac does **not** win the prize? [1]

0.99

(ii) How many raffle tickets does Zac have? [2]

$0.01 \times 500 = 5$ tickets

Examiner only

9. Fabric is sold from rolls.
All the rolls contain fabric of the same width.
Any length can be cut from a roll of fabric.

Tien buys:

- a 1·8 m length of flowered fabric,
- a 3·2 m length of plain fabric.

Flowered fabric costs £12.50 for one metre.
Tien spends £58.50 altogether.

Show that plain fabric costs £11.25 for one metre. [3]

12·50 × 1·8 = £22·50 spent on flowered fabric

58·50 − 22·50 = £36 spent on plain

36 ÷ 3·2 = £11·25 per metre

C300U201
11

Examiner only

10. Jack sells ice-cream cones at a beach cafe.
Each ice-cream cone has **two** scoops of ice cream.

(a) The scoops can be the same or different flavours.

There are three possible flavours to choose from:
- chocolate (C),
- vanilla (V),
- strawberry (S).

List all the possible flavour combinations for two scoops of ice cream. [2]

CV ~~VC~~ ~~SC~~
CS VS ~~SV~~
CC VV SS

(b) Two scoops of vanilla ice cream is the most popular.
Jack gets 125 single scoops of vanilla ice cream from one tub.
Each tub costs £43.50.
Jack needs to buy enough tubs to make 1300 of his two-scoop vanilla ice-cream cones.

What is the least amount Jack will need to pay? [5]

1300 x 2 = 2600 scoops

2600 ÷ 125 = 20.8 tubs -> so buy 21

21 x 43·50 = £913.50

Examiner only

11. *(a)* The original price of a car is £6500.
It is sold at a 12·5% discount.

Calculate the discounted price. [3]

100 − 12·5 = 87·5

6500 × 0·875 = 5687·5

Discounted price = £ 5687·50

(b) Emma borrows £875 to pay for a new computer.
She pays simple interest on the loan at 6% per year for 3 years.

Calculate the total amount of interest Emma pays. [2]

0·06 × 875 = 52·5

52·5 × 3 = 157·5

Interest = £ 157·50

(c) Asha buys a bike.
She sells it for three times what she paid for it.

What percentage profit has Asha made? [1]

say buys for £10

sells for £30

profit = 30 − 10

= 20

$\frac{20}{10} \times 100 = 200\%$

Percentage profit = 200 %

C300U201
13

Examiner only

12. *(a)* Two taxi drivers record the number of miles they each drive on 12 days.
The results are shown in the table below.

Miles driven								
Barry					Samira			
~~160~~	~~171~~	~~171~~	~~175~~		161	172	174	174
~~177~~	182	188	~~189~~		180	181	185	186
~~190~~	~~191~~	~~193~~	~~208~~		192	192	196	203

(i) Use the data to complete this table. [2]

	Barry	Samira
Range	48	42
Median	185	183

182 + 188 = 185 / 2

203 − 161

(ii) Which taxi driver drove a more consistent number of miles each day?
Give a reason for your answer. [1]

Samira as their range is smaller

Examiner only

(b) Tanya is also a taxi driver.
Last month she drove 3405 miles.

She says,

"That means that I drive over 40000 miles in a year!"

(i) Show how Tanya could be correct. [2]

$3405 \times 12 = 40860 > 40000$

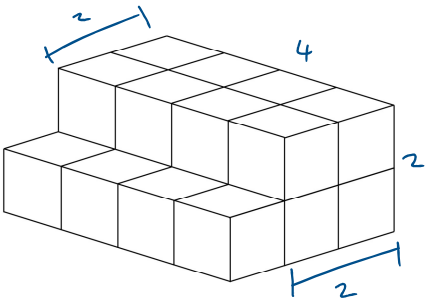
(ii) State **one** assumption Tanya has made.
Explain how this has affected the answer. [2]

Assumption: She will drive at least 3405 miles every month

Explanation: If some months were not as busy she may drive less, then the answer might not be over 40000 per year.

Examiner only

13. *(a)* This solid prism is made from identical cubes. Each cube has sides of length 1 cm.



