Name: **solutions**

GCSE 9-1 Higher
Practice Paper
Set B
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		2
2		4
3		5
4		4
5		2
6		4
7		3
8		3
9		2
10		3
11		3
12		3
13		6
14		4
15		6
16		2
17		4
18		4
19		4
20		5
21		4
22		3
Total		80

1. Work out, as a simplified fraction

$$\frac{4}{5} - \frac{2}{3}$$

$$= \frac{12}{15} - \frac{10}{15}$$

$\dfrac{2}{15}$

(2)

2. A sequence of numbers is shown.

   2   9   16   23   30   ...   ...

   (a) Find an expression for the nth term of the sequence.
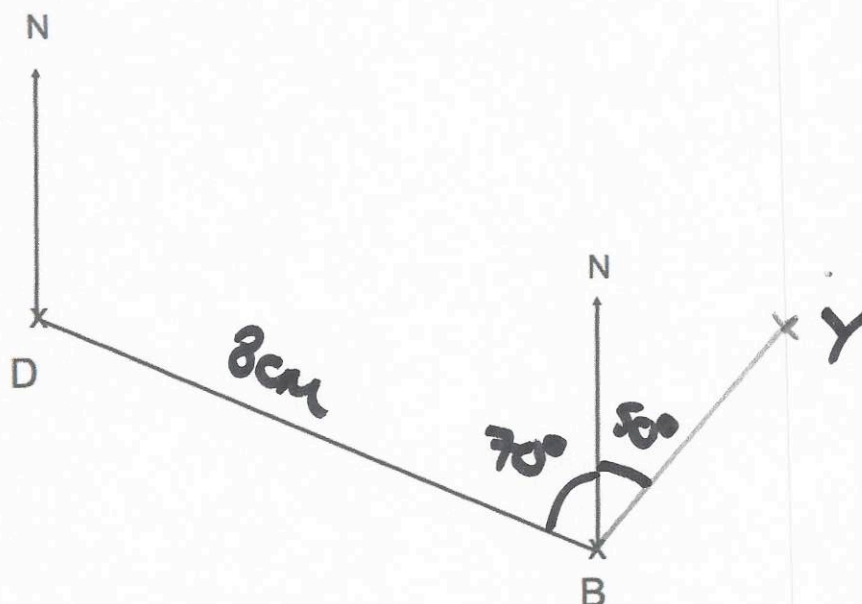
   $7n - 5$

   ....
   (2)

   (b) Find the 100th term in the sequence.

   $7 \times 100 - 5 = 695$

   ....

(2)

3.   The diagram shows the position of a boat B and a dock D.

The scale of the diagram is 1cm represents 2km.

(a) Work out the actual distance between the dock and the boat.

$$8 \times 2 = \qquad 16$$

..........................km

(2)

(b) Measure the bearing of the dock D from the boat B.

$$360 \cdot 70 = \qquad 290$$

.........................°

(1)
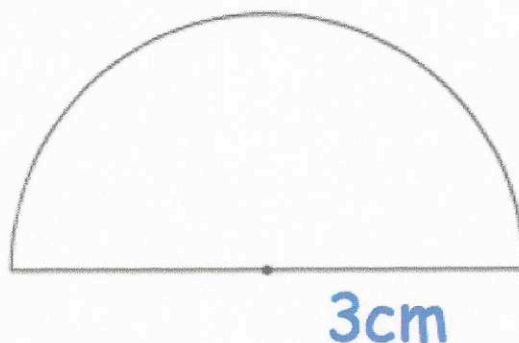
A yacht Y is 8km from the boat B on a bearing of 050°

(c) On the diagram, mark the position of yacht Y with a cross (x).
     Label it Y.

(2)

4. Shown is a semicircle with radius 3cm.

3cm

Work out the perimeter of the semicircle.
Give your answer in terms of π.

circumference $= \pi \times d = 6\pi$

$\therefore$ half circumference $= 3\pi$

Perimeter $= 3\pi + 6$

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

(4)

5. The length of a line, L cm, is measured as 10cm, correct to the nearest centimetre.

Write down the error interval for L

$9.5 \leqslant L < 10.5$

....

