Name:

GCSE 9-1 Higher
Practice Paper
Set C
Paper 1 - Non Calculator

Corbettmaths

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.

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		4
3		4
4		4
5		4
6		4
7		2
8		3
9		5
10		2
11		4
12		5
13		2
14		3
15		3
16		4
17		3
18		3
19		5
20		3
21		3
22		4
23		3
Total		80

1. Write 120 as a product of its prime factors.
Give your answer in index form.

$$120 = 2 \times 60,\quad 60 = 2 \times 30,\quad 30 = 2 \times 15,\quad 15 = 3 \times 5$$

$2^3 \times 3 \times 5$

(3)

2. Harley is 8 years younger than India.
Jessica is three times older than Harley.
The sum of the three ages is 88.

Write the ratio of Jessica's age to India's age.

India $= x$
Harley $= x-8$
Jessica $= 3(x-8)$

$$x + x - 8 + 3(x-8) = 88$$
$$x + x - 8 + 3x - 24 = 88$$
$$5x - 32 = 88$$
$$5x = 120$$
$$x = 24$$

India $= 24$
Harley $= 16$
Jessica $= 48$

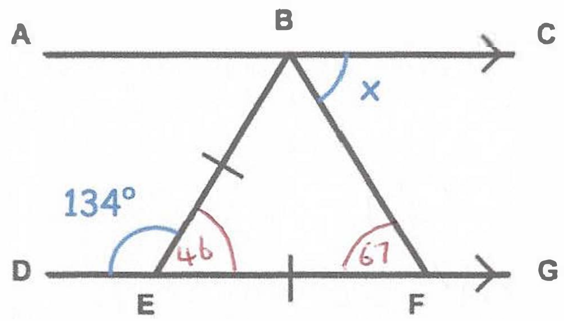
$48:24$

$2:1$

$2:1$

(4)

3.



ABC and DEG are straight lines.
BE = EF

Angle DEB = 134°

Find the size of angle CBF
Give a reason for each stage of your working.

FEB = 46 Angles in a straight line add up to 180

180 − 46 = 134
134 ÷ 2 = 67
EFB = 67 Angles in a triangle add up to 180

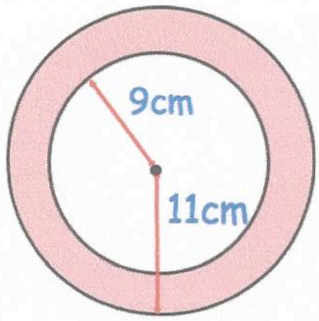
Base angles in an isosceles triangle are equal

CBF = 67 alternate angles are equal

x = 67

(4)

4.



Work out the shaded area.
Give your answer in terms of π

$\pi \times 11^2 = 121\pi \text{ cm}^2$

$\pi \times 9^2 = 81\pi \text{ cm}^2$

$121\pi - 81\pi = 40\pi \text{ cm}^2$

40π ....cm²

(4)

5. The table shows information about the delivery times of pizzas.

Delivery Time	Frequency	MP	fx
$0 < t \leq 10$	3	5	15
$10 < t \leq 20$	10	15	150
$20 < t \leq 30$	14	25	350
$30 < t \leq 40$	19	35	665
$40 < t \leq 50$	4	45	180
	50		1360

(a) Work out an estimate for the mean delivery time.

$1360 \div 50 = 27.2$

27.2

(3)

Evelyn says,

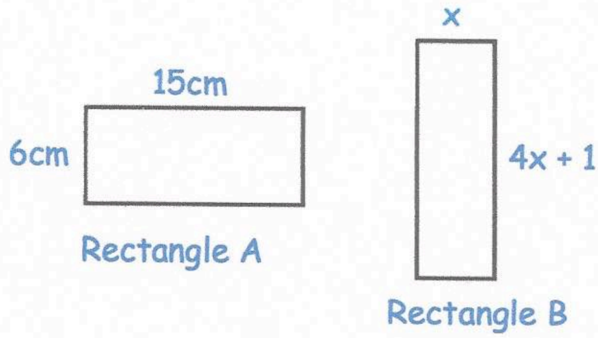
"The mean may **not** be the best average to use to represent this information."

