

Name: _____

GCSE 9-1 Higher
Practice Paper
Set D
Paper 3 - Calculator



Equipment

1. A black ink ball-point pen.
2. A pencil.
3. An eraser.
4. A ruler.
5. A pair of compasses.
6. A protractor.
7. A calculator

Guidance

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

Information

1. Time: 1 hour 30 minutes
2. The maximum mark for this paper is 80.
3. The marks for questions are shown in brackets
4. You may use tracing paper.

Question	Mark	Available
1		3
2		2
3		6
4		3
5		4
6		3
7		4
8		8
9		5
10		3
11		5
12		4
13		3
14		6
15		5
16		4
17		6
18		4
19		2
Total		80

1. (a) Write 48 as a product of primes.

.....
(1)

(b) Find the LCM of 48 and 180

.....
(2)

2. An energy bar contains 5.4g of protein.
15% of the bar is protein.

What is the total mass of the bar?

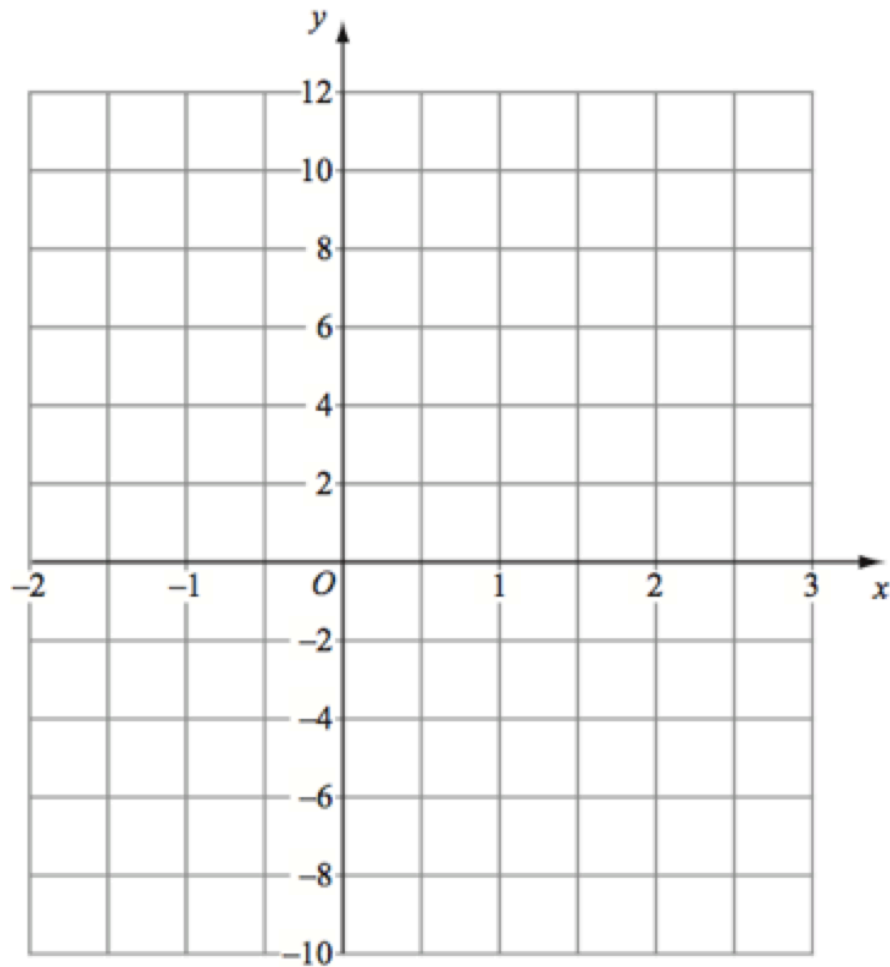
.....g
(2)

3. (a) Complete this table of value for $y = x^2 - 2x - 2$

x	-2	-1	0	1	2	3
y						

(2)

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



(2)

(c) Use the graph to estimate the solutions to $x^2 - 2x - 2 = 0$

.....
(2)

4. In Year 8 there are two classes, 8A and 8B
There are 20 students in Class 8A and 30 students in Class 8B.

The mean number of books read each month in Class 8A is 3.75

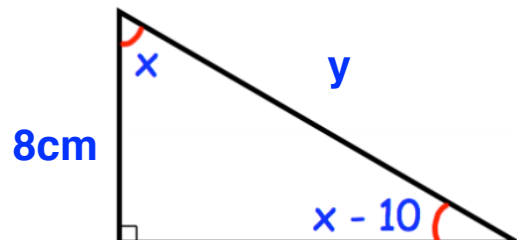
The mean number of books read each month in Year 8 is 3.2

Work out the mean number of books read each month in Class 8B.