6. 80 students at a college study one language.

Some of the students study French.
Some of the students study German.
The rest of the students study Spanish.

41 of the students are female.
Two thirds of the students studying German were female.
33 students study French.
17 of the 26 students studying Spanish are male.

Work out the number of students studying German that are male.

	F	G	S	
M		⑦	17	39
F		14	9	41
	33	21	26	80

7

7. A train has two types of carriage, first class and standard class.

The train has 3 first class carriages.
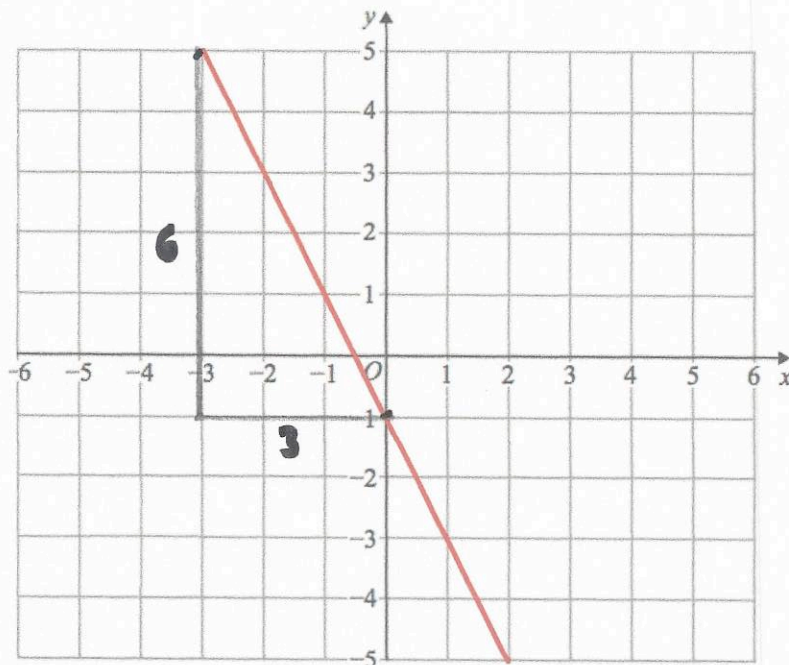The train has 13 standard class carriages.

There are x seats in each first class carriage and y seats in each standard class carriage.

Write down a formula for T, the total number of seats, in terms of x and y.

$$T = 3x + 13y$$

....

(3)

8. A straight line L is shown on the grid.

Work out the equation of line L

$$M = -\frac{6}{3} = -2$$

6

3

$$c = -1$$

$$y = -2x - 1$$

....

9. Write these numbers in order of size.
   Start with the largest number.

$0.1\dot{3}\dot{8}$ $0.13\dot{8}$ 0.138 $0.13\dot{8}$

0.1381   0.1388   0.1383

$0.13\dot{8}$ $0.13\dot{8}$ $0.1\dot{3}\dot{8}$ 0.138

(2)

10. Dillan has 7 wooden rods, each with a different length.

He wants to make a right-angled triangle by picking 3 rods.

4cm   8cm

5cm   6cm

11cm   12cm

15cm

13cm

rod 1 : ....5....cm   rod 2 : ...12....cm   rod 3 : ...13....cm

11.   (a)   Factorise $x^2 - 25$

(3)

$$(x+5)(x-5)$$

(1)