(b) Do you agree with Evelyn?
You must justify your answer

There are no outliers, so I do not agree with Evelyn.
The mean is a good choice of average to use.

(1)

6.

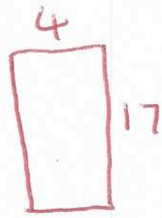


Rectangles A and B have the same perimeter.

Find the area of Rectangle B.

Perimeter of A = 42cm

Perimeter of B = $10x+2$



$10x+2=42$

$10x=40$

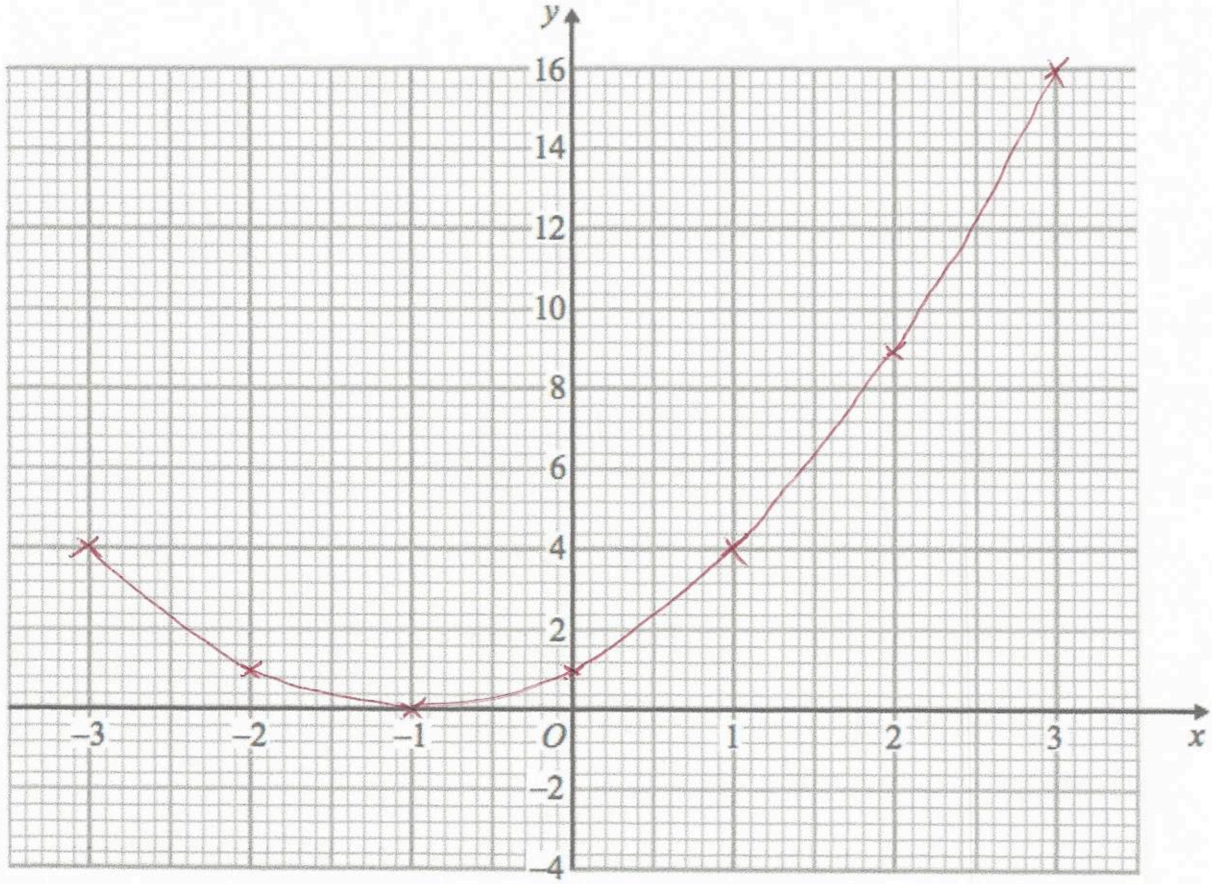
$x=4$

$4 \times 17 = 68$

........68........cm²
(4)

