Solomon Press Specimen Papers

GCSE Mathematics

SAMPLE PAPER (Calculator)

Higher Tier

Time: 1hour and 45 minutes

Materials required
Question Paper
Worksheet
Ruler, protractor, compasses.
Tracing paper may be used

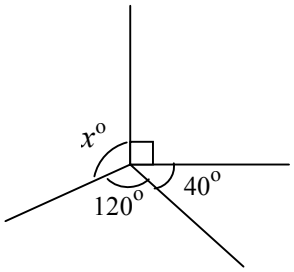
Instructions to candidates

Do not write on this paper. Write all answers on plain paper except where instructed to answer on your worksheet. *In an examination you will normally be required to write your answers in the spaces provided in the question paper.*

Information to candidates

The marks for questions and parts of questions are shown in brackets e.g. **(3)**.
This paper contains 23 questions and the total of the marks available is 100.
Calculators may be used.

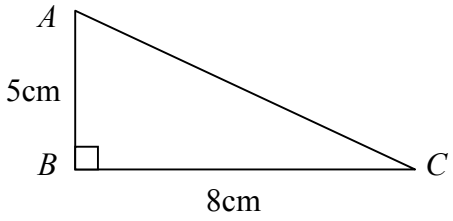
1. Find angle x. not drawn to scale



(1)

2. (a) Solve the equations
   (i) $15 - x = 7$ (1)
   (ii) $x - 1 = 3x - 7$ (2)
   (b)(i) Solve the inequality $5x + 7 \leq -3$ (2)
   (ii) Using fig(1) on your worksheet
   show your answer to (b)(i) on the number line. (2)

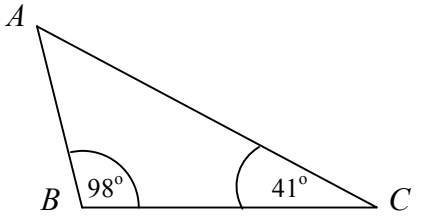
3. ABC is a right angled triangle. AB = 5cm BC = 8cm.
   (a) Find the area of triangle ABC. (2)
   (b) Find the length of AC. Give your answer correct to 2 decimal places. (2)



4. (a) Find the value of $\dfrac{3.472}{2.15 \times 32.12}$.
   Write down all the figures on your calculator. (1)
   (b) Write your answer to (a) correct to
   (i) 4 significant figures. (1)
   (ii) 3 decimal places. (1)

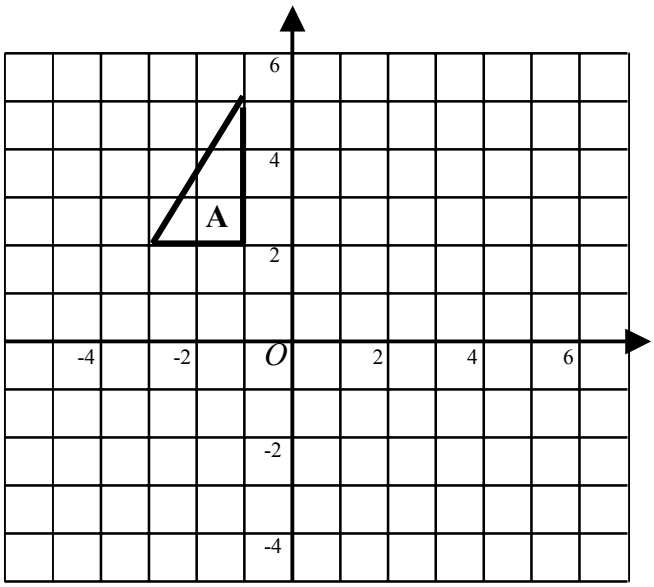
5. Three brothers are sharing the cost of a drum kit in the ratio 2 : 3 : 4
   The kit costs £972 and Chris pays the largest share.
   How much does Chris pay? (3)

6. In triangle ABC angle $ABC = 98^o$ and angle $BCA = 41^o$
   (a) Find angle BAC
   (b) What type of triangle is ABC?
   (c) What type of angle is angle ABC?



(3)

7.



