ANSWERS

edexcel

GCSE Mathematics Practice Tests: Set 3

Paper 1H (Non-calculator)

Time: 1 hour 30 minutes

You should have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator.

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may not be used.**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

ALWAYS LEARNING PEARSON

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1. The equation of a straight line is $y = 4x + 7$

(*a*) Write down the gradient of the line.

4

(1)

(*b*) Write down the *y*-intercept of the line.

7

(1)

(Total 2 mark)

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2. Work out $3\frac{1}{8} - 1\frac{2}{3}$

$\frac{25}{8} - \frac{5}{3}$

$= \frac{75 - 40}{24}$

$= \frac{35}{24} = 1\frac{11}{24}$

$1\frac{11}{24}$

(Total 3 marks)

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3. Here are the ingredients needed to make **8** shortbread biscuits.

Shortbread biscuits makes **8** biscuits
120 g butter
60 g caster sugar
180 g flour

Tariq is going to make some shortbread biscuits.
He has the following ingredients

330 g butter 200 g caster sugar 450 g flour

Work out the greatest number of shortbread biscuits that Tariq can make with his ingredients.
You must show all your working.

BUTTER : $\frac{330}{120} = \frac{33}{12} = \frac{11}{4} = 2\frac{3}{4}$

SUGAR : $\frac{200}{60} = \frac{20}{6} = \frac{10}{3} = 3\frac{1}{3}$

FLOUR : $\frac{450}{180} = \frac{45}{18} = \frac{5}{2} = 2\frac{1}{2}$

∴ FLOUR LIMITS THE NUMBER TO $2\frac{1}{2} \times 8 = 20$

20 ..... biscuits

(Total 3 marks)

4. Railtickets and Cheaptrains are two websites selling train tickets.

Each of the websites adds a credit card charge and a booking fee to the ticket price.

Railtickets
Credit card charge: 2.25% of ticket price
Booking fee: 80 pence

Cheaptrains
Credit card charge: 1.5% of ticket price
Booking fee: £1.90

Nadia wants to buy a train ticket.
The ticket price is £60 on each website.
Nadia will pay by credit card.

Will it be cheaper for Nadia to buy the train ticket from Railtickets or from Cheaptrains?

RAILTICKETS: 2.25% OF £60
+ £0.80
= £1.35 + £0.80
= £2.15

10% £6
1% 60p
2% £1.20
0.25% 15p
2.25% £1.20 + £0.15
= £1.35

CHEAPTRAINS: 1.5% OF £60
= £0.60 + £0.30
= £0.90
+ £1.90
= £2.80

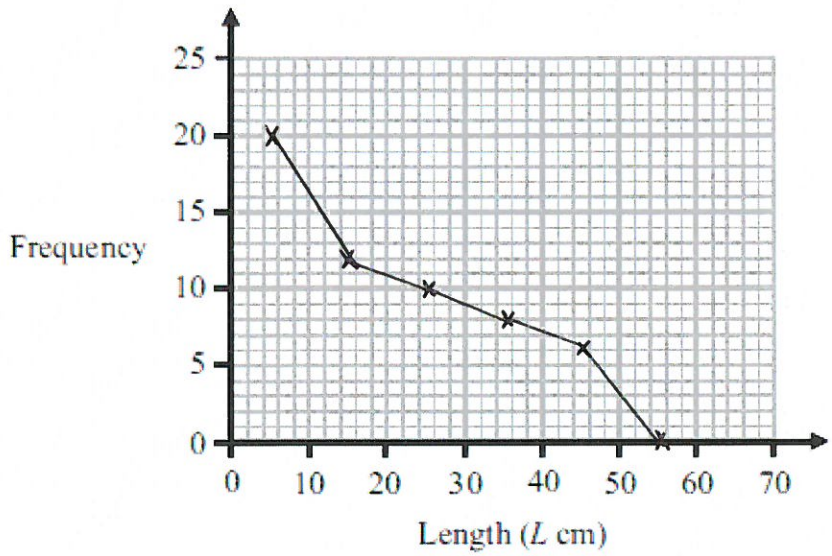
CHEAPER TO BUY FROM RAILTICKETS

(Total 4 marks)

5. The table gives information about the lengths of the branches on a bush.

Length(Lcm)	Frequency
$0 \leq L < 10$	20
$10 \leq L < 20$	12
$20 \leq L < 30$	10
$30 \leq L < 40$	8
$40 \leq L < 50$	6
$50 \leq L < 60$	0

(a) Draw a frequency polygon to show this information.



