

Name: *Solutions*

GCSE 9-1 Higher
Practice Paper
Set D
Paper 2 - 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.
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.

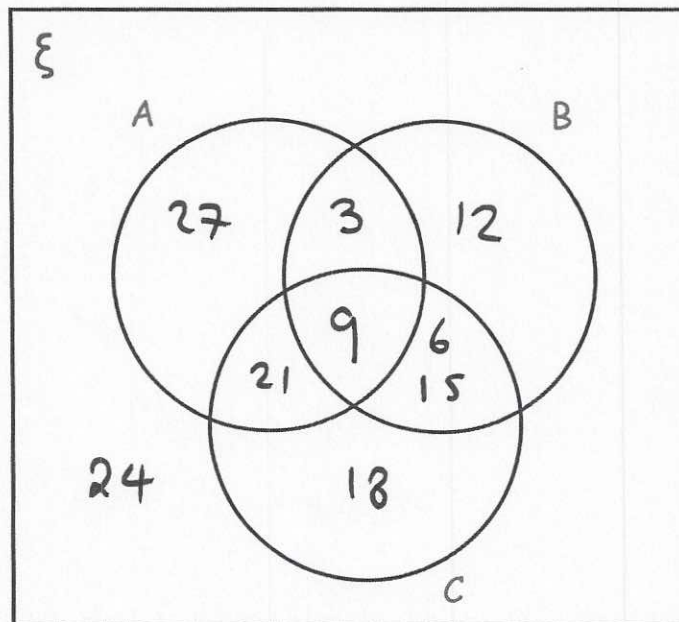
Question	Mark	Available
1		6
2		2
3		3
4		6
5		5
6		3
7		3
8		2
9		2
10		4
11		4
12		6
13		4
14		2
15		3
16		4
17		4
18		4
19		4
20		4
21		5
Total		80

1. $\xi = \{\text{multiple of 3 between 1 and 29}\}$

$$A = \{\cancel{3}, 9, \cancel{21}, \cancel{27}\}$$

$$B = \{\cancel{3}, \cancel{6}, 9, \cancel{12}, 15\}$$

$$C = \{6, 9, 15, 18, \cancel{21}\}$$



(a) Complete the Venn diagram above

(4)