        (b)   Factorise $y^2 - 12y - 64$
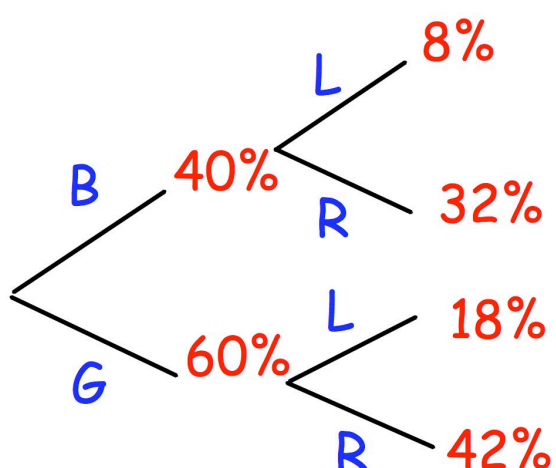
$$(y - 16)(y + 4)$$

(2)

12.   In a school, the ratio of boys to girls is 2:3

        20% of the boys are left handed
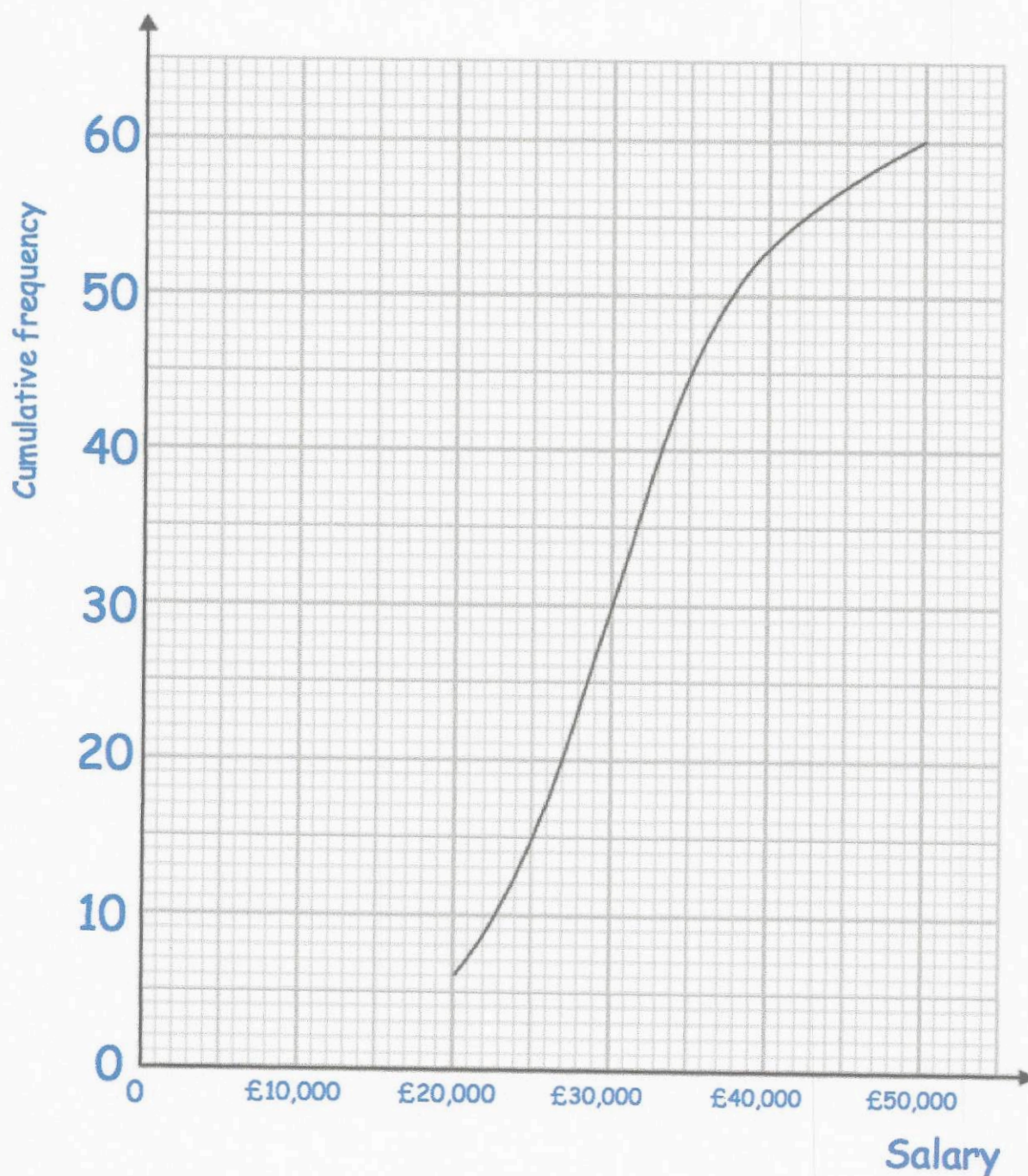   70% of the girls are right handed