(2)

(b) Work out the total number of branches on the bush.

20 + 12 + 10 + 8 + 6

56

(2)

(c) Write down the modal class interval.

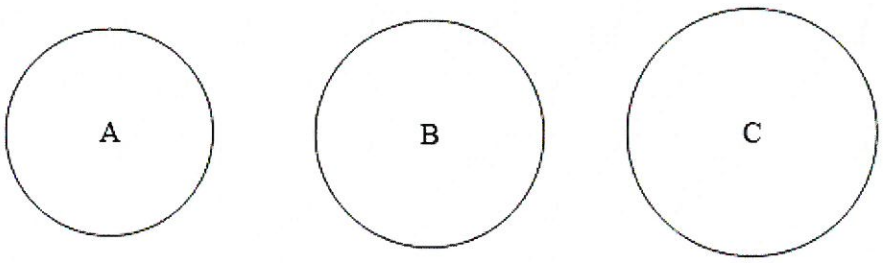
$0 \leq L < 10$

(1)

(Total 5 marks)

6. Here are three circles A, B and C.

Diagrams **NOT** accurately drawn



The area of circle A is 200 cm^2.

The area of circle B is 10% larger than the area of circle A.

The area of circle C is 10% larger than the area of circle B.

How much larger is the area of circle C than the area of circle A?

10% OF 200 = 20

10% OF 220 = 22

∴ C IS 242 cm^2

242 − 200 = 42 cm^2

(OR 1.1 × 1.1 = 1.21 ∴ 21% LARGER)

(Total 4 marks)

7. (*a*) Expand and simplify $2(x + 3y) + 4(x - y)$

$2x + 6y + 4x - 4y$

$6x + 2y$

(2)

(*b*) Factorise completely $8p - 12pq$

$4p(2 - 3q)$

(2)

(Total 4 marks)

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8. The diagram shows a triangle.

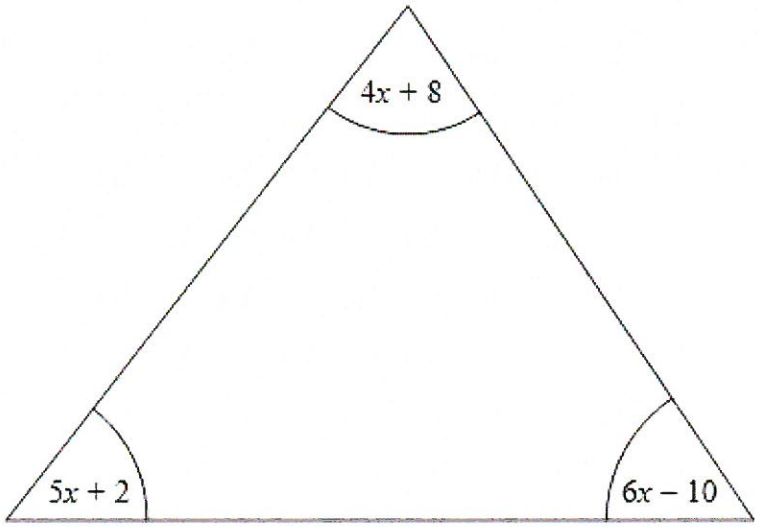


Diagram **NOT** accurately drawn

All the angles are measured in degrees.

Show that the triangle is isosceles.