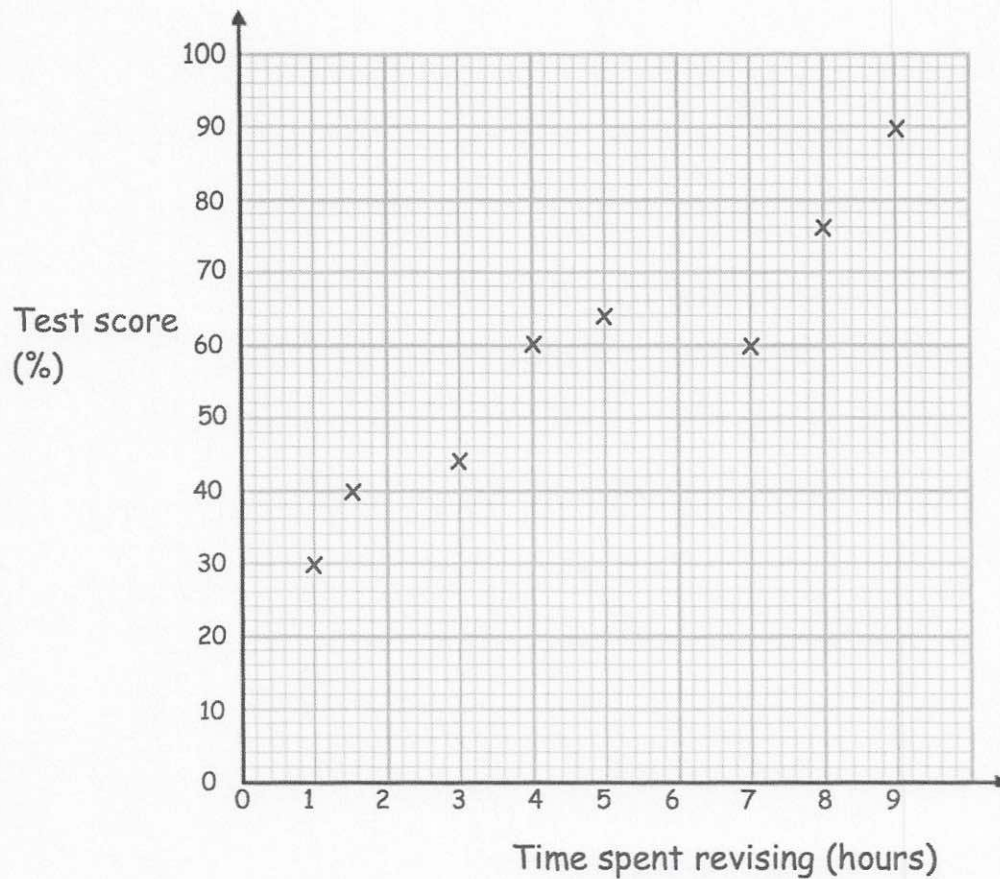
A number is chosen at random from ξ

(b) Find $P(B \cup C)$

$$\frac{7}{9}$$

(2)

2. The scatter graph below shows information about the number of hours spent revising for a test and the test result for a group of 8 students.

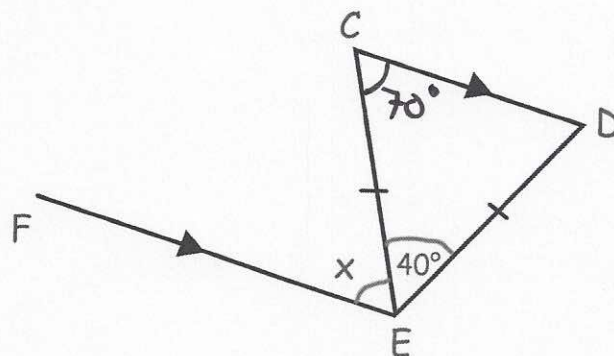


Explain why it might not be sensible to use the scatter graph to estimate the score for a student that spent 15 hours revising.

The data collected only has times up to 9 hours, so you can't use the graph for times greater than that.

(2)

3. CDE is a triangle



FE and CD are parallel lines.

Find the missing angle.

Give reasons for your answer.

$$\hat{ECD} = \frac{180 - 40}{2} = 70^\circ \quad (\text{angles in a triangle add up to } 180)$$

AND
isosceles triangles have 2 equal angles)

$$x = 70^\circ \quad (\text{alternate angles are equal})$$

(3)

4. Raheem and Ben invest money in 2019.

Raheem invests £1000 at Banks'R'us, who pay 5% interest per year.

Ben invests £1150 at Bank World, who pay 1% interest per year

- (a) In which year will Raheem's investment be worth more than Ben's?

after 3 years $R: 1000 \times 1.05^3 = £1157.63$
 $B: 1150 \times 1.01^3 = £1184.85$

after 4 years $R: £1215.51$
 $B: £1196.69$

4 years
(4)

Bank World increase their rate of interest by 1%

- (b) Does this affect your answer to part (a)?

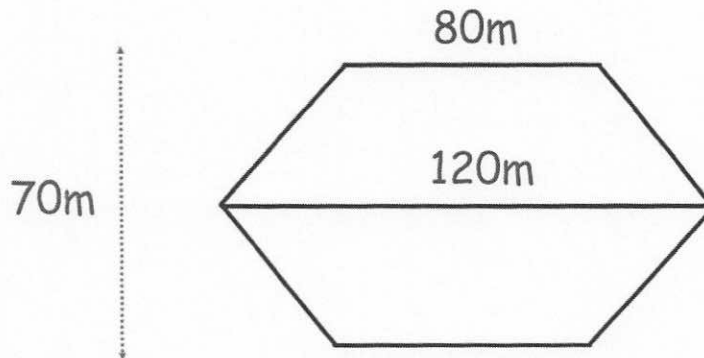
3 years $R: £1191.02$
 $B: £1220.39$

4 years $R: £1262.43$
 $B: £1244.80$

No, still 4 years

(2)

5. A farm owns two identical fields.
Each field is a trapezium



The farmer is going to plant a crop.

Each 8 kilogram bag of seed costs £19.99
60g of seed covers an area of 1m^2

The farmer has £575 to spend on seed.