7. Draw the graph of $y = x^2 + 2x + 1$

x	-3	-2	-1	0	1	2	3
y	4	1	0	1	4	9	16



(2)

9. Kelvin completes a journey in three stages.

In stage 1 of his journey, he drives at an average speed of 32 miles per hour for 45 minutes.

(a) How far does Kelvin travel in stage 1 of his journey?

45 mins $= \frac{3}{4}$ hour

$32 \times \frac{3}{4} = 24$

24 ....miles
(2)

In stage 2 of his journey, Lee drives at an average speed of 44 miles per hour for 2 hours 45 minutes.

Altogether, over all three stages, Lee drives 150 miles in 4 hours.

What is his average speed, in miles per hour, in stage 3 of his journey?

2hrs 45mins $= 2\frac{3}{4}$ hours

$44 \times 2\frac{3}{4} = 121$ miles

$121 + 24 = 145$

$150 - 145 = 5$ miles

$2\frac{3}{4} + \frac{3}{4} = 3\frac{1}{2}$

stage 3 was 5 miles in $\frac{1}{2}$ hour

$5 \div \frac{1}{2} = 10$

10 ....miles per hour
(3)

10. (a) Write down the value of $27^{\frac{1}{3}}$

3

....
(1)

(b) Write down the value of $36^{\frac{3}{2}}$

$\sqrt{36} = 6$

$6^3 = 216$

216

....
(1)

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11. Three bananas and two pears cost 95p.
Five bananas and three pears cost £1.51

Find the cost of ten bananas and ten pears.

$3b + 2p = 95 \quad \times 3$

$5b + 3p = 151 \quad \times 2$

$9b + 6p = 285$

$10b + 6p = 302$

$b = 17$

$51 + 2p = 95$

$2p = 44$

$p = 22$

$10b = 170$

$+ \quad 10p = 220$

390

£3.90

....
(4)

8. In a competition, a prize is won every 2018 minutes.
Work out an estimate for the number of prizes won in 1 year.

You must show your working.

60 mins = 1 hr

24 hours = 1 day

365 days = 1 year

$60 \times 20 \times 400 = 480000$

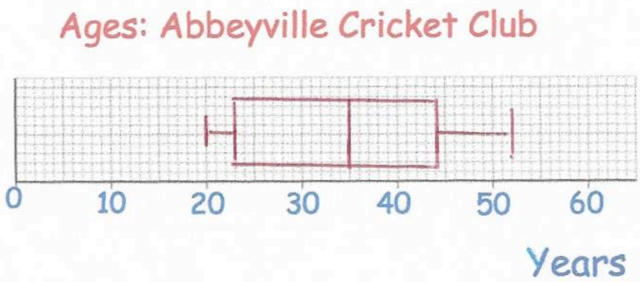
$480000 \div 2000 = 240$

240
....
(3)

12. The table shows information about the ages of cricketers at Abbeyville Cricket Club.

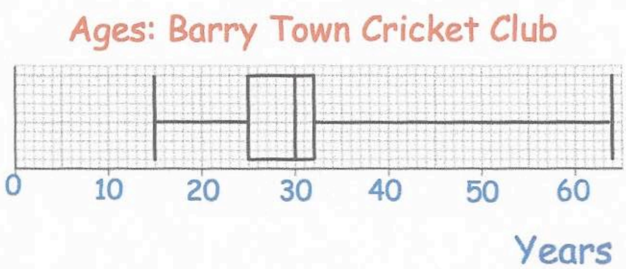
Youngest	20
Median	35
Upper Quartile	44
Range	32
Interquartile Range	21

(a) Draw a box plot for this information



(3)

The box plot below shows information about the ages of cricketers at Barry Town Cricket Club.