ANGLES ADD UP TO 180°

$\therefore 5x+2+4x+8+6x-10=180$

$\therefore 15x=180$

$\therefore x=\frac{180}{15}=\frac{36}{3}=12$

$4x+8=4\times12+8=56$

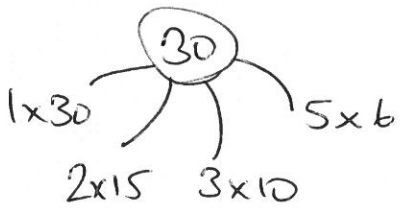
$5x+2=5\times12+2=62$

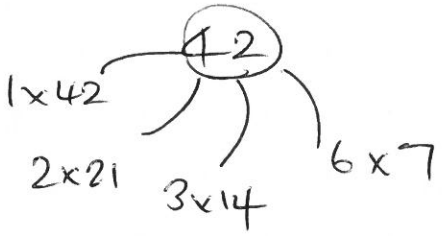
$6x-10=6\times12-10=62$

TWO ANGLES ARE THE SAME $\therefore$ TRIANGLE IS ISOSCELES

(Total 5 marks)

9. (*a*) Find the Highest Common Factor (HCF) of 30 and 42.





6

.....

(2)

(*b*) Find the Lowest Common Multiple (LCM) of 30 and 45.

30, 60, 90

45, 90

90

.....

(2)

(Total 4 marks)

10.

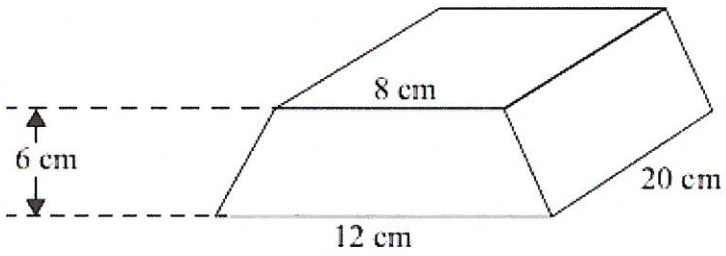


Diagram **NOT** accurately drawn

The diagram shows a solid prism made from metal.
The cross-section of the prism is a trapezium.

The parallel sides of the trapezium are 8 cm and 12 cm.
The height of the trapezium is 6 cm.
The length of the prism is 20 cm.

The density of the metal is 5 g/cm^3.

Calculate the mass of the prism.
Give your answer in kilograms.

AREA OF CROSS-SECTION = $\frac{6}{2}(8+12) = 3 \times 20 = 60\text{cm}^2$

VOLUME OF PRISM = $60 \times 20 = 1200\text{cm}^3$

MASS OF PRISM = $1200 \times 5 = 6000\text{g} = 6\text{kg}$

.....6..... kg

(Total 5 marks)

11. (*a*) Write down the value of 25^0

1

(1)

(*b*) Write down the value of $49^{-\frac{1}{2}}$

$\frac{1}{7}$

(1)

(*c*) Write as a power of 2 $\dfrac{4\times 8}{16^3}$

$16 = 2^4$

$\therefore 16^3 = 2^{12}$

$\dfrac{2^2 \times 2^3}{2^{12}} = \dfrac{2^5}{2^{12}}$

2^{-7}

(3)