$2 \times 2 \times 4 = 16$

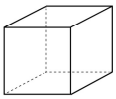
$16 + 4 = 20$

20 cubes

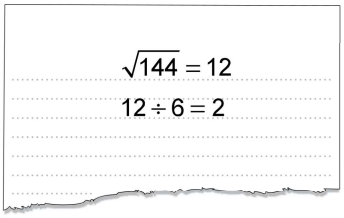
Give the dimensions of a cuboid that could be made with the same number of cubes. [1]

$2 \times 2 \times 5$

(b) The total surface area of a different cube is 144 cm^2.



To work out the side length of this cube, Mai does the following calculations:



Mai's method is incorrect.

Explain the mistake that Mai has made. [1]

Needs to divide by the 6 first, then square root

Examiner only

14. Use: 1 mile = 1·6 km

÷1.6

(a) The Earth travels around the Sun at 30 km per second.

Convert 30 km per second into miles per second. [2]

30 ÷ 1.6 = 18.75 miles/s

(b) (i) The diagram shows a field. It has an area of 1 square mile.

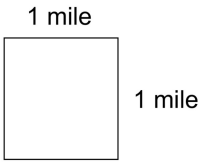


Diagram not drawn to scale

What is the area of the field in square kilometres? [2]

1.6 x 1.6 = 2.56 km^2

(ii) The surface area of the Earth is about two hundred million square miles.

Calculate the surface area of the Earth in square kilometres. [2]

200,000,000 x 1.6 x 1.6 = 512 000 000 km^2

Examiner only

15. Nadia is going to drive from her home to a meeting in Newcastle.

Her route can be approximated using a straight line.

She plans to leave home at 6 a.m.
She wants to arrive in Newcastle at 11:45 a.m.

What must Nadia's average speed be for her to get to Newcastle on time?
Give your answer in miles per hour. [5]

distance = $4.8 \times 50 = 240$ miles

time = 5.75 hrs

$\frac{d}{s \times t}$

$s = \frac{d}{t} = \frac{240}{5.75} = 41.7$ mph (1 dp)

Examiner only

16. *(a)* 135 women and 150 men were asked to complete a survey.
44 of the women completed the survey.
32 % of the men completed the survey.

Which of the following statements is correct?
You must show all your working. [3]

A greater proportion of men than women completed the survey. ☐

A greater proportion of women than men completed the survey. ☑

$\frac{44}{135} = 0.326$

$= 32.6\%$

(b) 225 people took part in a different survey.
40 % were women.
20 % of the women were over 50 years of age.

How many women over 50 years of age took part in this survey? [3]

$0.4 \times 225 = 90$

$0.2 \times 90 = 18$

Examiner only

17.

200 ml	375 ml	500 ml
98p	£1.80	£2.30

Which size of bottle offers the best value for money?

200 ml ☐ 375 ml ☐ 500 ml ☑

Show how you decide. [3]

cost ÷ amount

0.98 ÷ 200 = 0.0049

1.80 ÷ 375 = 0.0048

2.30 ÷ 500 = 0.0046 ← smallest

so cheapest

Examiner only

18. *(a)* Sam and Jody share £366 in the ratio 1 : 3.

How much money does Jody get? [2]

$1 + 3 = 4$

$366 \div 4 = 91.5$

S : J

1 : 3 ×91.5

: 274.5

Jody gets £ 274.50

(b) Maria is 4 years old.
She is half Connor's age.

What will be the ratio of their ages in 2 years' time?
Give your answer in its simplest form. [2]

M : C

4 : 8

+2

6 : 10

÷2

3 : 5

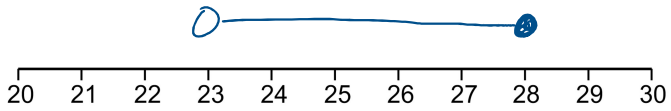
Maria's age : Connor's age will be 3 : 5

19. *(a)* n is a whole number where $-4 \leqslant 2n < 6$.
Write down all the possible values of n. [2]

$-2 \leqslant n < 3$ (÷2)