Has the farmer got enough money to buy all the seed he needs to cover both fields?

$$\text{area of each trapezium} = \frac{80 + 120}{2} \times 35 = 3500$$

$$\therefore \text{total area} = 7000\text{m}^2$$

$$\therefore \text{require } 7000 \times 60 = 420,000\text{g of seed} \\ = 420\text{kg}$$

$$420 \div 8 = 52.5 \quad \therefore \text{Need 53 bags}$$

$$53 \times 19.99 = \pounds 1059.47$$

No, he doesn't

(5)

6. The line passing through $(1, p)$ and $(5, 1)$ has a gradient of $\frac{3}{4}$
Find the value of p .

$$\frac{1-p}{5-1} = \frac{3}{4} \quad 1-p = 3$$
$$p = -2$$

$$\underline{-2}$$

(3)

7. (a) Write the number 0.000751 in standard form

$$\underline{7.51 \times 10^{-4}}$$

(1)

- (b) Work out $(9.5 \times 10^6)^{-3}$

Give your answer correct to 2 significant figures

$$1.16635 \dots \times 10^{-21}$$

$$\underline{1.2 \times 10^{-21}}$$

(2)

8. Yvonne truncates a number, y to 1 decimal place.

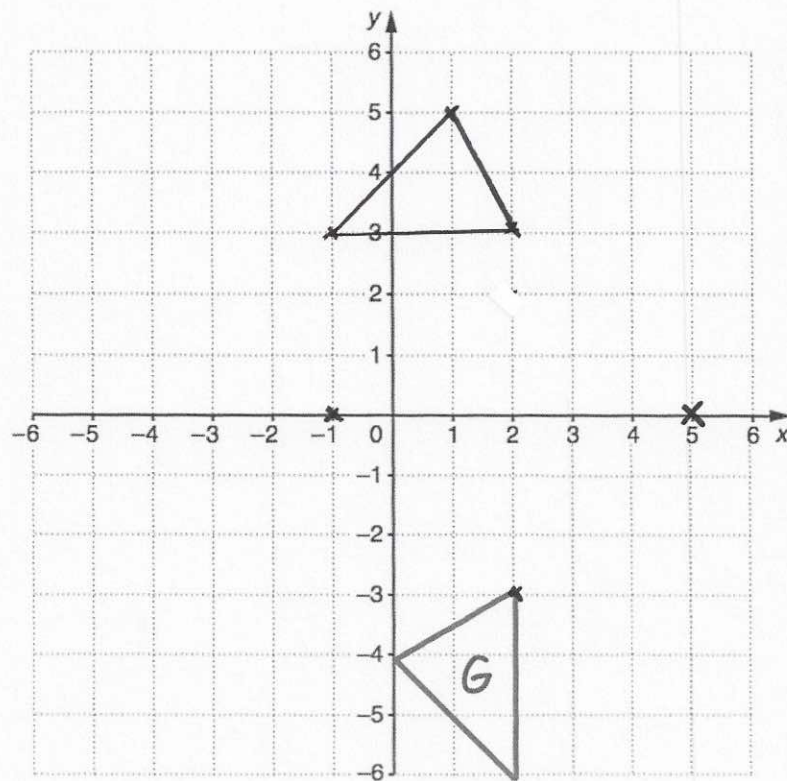
Her result is 2.7

Write down the error interval for y

$$\underline{2.7 \leq y < 2.8}$$

(2)

9.



Rotate triangle G 90° clockwise about $(5, 0)$

(2)

10. Bag A contains $5x$ coins.
 Bag B contains $3x$ coins.
 8 coins are taken from Bag B and put into Bag A
 The ratio of coins in Bag A to Bag B is now 11:5

Work out the total number of coins.

$$\frac{5x + 8}{3x - 8} = \frac{11}{5} \Rightarrow 25x + 40 = 33x - 88$$

$$8x = 128$$

$$x = 16$$

$$8 \times 16 =$$

128

(4)

11. Bethan owns 10 shops and 5 restaurants.

She is going to visit three of her businesses and writes her list in order.
 The order will be:

shop, restaurant, shop

or

restaurant, shop, restaurant

Find how many different lists can Bethan write.

$$10 \times 5 \times 9 = 450$$

or

$$5 \times 10 \times 4 = 200$$

650

(4)

12. (a) Express $\frac{x+4}{x+5} \div \frac{3x+12}{x^2-25}$ as a single fraction in its simplest form.

$$= \frac{\cancel{x+4}}{\cancel{x+5}} \times \frac{(x-5)(\cancel{x+5})}{3(\cancel{x+4})}$$

$$\frac{x-5}{3}$$

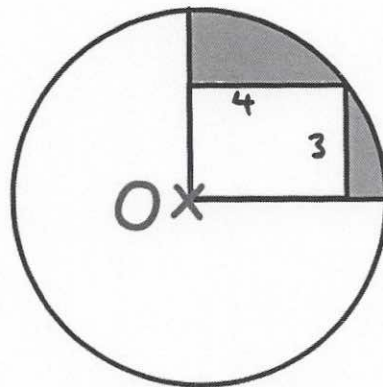
.....
(3)

- (b) Express $\frac{3}{x+1} + \frac{x+7}{(x+1)(x+2)}$ as a single fraction in its simplest form.

$$\frac{3(x+2)}{(x+1)(x+2)} + \frac{x+7}{(x+1)(x+2)} = \frac{4x+13}{(x+1)(x+2)}$$

.....
(3)

13. A rectangle is drawn inside of a circle with centre O.



The rectangle is 4cm by 3cm.