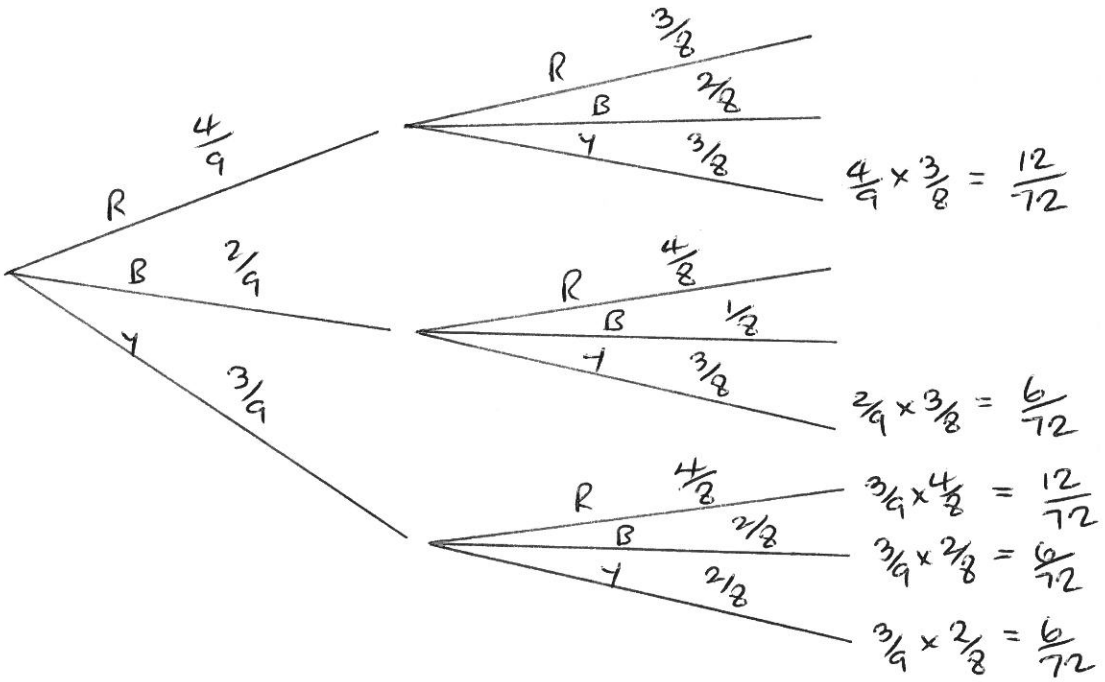
(Total 5 marks)

12. There are 9 counters in a box.

4 of the counters are red.
2 of the counters are blue.
3 of the counters are yellow.

Pavinder takes at random two counters from the box.

Work out the probability that he takes at least one yellow counter.



$\frac{12}{72} + \frac{6}{72} + \frac{12}{72} + \frac{6}{72} + \frac{6}{72}$

$= \frac{42}{72}$

$\frac{42}{72}$

.....

(Total 4 marks)

13. Simplify fully $\dfrac{2x^2 - 7x + 3}{x^2 - 9}$

$$\frac{(2x-1)(x-3)}{(x+3)(x-3)}$$

$$\frac{2x-1}{x+3}$$

(Total 3 marks)

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14. Work out $(2 + \sqrt{3})(2 - \sqrt{3})$
Give your answer in its simplest form.

$$4 - 2\sqrt{3} + 2\sqrt{3} - \sqrt{9}$$

$$= 4 - 3$$

$$= 1$$

1

(Total 2 marks)

15.

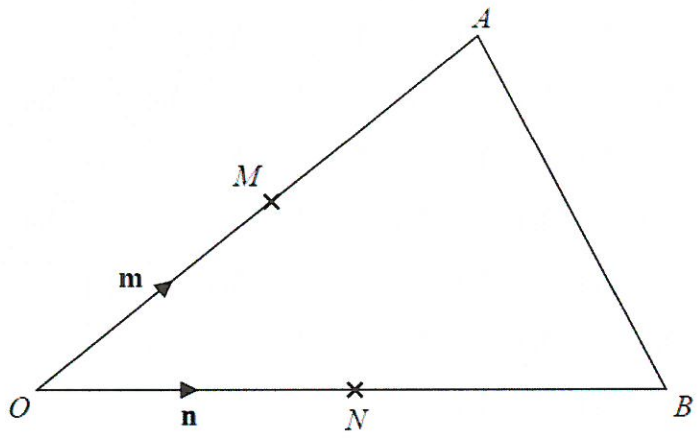


Diagram **NOT** accurately drawn

OAB is a triangle.
M is the midpoint of *OA*.
N is the midpoint of *OB*.