Give your answer to 2 decimal places.

.....
(3)

5. Here is a right angled triangle.



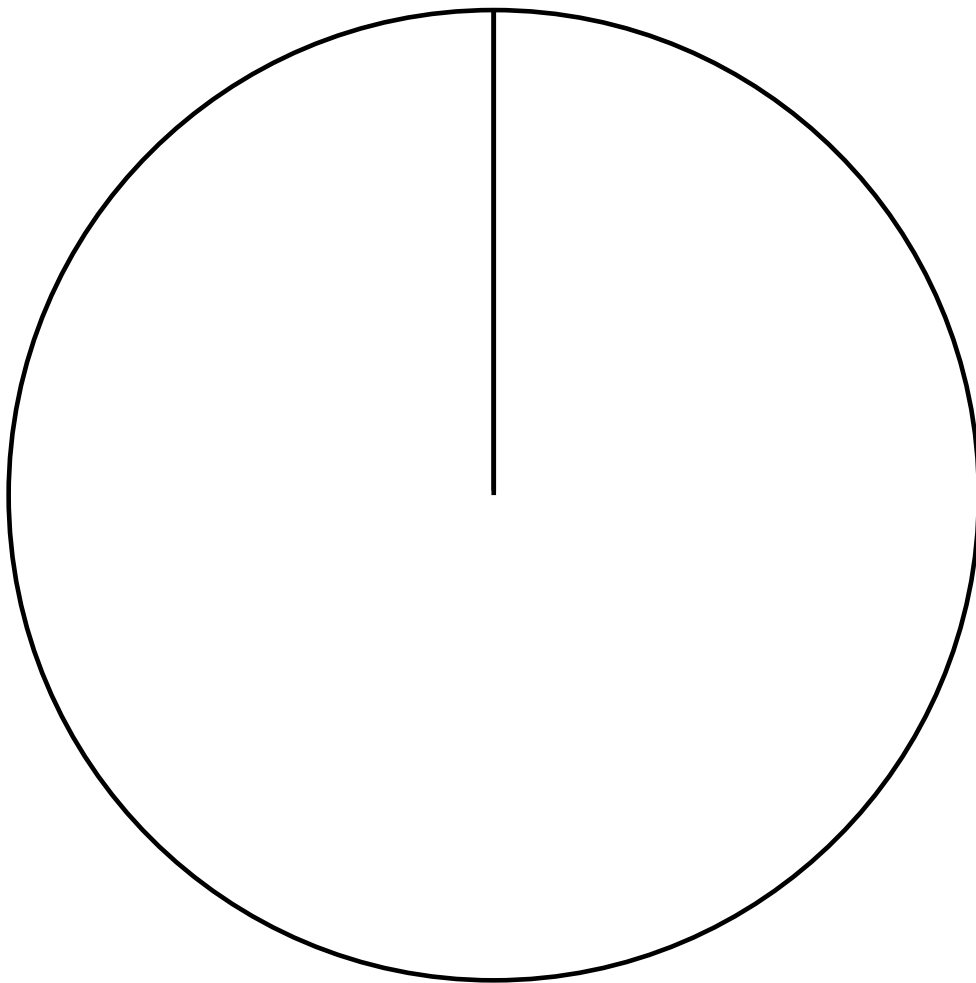
Work out the length of the side labelled y.

.....
(4)

6. The table shows information on the number prizes given out in prize day.

Year Group	Frequency
7	5
8	17
9	20
10	8

Draw a pie chart for this information



(3)

7. Mr.Dixon is building a toy boat for his son.
He has three different planks of wood to choose from.

Plank A	Plank B	Plank C
Volume = 750cm^3 Mass = 900g	Volume = 0.0152m^3 Mass = 7.6kg	Volume = 1000cm^3 Mass = 1.02kg

If wood has a density under 1g/cm^3 , it will float.

Which plank of wood is the most suitable?
Explain your answer.

Plank
(4)

8. (a) Expand and simplify $(x - 1)(3x - 1)(x - 4)$

.....
(3)

(b) Simplify $(3x^4)^3$

.....
(2)

(c) Solve $3x^2 + 2x - 7 = 0$
Give your solutions correct to 2 significant figures.

.....
(3)

9. $f(x) = 1 + \cos x^\circ$

(a) Find $f(100)$

Give your answer to 3 decimal places.