Find the shaded area.

$$\text{pythagoras : } r^2 = 3^2 + 4^2 = 25$$

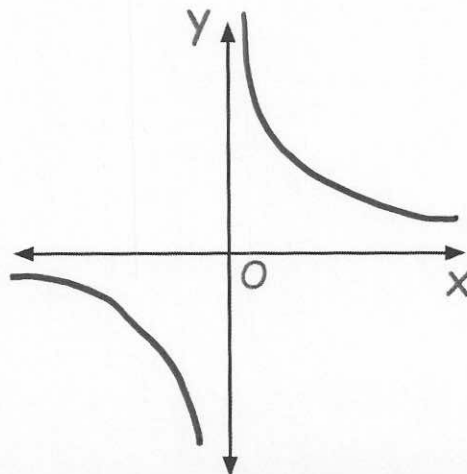
$$\Rightarrow r = 5 \text{ cm}$$

$$\text{area of quarter circle} = \frac{\pi \times 5^2}{4} = \frac{25\pi}{4}$$

$$\text{area} = \frac{25\pi}{4} - 12 = 7.63 \dots \text{cm}^2$$

(4)

14. Sketch $y = \frac{4}{x}$



(2)

15. The equation of a circle is $x^2 + y^2 = 16$

Find the circumference of the circle.

Give your answer to 1 decimal place.

$$\text{radius} = \sqrt{16} = 4$$

$$\text{Circumference} = \pi \times 8 = 25.132 \dots$$

25.1 cm

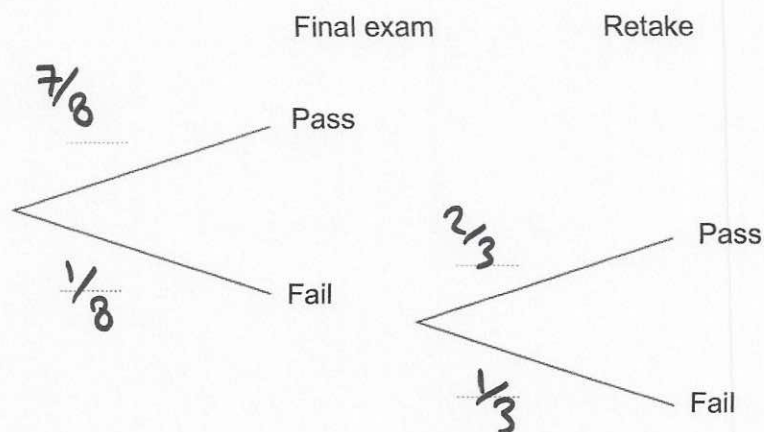
(3)

16. A college course consists of 8 weeks of teaching with a final exam at the end of the course

If a student fails the final exam, they have one opportunity to retake the exam.

The probability of a student passing the final exam is $\frac{7}{8}$.

The probability of a student passing the retake is $\frac{2}{3}$



- (a) Complete the tree diagram

(2)

If a student passes the final exam or retake, they receive a certificate.

- (b) Work out the probability that a student receives a certificate.

$$\frac{7}{8} + \frac{1}{8} \times \frac{2}{3} = \frac{23}{24}$$

(2)

17. On 1st March 2001, the ratio of Freddie's age to his mother's age was 1:11
On 1st March 2018, the ratio of Freddie's age to his mother's age was 2:5

Write the ratio of Freddie's age to his mother's age on 1st March 2030

$$2001: x : 11x$$

$$2018: x+17 : 11x+17 = 2:5$$

$$\frac{x+17}{11x+17} = \frac{2}{5}$$

$$5x + 85 = 22x + 34$$

$$51 = 17x$$

$$x = 3 \quad \text{so in 2001 Freddie is } 3$$

$$\text{mother is } 33$$

$$\text{In 2030 Freddie is } 32$$

$$\text{Mother is } 62$$

$$32:62$$

$$16:31$$

(4)

18. The point A has coordinates $(-6, 0)$
The point B has coordinates $(0, 3)$
The point C has coordinates $(9, -1)$

Find the equation of the line that passes through C and is perpendicular to AB.