$\overrightarrow{OM} = \mathbf{m}$ $\quad\therefore \overrightarrow{OA} = 2\underline{m}$

$\overrightarrow{ON} = \mathbf{n}$ $\quad\therefore \overrightarrow{OB} = 2\underline{n}$

Show that *AB* is parallel to *MN*.

$\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB} = -2\underline{m} + 2\underline{n} = 2(-\underline{m} + \underline{n})$

$\overrightarrow{MN} = \overrightarrow{MO} + \overrightarrow{ON} = -\underline{m} + \underline{n}$

$\therefore \overrightarrow{AB} = 2\overrightarrow{MN}$

$\therefore$ AB IS PARALLEL TO MN

(Total 3 marks)

16.

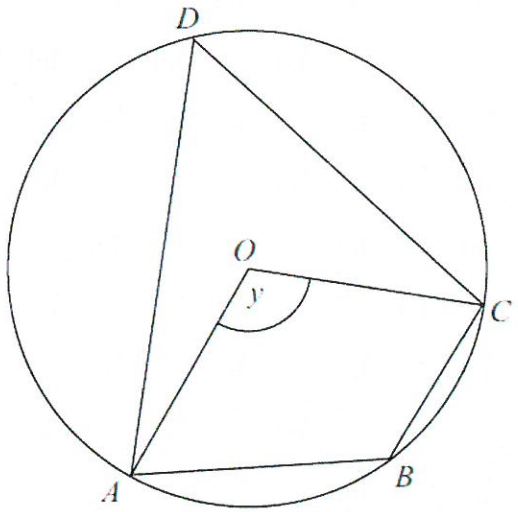


Diagram **NOT** accurately drawn

A, B, C and D are points on the circumference of a circle, centre O.

Angle $AOC = y$.

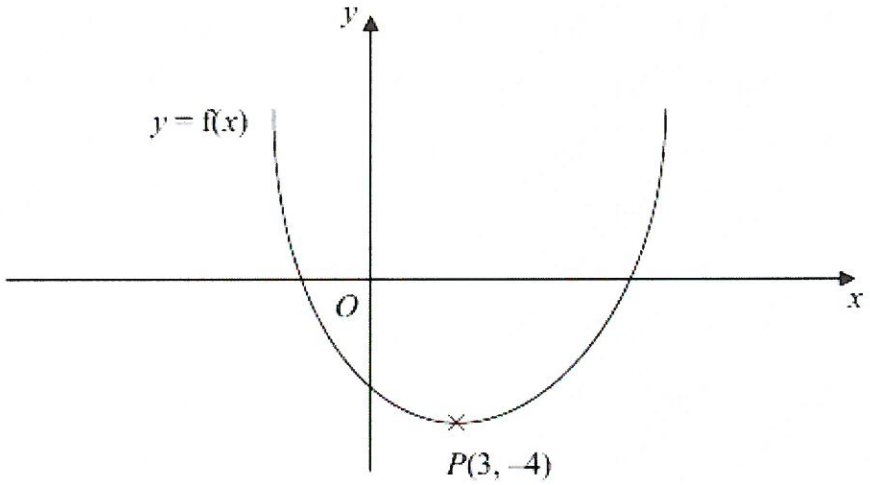
Find the size of angle ABC in terms of y.
Give a reason for each stage of your working.

$A\hat{D}C = \frac{1}{2}y$ ANGLE SUBTENDED AT CIRCUMFERENCE = ½ ANGLE SUBTENDED AT CENTRE

$A\hat{B}C = 180 - \frac{1}{2}y$ OPPOSITE ANGLES IN A CYCLIC QUADRILATERAL ADD UP TO 180°

(Total 4 marks)

17. This is a sketch of the curve with the equation $y = f(x)$.
The only minimum point of the curve is at $P(3, -4)$.



(*a*) Write down the coordinates of the minimum point of the curve with the equation $y = f(x - 2)$.

(5 , –4)

(2)

(*b*) Write down the coordinates of the minimum point of the curve with the equation $y = f(x + 5) + 6$

(–2 , 2)

(2)

(Total 4 marks)

18.