        What percentage of all the students are left handed?

26 %

13. A university surveyed 60 mathematics graduates on their starting salary.
The cumulative frequency graph shows some information about the salaries.

(a) Use the graph to find an estimate for the median salary.

£...30,000...........

(1)

The 60 mathematics graduates
had a minimum salary of £16,000
and a maximum salary of £48,000.

(b) Use this information and the cumulative frequency curve to draw a box plot
for the 60 mathematics graduates.

Mathematics Graduates

£   £0   £10,000   £20,000   £30,000   £40,000   £50,000
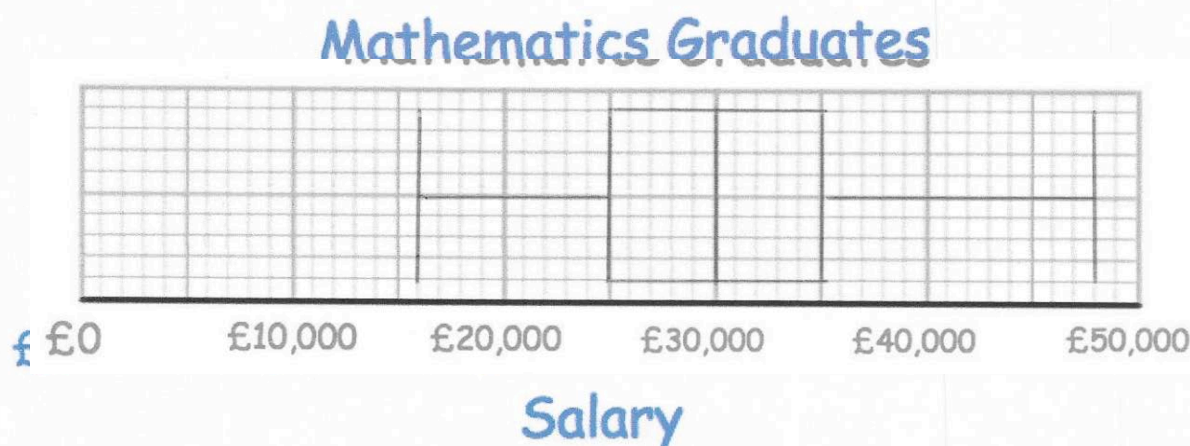
Salary

(3)

The university also surveyed 60 archaeology graduates.
The box plot below shows information about their salaries.

Archaeology Graduates

£0   £10,000   £20,000   £30,000   £40,000   £50,000
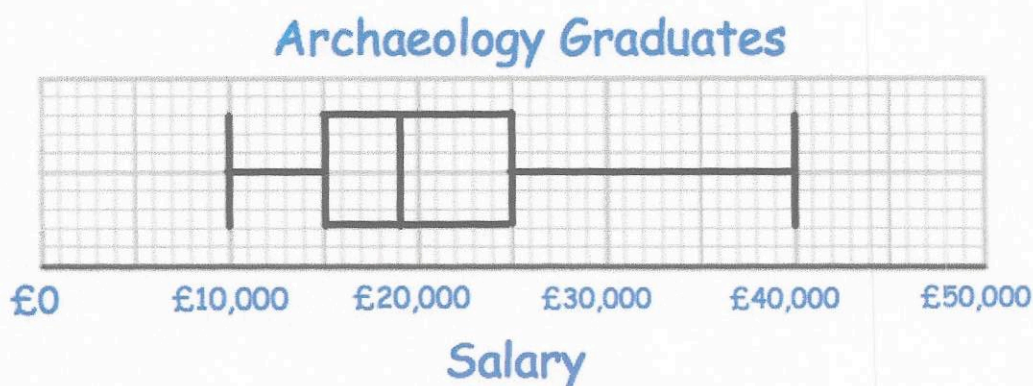
Salary