Using fig(2) on your worksheet

(a) Reflect triangle A in the line $x = 1$. Label the image B. (1)

(b) Rotate triangle A 180^{o} about point (1,0). Label the image C. (2)

(c) Describe in words the single transformation that would map C to B. (1)

8. A school menu is planned in 12 day blocks.
On three days, chosen at random, chips are available
and on two days, also chosen at random, ice cream is available.
Find the probability that on a given day

(a) Both chips and ice cream are available. (2)

(b) Either chips or ice cream is available. (2)

9. A map has a scale of 1 : 10,000.
Find

(a) The distance in cm on the map that represents 1.5km on the ground. (2)

(b) The area in km^2 that is represented by an area of $200cm^2$ on the map. (2)

10. If $y = 2a^2 - 3b^2$ find y when

(a) $a = 4.1$ and $b = 3.5$ (2)

(b) Make a the subject of the formula. (2)

11. A shop is having a sale.

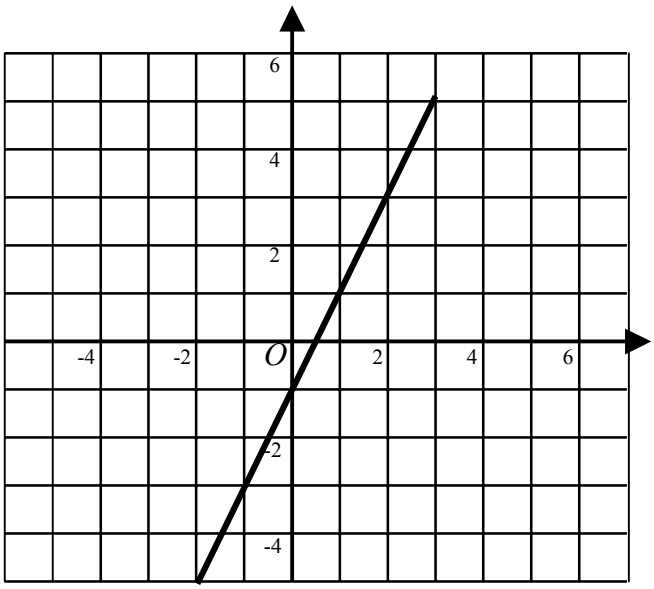
SALE

30% off all clothes.

(a) In the sale Jane buys a dress originally costing £45.
How much does Jane have to pay? (2)

(b) Emily buys a skirt at a sale price of £24.50.
What was the original price of Emily's skirt? (2)

12.

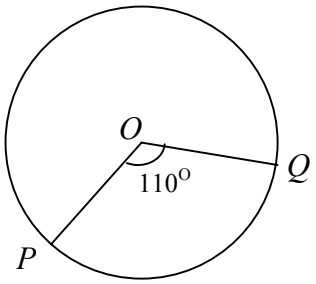


Using fig(3) on your worksheet

(a) Write down the equation of the line on the grid. (2)

(b) Draw on the grid the line $y = -x + 2$ (2)

13. In the diagram, O is the centre of the circle.
The radius is 5cm and angle POQ=110°.
Find the area of the major segment POQ.
Give your answer correct to 3 significant figures.



(3)

14. The table shows the length, in cm, of leaves on a tree.

Length l in cm	Number
$0 < l \leq 3$	6
$3 < l \leq 6$	
$6 < l \leq 8$	20
$8 < l \leq 10$	27
$10 < l \leq 15$	15

Using fig(4) on your worksheet

(a) Use the diagram to complete the table. (1)

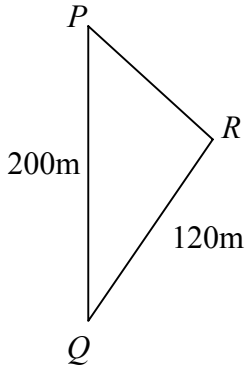
(b) Use the table to complete the histogram. (2)

(c) In which group is the median? (1)

(d) Estimate the mean length of a leaf. (3)
give your answer correct to 3 significant figures.

15. James lives 2.1km, correct to the nearest $\frac{1}{10}$ km, from the railway station.
James estimates, correct to 1 significant figure, that he can walk at 2m/second.
James leaves home at 08 07am to catch the 08 30 train.
Show by calculation whether or not James is certain to catch the train. (4)

16. A triangular field PQR has P due north of Q.
PQ = 200m and QR = 120m.
The bearing of R from Q is 030°.
Find
(a) The distance PR. (2)
(b) The area of the field. (2)
(c) The bearing of R from P. (2)
Give your answers correct to 3 significant figures.