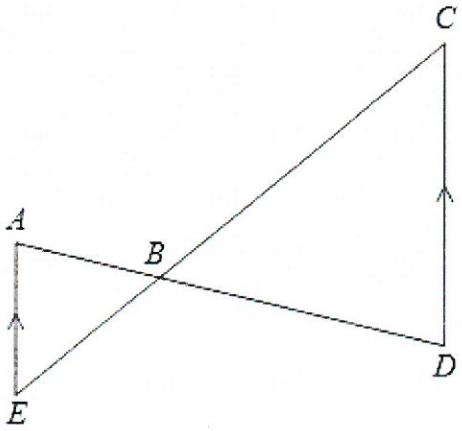


Diagram **NOT** accurately drawn

AE is parallel to *CD*.
ABD and *EBC* are straight lines.

Prove that triangle *ABE* is similar to triangle *DBC*.
Give reasons for each stage of your proof.

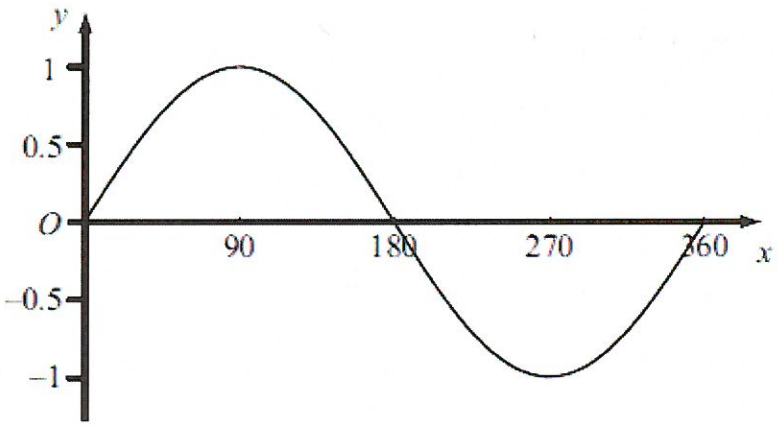
$A\hat{E}B = B\hat{C}D$
$E\hat{A}B = B\hat{D}C$
} ALTERNATE ANGLES ARE EQUAL

$A\hat{B}E = C\hat{B}D$ VERTICALLY OPPOSITE ANGLES ARE EQUAL

∴ ANGLES IN THE TWO TRIANGLES ARE THE SAME
∴ TRIANGLES ARE SIMILAR.

(Total 4 marks)

19. The diagram shows a sketch of the curve $y = \sin x°$ for $0 \leq x \leq 360$



The exact value of $\sin 60° = \frac{\sqrt{3}}{2}$

(*a*) Write down the exact value of

(i) $\sin 120°$,

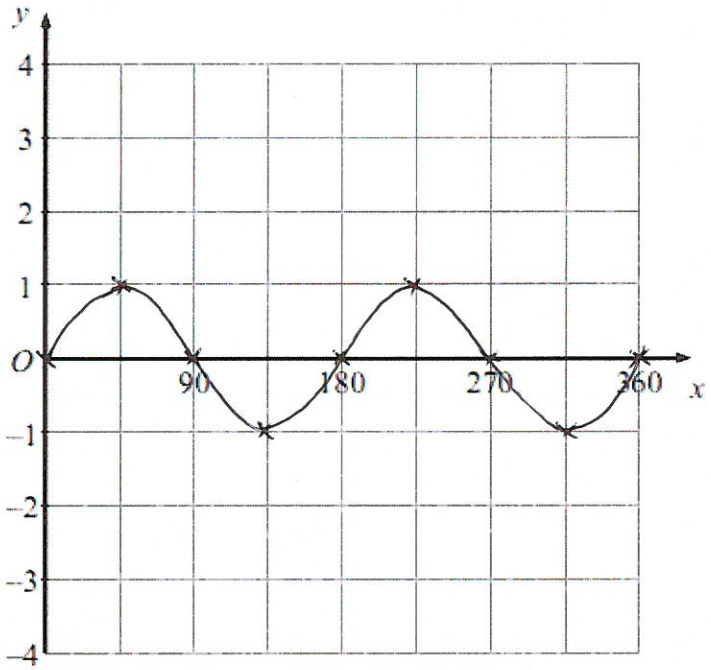
$\frac{\sqrt{3}}{2}$

(ii) $\sin 240°$.