(c) Compare the distribution of the salaries of the mathematics graduates with
the distribution of the salaries of the archaeology graduates.

The salaries have a similar spread, both with IQR
of £10000. The mathematics graduates earn more, with
a median of £30000 compared to £19000

(2)

14. The number of visitors to some tourist attractions is shown in the table below.

The King's Palace	5.4 million
Castle	923,840
Theme Park	1.43×10^7
Science Museum	4,192,900

(a) Write the number of visitors to the Theme Park as an ordinary number.

14,309000 0

(1)

(b) Write the number of visitors to the Castle in standard form.

9.2384×10^5

(1)

(c) How many more people visited the Theme Park than the Science.

```
    2 99
  14300000
- 4192,900
  10104100
```

10104100

(2)

15. Sally and Laura sit their driving tests.

The probability of Sally passing her driving test is 0.7
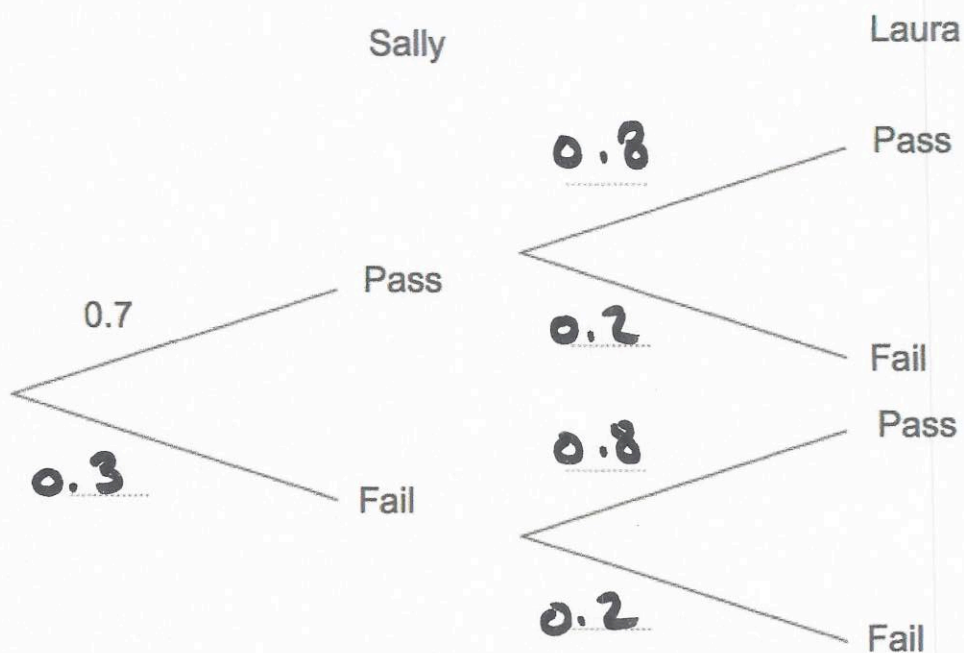The probability of both Sally and Laura passing is 0.56

(a) Work out the probability of Laura passing her driving test.

$$0.56 \div 0.7 =$$

....................0.8....................

(2)

(b) Complete the tree diagram.