.....
(1)

$$g(x) = \tan x^\circ$$

(b) Find $fg(88)$

Give your answer to 3 decimal places.

.....
(2)

$$h(x) = 2x + 1$$

(a) Find the value of a such that $h(a) = h^{-1}(a)$

.....
(2)

10. The amount of money at the start of year t is A_t
The amount of money in the bank account at the start of year 1 is £5000

Given that

$$A_{t+1} = 1.02A_t$$

work out the amount of money in the bank account at the start of year 4.

£.....
(3)

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11. q is inversely proportional to the square of t .
When $q = 7.5$, $t = 1.6$

(a) Calculate the value of q when $t = 8$

.....
(3)

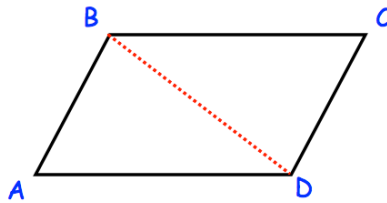
(b) Calculate the value of t when $q = 1.875$

.....
(2)

12. Prove that when two consecutive integers are squared, that the difference is equal to the sum of the two consecutive integers.

(4)

13. ABCD is a parallelogram.



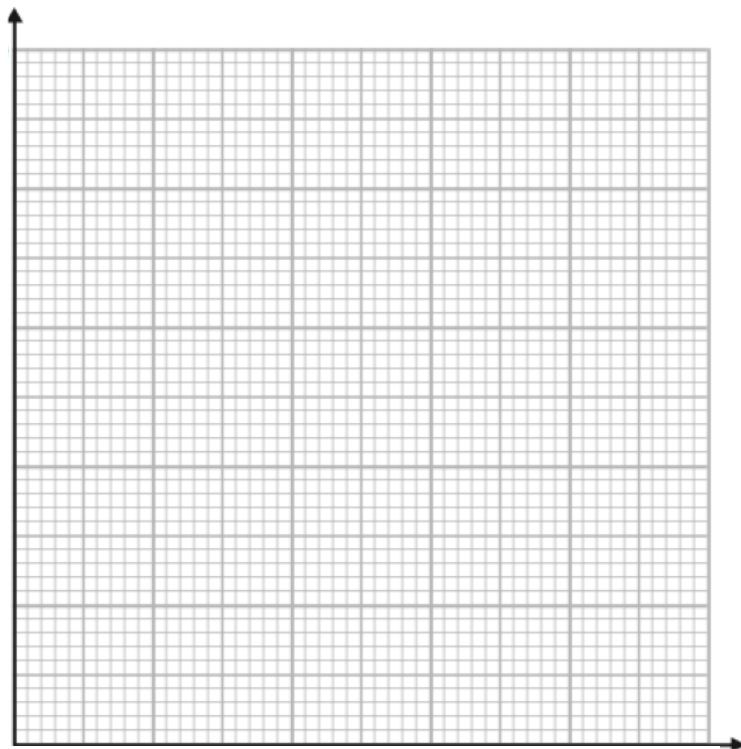
Prove that triangles ABD and BCD are congruent.

(3)

14. The waiting times, h hours, for 40 patients at an accident and emergency department in one evening is shown below.

Waiting time, h	Frequency
$0 < h \leq 0.5$	8
$0.5 < h \leq 1$	10
$1 < h \leq 1.5$	7
$1.5 < h \leq 3$	9
$3 < h \leq 5$	6

- (a) Draw a histogram for this data.



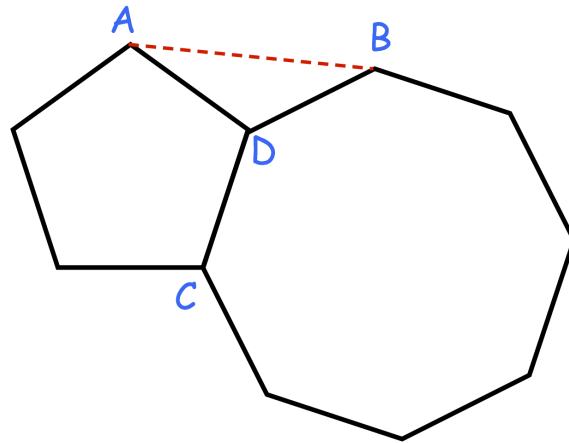
(3)

Two patients are selected at random to complete a survey.

- (b) Find the probability that both patients had a waiting time of over 1.5 hours.

.....
(3)

15. A is a vertex of a regular pentagon.
B is a vertex of a regular octagon.
C and D are vertices of both polygons.



The perimeter of the octagon is 40cm.