17. The height h of a group of aliens is proportional to the square root of their age a.
A nine year-old alien is 2m tall.
(a) Find a formula for h in terms of a. (2)
(b) Find the age of a 10m tall alien. (2)

18. In a class of 12 girls and 15 boys the mean mark for the girls in a maths test is 20.
The mean mark for the whole class is 18.
Find the mean mark for the boys. (4)

19. Simplify the following
(a) $\dfrac{x^2+2x-3}{x^2+4x+3}$ (3)

(b) $2a^3b \times 3a^2b^5$ (2)

20. Mary and Jane both order a bowl of soup.
Soup is served at a temperature of 94°C.
During the 1st three minutes after serving the temperature falls as described below.
Left to cool naturally soup temperature decreases by 7% of its value every minute.
Stirring soup doubles its rate of cooling while it is being stirred
Mary leaves her soup to cool naturally
(a) Find the temperature of Mary's soup after 3 minutes. (3)
Jane stirs her soup for one minute, then leaves it to cool naturally for two minutes.
(b) Find how much cooler Jane's soup is than Mary's after three minutes. (3)

21. Solve $x^2 + y^2 = 41$
$y = 2x - 6$ (4)

22. Using fig (5) on your worksheet

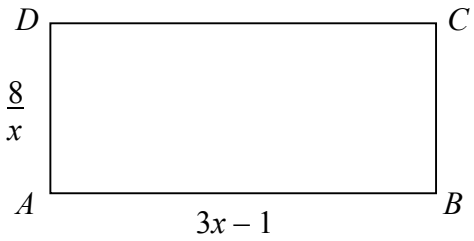
(a) Sketch on the axis the curve with equation $y = \sin x$. Label this curve (a) (2)

(b) On the same axis sketch $y = -2\sin x$. Label this curve (b) (2)

(c) Describe in words the transformation that would map
map $y = \sin x$ to the curve $y = \sin(x - 90) + 3$. (2)

23. Rectangle $ABCD$ is $3x - 1$ cm long and $\frac{8}{x}$ cm wide.

Its perimeter is 30cm.



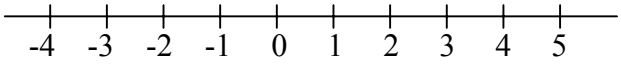
(a) Show that $3x^2 - 16x + 8 = 0$ (3)

Given that the rectangle is longer than it is wide.

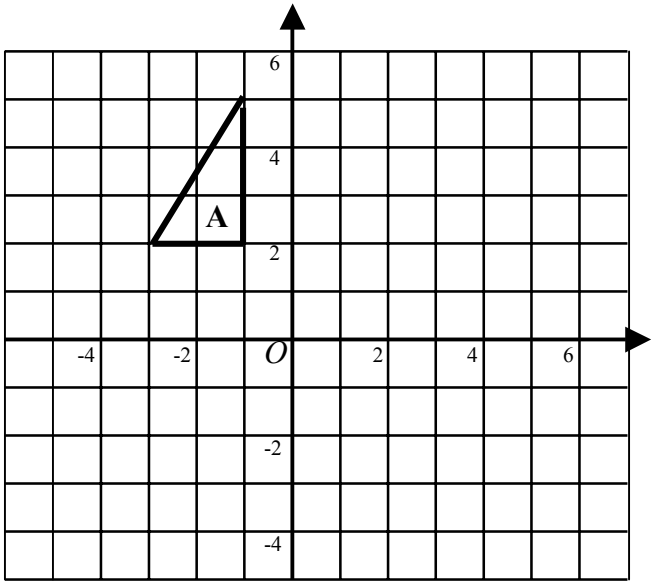
(b) Find the length of the rectangle.
Give your answer correct to 3 significant figures. (3)

Sample Paper worksheet Name…….

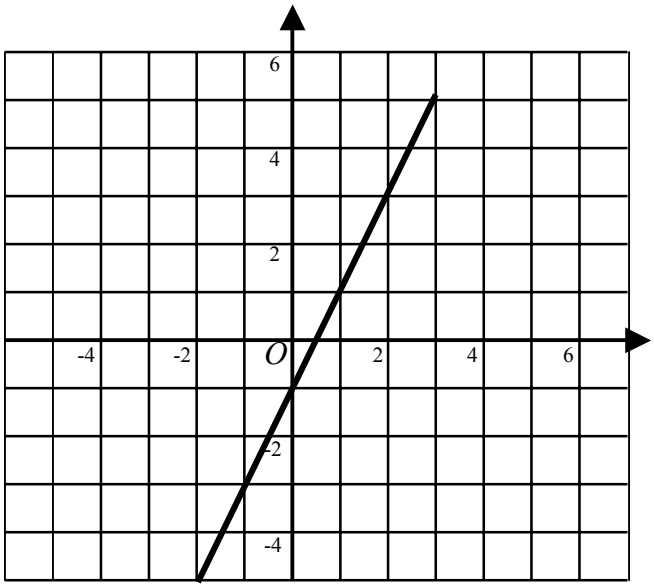
Fig(1)



Fig(2)