Sally   Laura

0.8   Pass

0.7   Pass

0.2   Fail

0.3   Fail

0.8   Pass

0.2   Fail

(2)

(c) Find the probability of both women failing.

$$0.3 \times 0.2 =$$

....................0.06....................

(2)

16. Hannah wants to estimate the number of eels in a lake.
She catches and rings 50 eels.
She returns the 50 eels to the lake.
Hannah then catches 200 eels.
Of these 200 eels, 27 are ringed.

Work out an estimate of how many eels live in the lake.

$$\frac{50}{total} = \frac{27}{200} \quad \therefore total = \frac{200 \times 50}{27} \approx 370$$

370
....
(2)
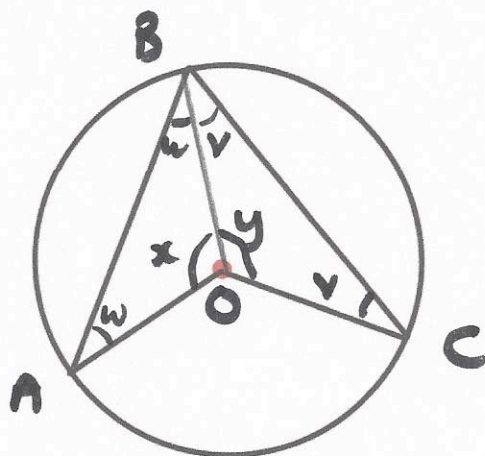
17. Expand and simplify $(3 + \sqrt{8})(4 + \sqrt{2})$

Give your answer in the form $a + b\sqrt{2}$ where a and b are integers.

$$12 + 4 + 4\sqrt{8} + 3\sqrt{2}$$

$$= 16 + 4 \times 2\sqrt{2} + 3\sqrt{2}$$

$$= 16 + 11\sqrt{2}$$

....
(4)

18.   Prove that the angle at the centre is twice the angle at the circumference.

triangles OAB and OBC are isosceles,

so $O\hat{A}B = O\hat{B}A$ and $B\hat{C}O = C\hat{B}O$

$2w + x = 180$

$2v + y = 180$

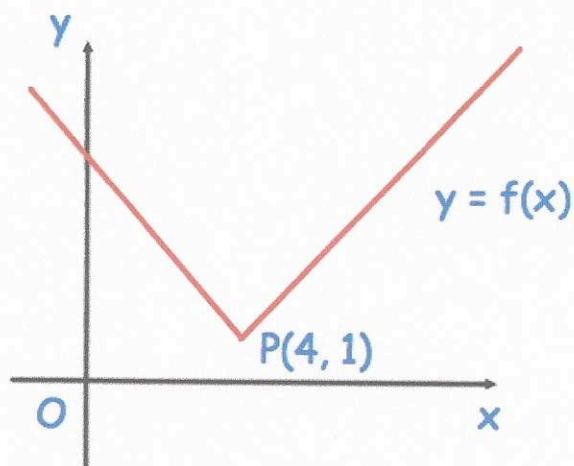$\therefore x = 180 - 2w$

$y = 180 - 2v$

$x + y = 360 - 2w - 2v$

$\therefore C\hat{O}A = 360 - (x+y) = 2w + 2v$

$= 2(w+v)$

which is $2 \times A\hat{B}C$

(4)

19. Here is the graph of y = f(x)
The point P(4, 1) is a point on the graph.

What are the coordinates of the new position of P when the graph y = f(x) is transformed to the graph of

(a) y = –f(x)