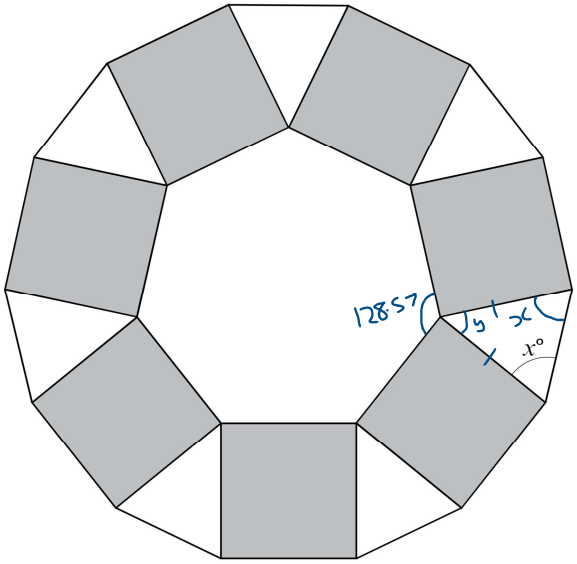
$-2, -1, 0, 1, 2$

(b) Represent the inequality $23 < x \leqslant 28$ on this number line. [2]



Examiner only

20.



This pattern is made from a regular seven-sided polygon surrounded by squares and isosceles triangles.

Show that the value of x is 64·3 correct to 1 decimal place. [4]

You must show all your working.

3 -> 180
4 -> 360
5 -> 540
6 -> 720
7 -> 900

Total interior of Heptagon = 900°
900 ÷ 7 = 128.57°

$y = 360 - 90 - 90 - 128.57$
$= 51.43°$

$x = \frac{180 - 51.43}{2} = 64.3°$

Examiner only

21. Rashid plays a game.
Each time he can score 1 point, 5 points or 10 points.
The table shows the probability of each outcome.

Points	Probability
1	0·80
5	0·15
10	0·05

Rashid plays the game 40 times.

How many times does he expect to score more than 1 point? [3]

$40(0.15 + 0.05) = 8$

22. A cylindrical glass contains 500 cm^3 of water.
The glass has an internal radius of 3·5 cm.

Calculate the height of the water in the glass. [3]

$V = \pi r^2 h$

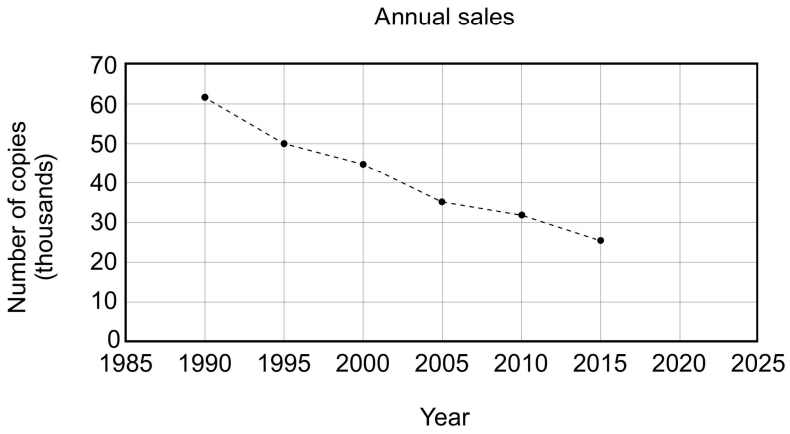
$500 = \pi \times 3.5^2 \times h$

$h = \dfrac{500}{\pi \times 3.5^2}$

$= 13\text{cm}$

Examiner only

23. The graph shows the number of copies of a local newspaper sold over a 25-year period.



(a) (i) Eva uses the graph to predict that about 10 thousand newspapers will be sold in 2025.

Explain why her prediction may not be reliable. [1]

The data only goes up to 2015, using it to predict 2025 is extrapolation and as such unreliable

(ii) Between 1990 and 2015, sales of the local newspaper fell from 62 000 to 26 000.

What was the percentage decrease in sales? [2]

$\frac{\text{new} - \text{original}}{\text{original}} \times 100 \rightarrow \frac{26000 - 62000}{62000} \times 100$

$= -58.1\%$

or 58.1% decrease

(b) The ratio of adults who read news online to those who do not is 16 : 9.
The adult population of the UK is about 52 000 000.

Calculate an estimate of the number of adults in the UK who read news online. [2]

16 + 9 = 25

52 000 000 ÷ 25 = 2 080 000

✓ : ×

16 : 9

× 2 080 000 ↓

33 280 000

Examiner only

24. *ABCD* is a parallelogram.