(b) Compare the distribution of ages of cricketers at Abbeyville with the distribution of ages of cricketers at Barry Town

The median age at Barry is much younger.

The range of ages at Barry is much larger

....

(2)

13. A saleswoman sold the 630 cars last year.
The cars were either Ford or Toyota.
The saleswoman takes a sample of 18 cars that she sold to survey their owners.

The proportion of the Ford cars in her sample is the same as the proportion of Ford cars last year.

She calculated that she needed exactly 7 Ford cars in her sample.

Work out the total number of Ford cars the saleswoman sold last year.

$\frac{7}{18} = \frac{x}{630}$

$\frac{630}{18} = 35$

$35 \times 7 = 245$

245
....
(2)

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14. The ratio (m – 2c) : (m + c) is equivalent to 1 : *k*

Show that $m = \dfrac{c(2k+1)}{k-1}$

$K(m-2c) = 1(m+c)$

$Km - 2cK = m + c$

$Km - m = c + 2cK$

$m(K-1) = c(2K+1)$

$m = \dfrac{c(2K+1)}{K-1}$

(3)

15. Write $0.3\dot{9}\dot{0}$ as a fraction.

Give your answer in its simplest form.

$y = 0.39090...$

$10y = 3.9090...$

$100y = 39.0909...$

$1000y = 390.9090...$

$990y = 387$

$y = \frac{387}{990} = \frac{43}{110}$

(3)

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16. C is directly proportional to the square root of y.
When C = 12.8, y = 16.

(a) Express C in terms of y.

$C \propto \sqrt{y}$

$C = k\sqrt{y}$

$12.8 = k\sqrt{16}$

$4k = 12.8$

$k = 3.2$

C = $3.2\sqrt{y}$ ....

(3)

(b) Find C when y = 400

$C = 3.2 \times \sqrt{400}$

$C = 3.2 \times 20$

$C = 64$

C = 64 ....

(1)