$$AB \text{ has gradient } \frac{3-0}{0-(-6)} = \frac{3}{6} = \frac{1}{2}$$

\therefore perpendicular line has gradient $= -2$

$$y = -2x + C$$

$$\begin{array}{l} \text{at C } x=9 \\ y=-1 \end{array} \quad \& \quad -1 = -2 \times 9 + C \\ C = 17$$

$$y = -2x + 17$$

(4)

19. Find the set of values of x that satisfy both

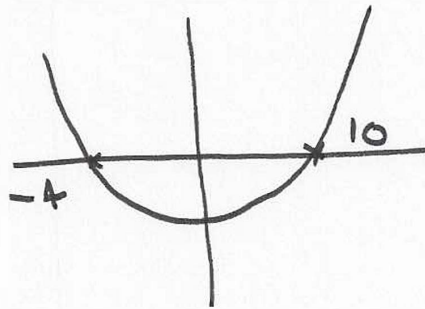
$$2x - 6 > 6 - 6x \quad \text{and} \quad x^2 - 6x + 2 < 42$$

$$8x > 12$$

$$x > 1.5$$

$$x^2 - 6x - 40 < 0$$

$$(x - 10)(x + 4) < 0$$



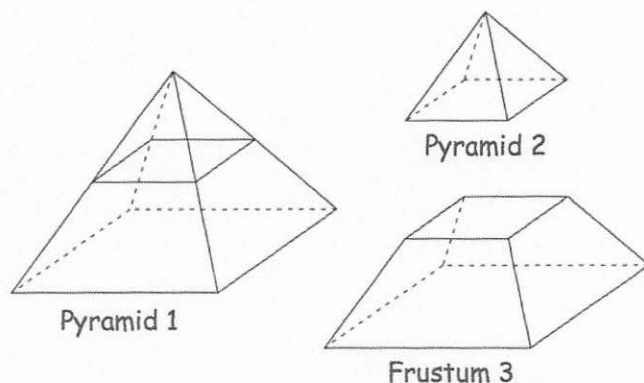
$$-4 < x < 10$$

to satisfy both

$$\underline{1.5 < x < 10}$$

(4)

20. A solid square based pyramid 1 is divided into two parts: a square based pyramid 2 and a frustum 3, as shown.



Pyramid 1 has a base of side length 8cm.
 Pyramid 2 has a base of side length 2cm.
 The perpendicular height of pyramid 1 is 10cm.

Frustum 3 is made from a material with a density of 4.2g/cm^3

Work out the mass of the frustum.

$$\text{total volume (pyramid 1)} = \frac{1}{3} \times 8^2 \times 10 = \frac{640}{3} \text{ cm}^3$$

$$\text{pyramid 2 has height } 10 \div 4 = 2.5$$

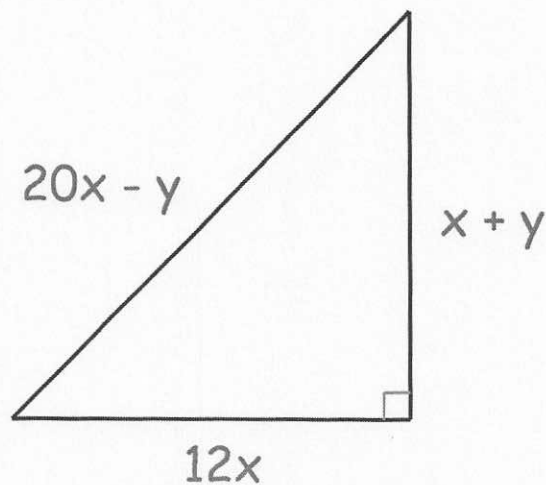
$$\therefore \text{volume (pyramid 2)} = \frac{1}{3} \times 2^2 \times 2.5 = \frac{10}{3} \text{ cm}^3$$

$$\therefore \text{volume of frustum} = \frac{630}{3} = 210 \text{ cm}^3$$

$$\text{mass} = d \times v = 4.2 \times 210 = \underline{882} \text{ g}$$

(4)

21. Below is a right angled triangle.



Prove $x : y = 14 : 85$

Pythagoras :

$$(12x)^2 + (x+y)^2 = (20x-y)^2$$

$$\Rightarrow 144x^2 + x^2 + 2xy + y^2 = 400x^2 - 40xy + y^2$$

$$\Rightarrow 42xy = 255x^2$$

$$\Rightarrow 42y = 255x$$

$$\Rightarrow 14y = 85x$$

$$\therefore x : y = 14 : 85$$

(5)