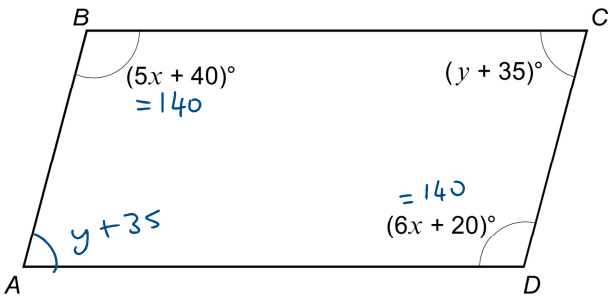


Diagram not drawn to scale

Work out the value of x and the value of y.
You must show all your working. [5]

$5x + 40 = 6x + 20$
$-5x \quad -5x$

$40 = x + 20$
$-20 \quad -20$

$20 = x$

$6(20) + 20 = 140$
$5(20) + 40 = 140$

$360 - 140 - 140 = 80$

$80 \div 2 = 40$

$y + 35 = 40$

$y = 5$

$x =$ 20 $y =$ 5

Examiner only

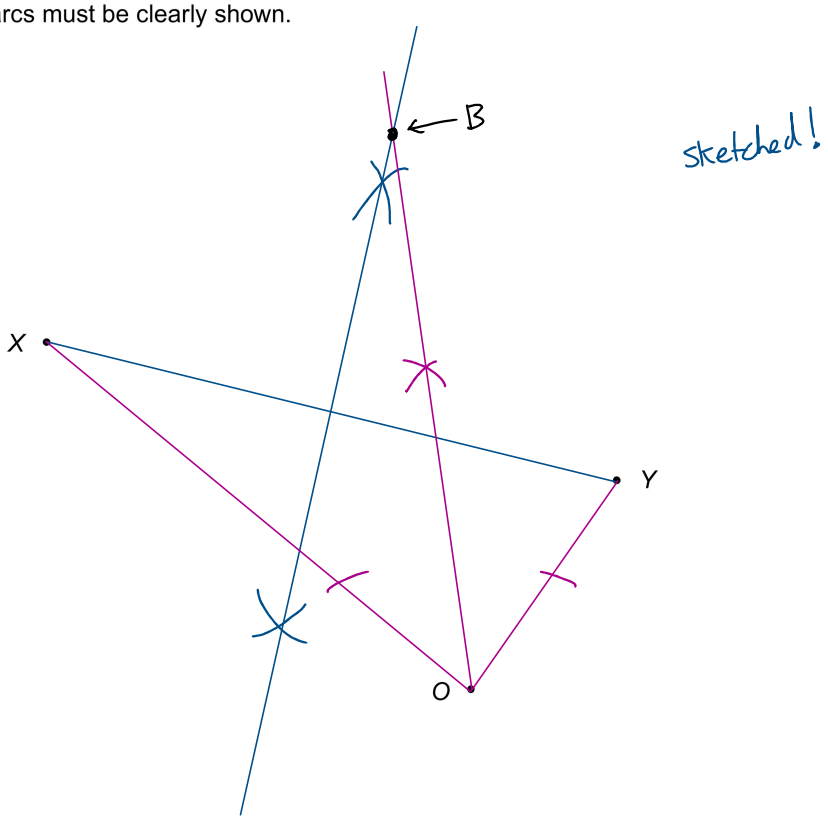
25. Cheng stands at *O* and rolls a ball along the horizontal ground.

The ball stops at point *B*, which:

- is equidistant from *X* and *Y*,
- lies on the bisector of angle *XOY*.

Use a ruler and a pair of compasses to **construct** suitable lines and arcs to show the position of point *B*.

Construction arcs must be clearly shown. [5]



Examiner only

26. The diagram shows two right-angled triangles.

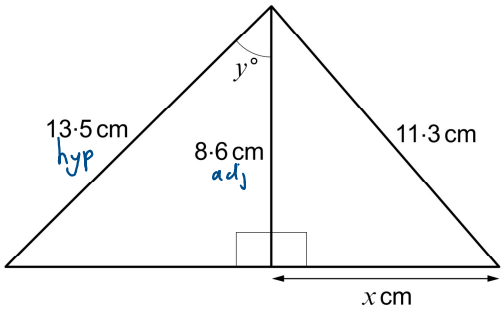


Diagram not drawn to scale

(a) Calculate the value of x. [3]

$x = \sqrt{11.3^2 - 8.6^2}$

$= 7.33\text{ cm}$

(b) Calculate the value of y. [3]

$\cos y = \frac{\text{adj}}{\text{hyp}} = \frac{8.6}{13.5}$

$y = \cos^{-1}\left(\frac{8.6}{13.5}\right) = 50.4°$

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