17. Prove that when two consecutive odd integers are squared, that the sum is always an even number

$(2n+1)^2 + (2n+3)^2$

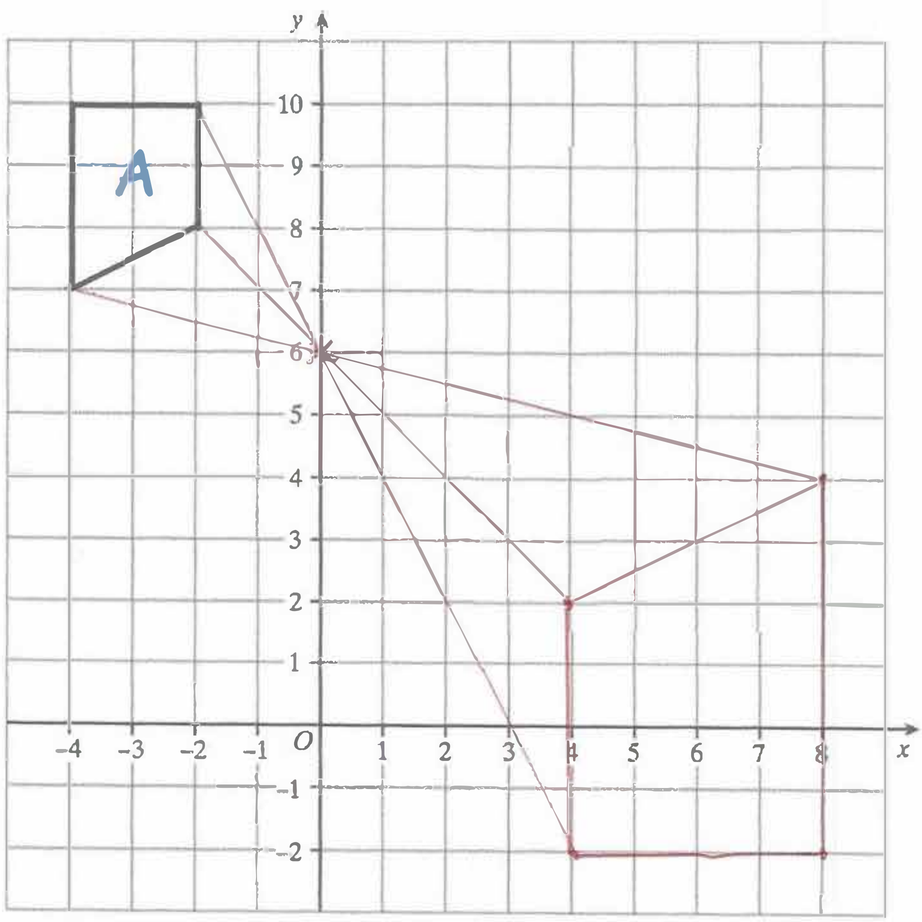
$= 4n^2 + 4n + 1 + 4n^2 + 12n + 9$

$= 8n^2 + 16n + 10$

$= 2(4n^2 + 8n + 5)$ therefore always even

(3)

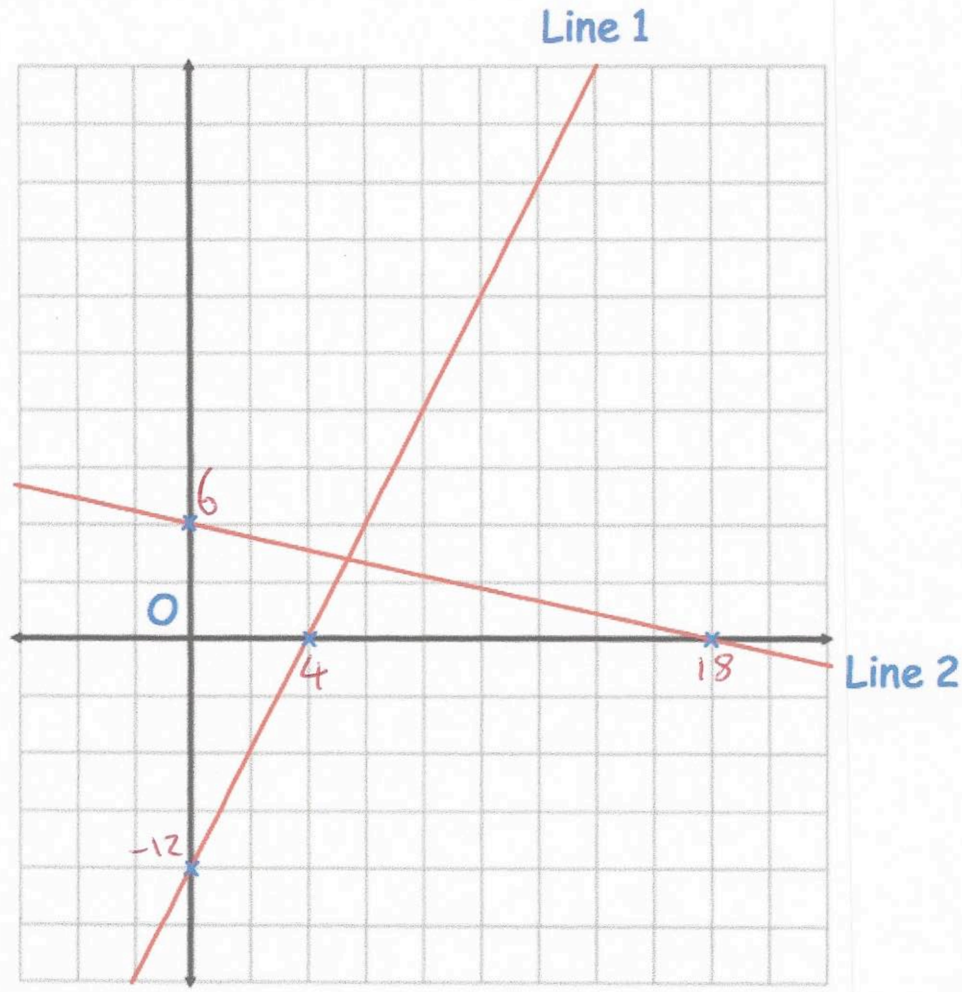
18.