$-\frac{\sqrt{3}}{2}$

(2)

(*b*) On the grid below, sketch the graph of $y = \sin 2x°$ for $0 \leq x \leq 360$



(2)

(Total 4 marks)

20. Prove algebraically that the difference between the squares of any two consecutive integers is equal to the sum of these two integers.

LET THE TWO INTEGERS BE n, $n+1$

$\therefore$ SUM $= n + n + 1 = 2n + 1$

DIFFERENCE BETWEEN SQUARES $= (n+1)^2 - n^2$

$= n^2 + 2n + 1 - n^2$

$= 2n + 1$

QED

(Total 4 marks)

21 Sketch the graph of $f(x) = -x^2 - 3x + 5$, showing the coordinates of the turning point and the coordinates of any intercepts with the coordinate axes.

$y = x^2 + 3x - 5 = (x + \quad)(x - \quad)$ DOESN'T FACTORISE

COMPLETE THE SQUARE: $\left(x + \frac{3}{2}\right)^2 = x^2 + 3x + \frac{9}{4}$

$\therefore \left(x + \frac{3}{2}\right)^2 - \frac{9}{4} - 5 = x^2 + 3x - 5 = y$

$\therefore y = \left(x + \frac{3}{2}\right)^2 - \frac{29}{4}$

$f(x) = -y \quad \therefore f(x) = \frac{29}{4} - \left(x + \frac{3}{2}\right)^2$

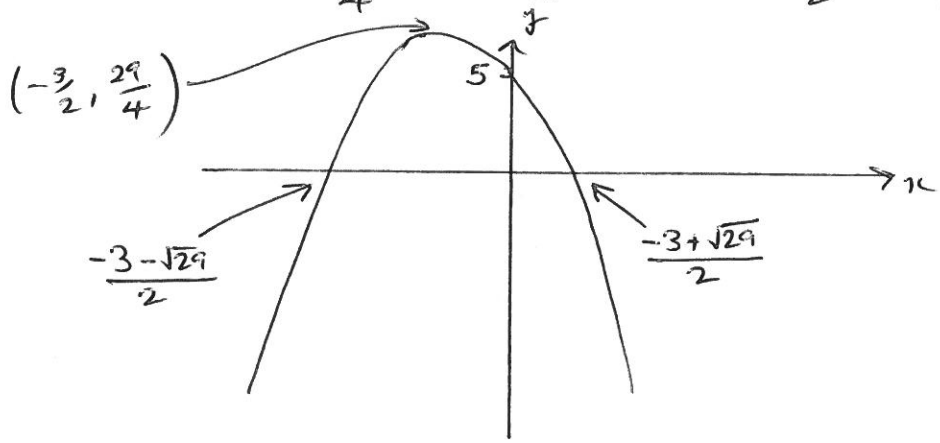
$x = -\frac{3}{2}$ MAXIMISES $f(x)$ GIVING $y = \frac{29}{4}$

$\therefore$ TURNING POINT IS A MAXIMUM AT $\left(-\frac{3}{2}, \frac{29}{4}\right)$

$f(x = 0)$ GIVES y-INTERCEPT $= 5$

$f(x) = 0$ GIVE x-INTERCEPTS (ie ROOTS)

$\therefore \frac{29}{4} = \left(x + \frac{3}{2}\right)^2 \quad \therefore x + \frac{3}{2} = \pm\frac{\sqrt{29}}{2} \quad \therefore x = -\frac{3}{2} \pm \frac{\sqrt{29}}{2}$



(Total 4 mark)

TOTAL FOR PAPER IS 80 MARKS