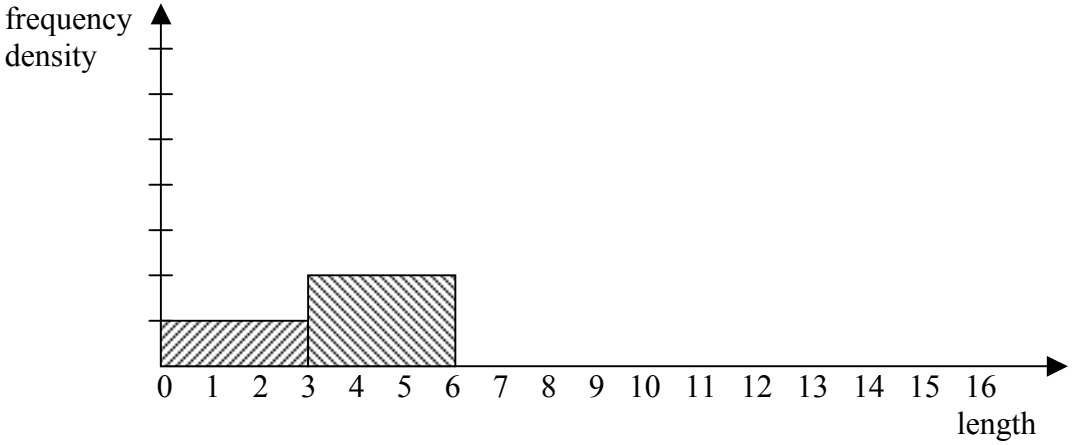
Fig(3)



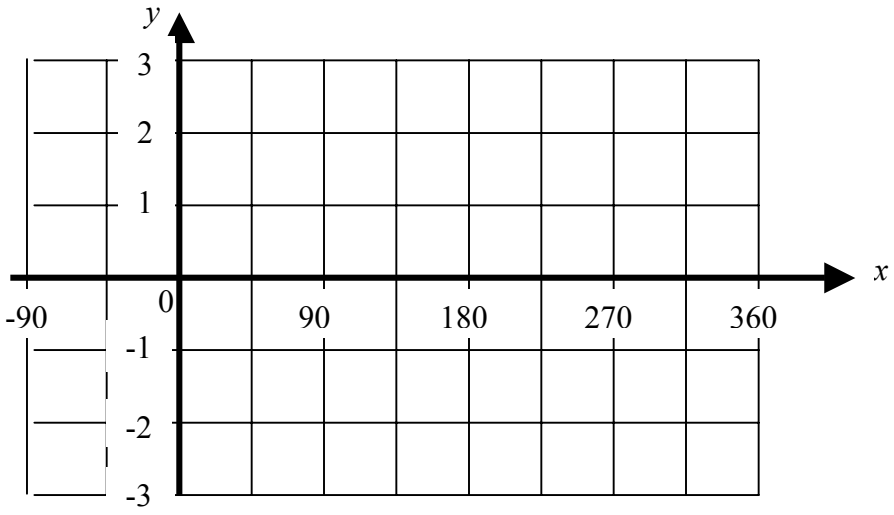
Sample Paper worksheet cont. name……

Fig(4)

Length l in cm	Number
$0 < l \leq 3$	6
$3 < l \leq 6$	
$6 < l \leq 8$	20
$8 < l \leq 10$	27
$10 < l \leq 15$	15



Fig(5)



Answers Sample Paper.

1. 110^o
2. (a)(i) $x = 8$
   (ii) $x = 3$
   (b)(i) $x \leq -2$
3. (a) 20cm^2
   (b) 9.43cm.
4. (a) 0.0502765791
   (b)(i) 0.05028
   (ii) 0.050
5. £432
6. (a) 41^o
   (b) Isosceles.
   (c) Obtuse
7. (c) Reflection in x axis.
8. (a) 1/24
   (b) 1/3
9. (a) 15cm.
   (b) 2km^2
10. (a) -3.13
    (b) $\sqrt{\frac{y+3b^2}{2}}$
11. (a) £31.50
    (b) £35
12. (a) $y = 2x - 1$
13. 54.5cm^2
14. (a) 12
    (c) $8 < l \leq 10$
    (d) 7.92
15. 23.88 not certain.
16. (a) 113m.
    (b) 6000m^2
    (c) 148^o
17. (a) $h = \frac{2\sqrt{a}}{3}$
    (b) 225 years.
18. 16.4.
19. (a) $\frac{x-1}{x+1}$
    (b) $6a^5b^6$
20. (a) 75.6
    (b) 5.7^o
21. $x = 5, y = 4$. $x = -0.2, y = -6.4$
22. (c) Translation 90 in positive x direction and translation 3 in positive y direction.
23. 13.3cm.