Enlarge the quadrilateral by scale factor –2, using centre of enlargement (0, 6)

(3)

19. Shown are two straight lines drawn on the grid.



Line 1 has equation $y = 3x - 12$

$3x - 12 = 0$
$3x = 12$
$x = 4$

(a) Find the equation of Line 2

$\frac{y_2 - y_1}{x_2 - x_1} = \frac{6-0}{0-18} = -\frac{6}{18} = -\frac{1}{3}$

$y = -\frac{1}{3}x + 6$

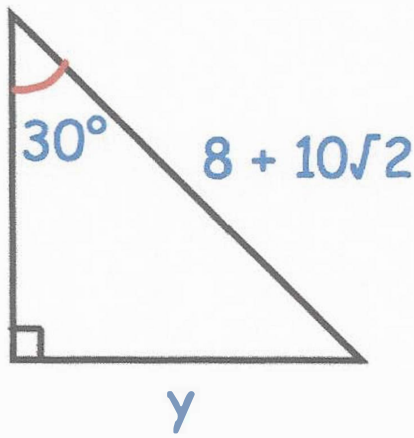
(4)

(b) Are the two lines perpendicular?
Explain your answer.

Yes as the gradients multiply together to give -1. Negative reciprocal of each other

(1)

20. Shown below is a right angled triangle.



S O H

Find the exact length of the side labelled y.

$y = \sin(30) \times (8 + 10\sqrt{2})$

$\sin 30 = \frac{1}{2}$

$\frac{1}{2}(8 + 10\sqrt{2})$

$= 4 + 5\sqrt{2}$

$4 + 5\sqrt{2}$
....

(3)

21. Show that $\dfrac{3-\sqrt{32}}{1+\sqrt{2}}$ can be written in the form $a + b\sqrt{2}$

where a and b are integers.

$$\frac{(3-\sqrt{32})(1-\sqrt{2})}{(1+\sqrt{2})(1-\sqrt{2})} = \frac{3-\sqrt{32}-3\sqrt{2}+\sqrt{64}}{1-\sqrt{2}+\sqrt{2}-2}$$

$$= \frac{3-4\sqrt{2}-3\sqrt{2}+8}{1-2}$$

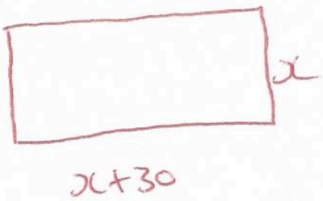
$$= \frac{11-7\sqrt{2}}{-1} = -11+7\sqrt{2}$$

$-11+7\sqrt{2}$ ....

(3)

22. The width of a rectangular field is x metres.
The length of the field is 30m longer than the width.
The perimeter of the field is less than 500m.
The area of the field is greater than 4000m².

By writing suitable inequalities, find the possible values of x



$4x + 60 < 500$

$4x < 440$

$x < 110$

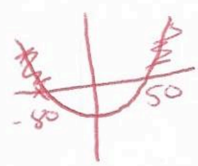
$\text{Area} = x(x+30)$

$= x^2 + 30x$

$x^2 + 30x > 4000$

$x^2 + 30x - 4000 > 0$

$(x+80)(x-50) > 0$



$x < -80$

$x > 50$

x cannot be negative

so $50 < x < 110$

$50 < x < 110$

(4)

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

10 18 30 46 66

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

10 18 30 46 66

8 12 16 20

4 4 4 Second difference of 4.

$2n^2 + 2n + 6$

$2n^2 + 2n + 6$

....

(3)

2 8 18 32

10 18 30 46

+8, +10, +12, +14. $2n + 6$