Work out the length AB

.....cm
(5)

16. Sophie estimated that the distance between Bristol and Newcastle is about 290 miles and that her average driving speed would be 50 mph.

She estimated the distance to the nearest 10 miles and the speed to the nearest 5 mph.

Calculate the lower bound of the time the journey should take.

Give your answer in hours and minutes.

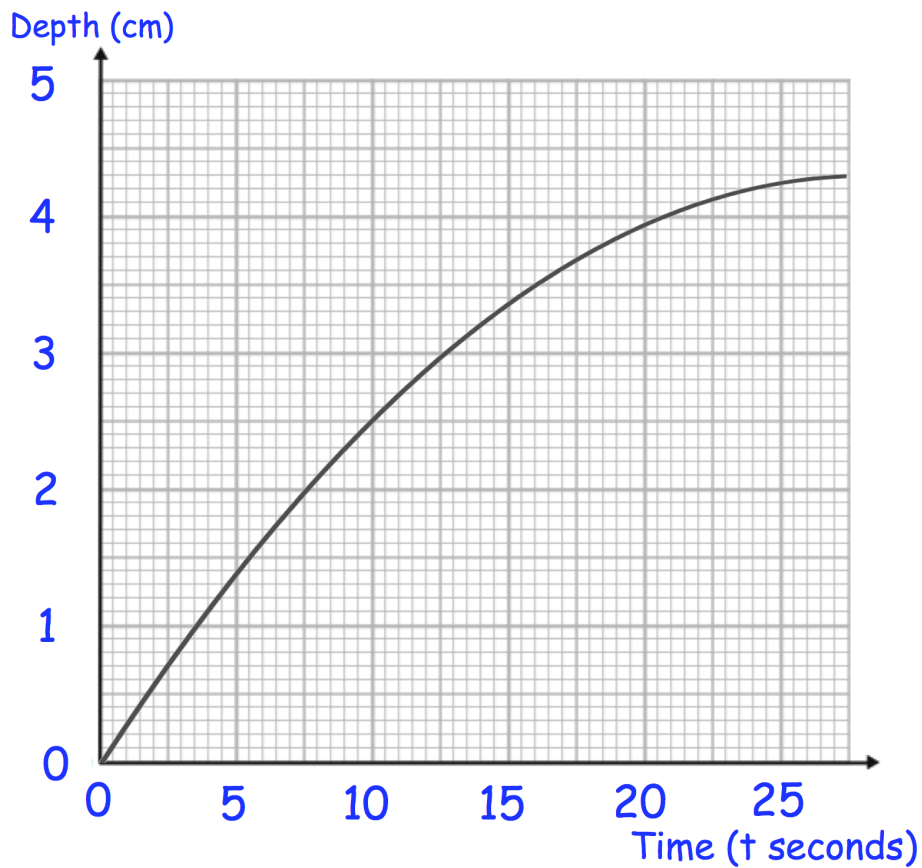
Give your answer to the nearest minute.

.....hoursminutes

(4)

17. Jack is filling a container with water.

The graph shows the depth of the water, in centimetres, t seconds after the start of filling the container.



(a) Calculate an estimate for the gradient of the graph when $t = 15$ seconds.

.....
(3)

(b) Describe fully what your answer to (a) represents

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

(c) Explain why your answer to (a) is only an estimate

.....
(1)

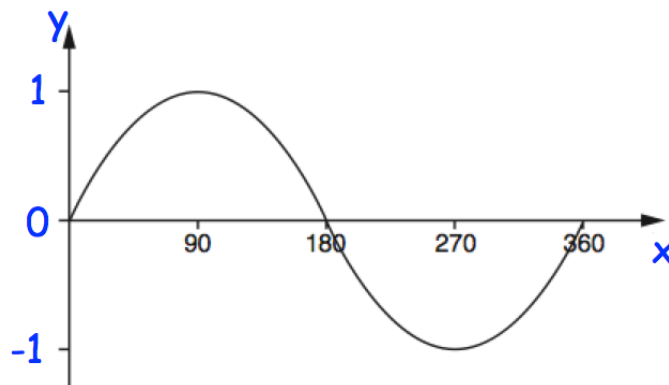
18. Solve the equations

$$2x + y = 11$$

$$2x^2 - y^2 = 23$$

.....
(4)

19. Here is the graph of $y = \sin(x)$ for $0 \leq x \leq 360$



One solution of $\sin x = -0.5$ is $x = 330^\circ$
Find another solution of $\sin x = -0.5$

$x = \dots\dots\dots$
(2)