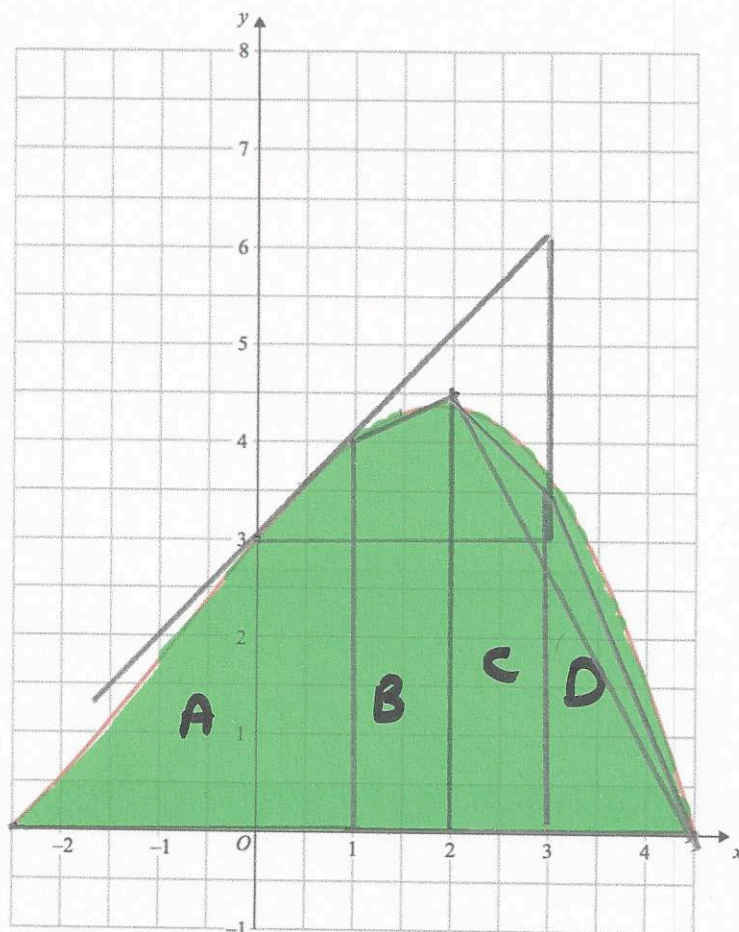(.....4....., ...- 1....)
(1)

(b) y = f(x) + 4

(.....4....., ...5.....)
(1)

(c) y = f(–x)

(....- 4....., ...1.....)
(1)

(d) y = f(x + 5)

(....-1....., ...1.....)
(1)

20. Here is a graph of y = f(x) between x = –2.5 and x = 4.5

(a) Work out an estimate for the rate of change at x = 1

$$gradient = \frac{rise}{run} = \frac{3}{3}$$

1

....
(2)

(b) Work out an estimate for the area under the curve

A $\frac{1}{2} \times 4 \times 3.5 = 7$

B $\frac{4+4.5}{2} \times 1 = 4.75$

C: $\frac{4.5+3.5}{2} \times 1 = 4$
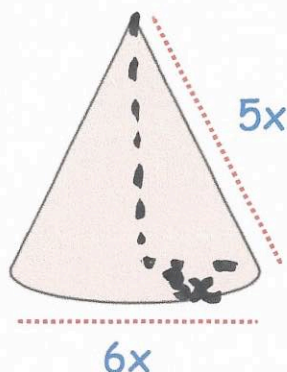
D: $\frac{1}{2} \times 1.5 \times 3.5 \approx 2.6$

total   18.35
                  ....

(this is a slight underestimate)

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21.   The diagram below shows a solid cone.

The cone is made from a material with density 5g/cm³.

Write an expression for the mass of the cone, in terms of x.

$$\frac{M}{D \quad V}$$

$$V = \frac{1}{3} \times \pi \times (3x)^2 \times h$$

$$h = 4x \text{ (pythagoras)}$$

$$\therefore V = \frac{1}{3} \pi \times 9x^2 \times 4x$$

$$= 12x^3\pi$$

$$m = d \times v = 5 \times 12x^3\pi$$

...$60\pi x^3$...cm³

(4)

22. Write $x^2 + 10x + 7$ in the form $(x + a)^2 + b$, where a and b are constants.

$$(x+5)^2 - 25 + 7$$
$$= (x+5)^2 - 18$$

(3)