BUMPER "BETWEEN PAPERS (2 & 3)" PRACTICE

SUITABLE FOR HIGHER TIER ONLY

SUMMER 2019

QUESTIONS

NOT A "BEST" GUESS PAPER.

NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT! YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 OR 2 IT MAY STILL COME UP ON PAPER 3 ...

WE KNOW HOW IMPORTANT IT IS TO PRACTICE, PRACTICE, PRACTICE .... SO WE'VE COLLATED A LOAD OF QUESTIONS THAT WEREN'T EXAMINED IN THE AQA 9-1 GCSE MATHS PAPER 1 OR 2 BUT WE CANNOT GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE NEXT PAPERS ...

ENJOY!
MEL & SEAGER

Q1.

The diagram shows a hexagon *ABCDEF*.
BC is parallel to *ED*.

Work out the size of the obtuse angle *DEF*.

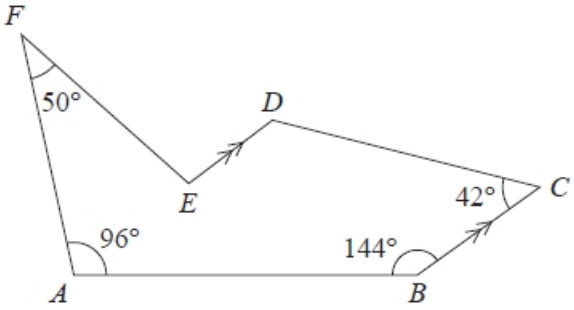


Diagram **NOT** accurately drawn

(5)

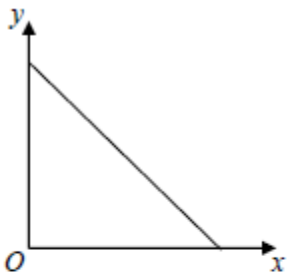
Q2. There are 14 boys and 12 girls in a class.
Work out the total number of ways that 1 boy and 1 girl can be chosen from the class.

(2)

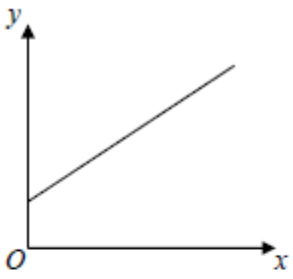
Q3. y is directly proportional to x.

Which graph shows this?

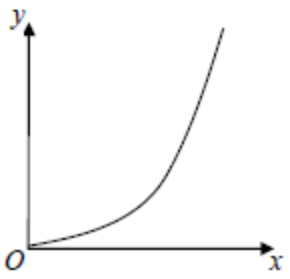
A



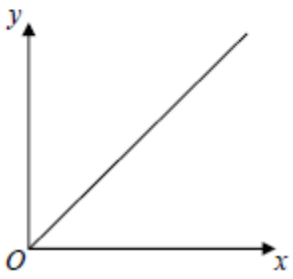
B



C



D



Circle the correct letter.

[1]

Q4.

The diagram shows a pentagon *ABCDE*.
DC is parallel to *AB*.
The size of an exterior angle at *A* is 67
The size of an exterior angle at *B* is 112
The size of an exterior angle at *C* is *x*
The size of an exterior angle at *D* is 74
The size of an exterior angle at *E* is *y*

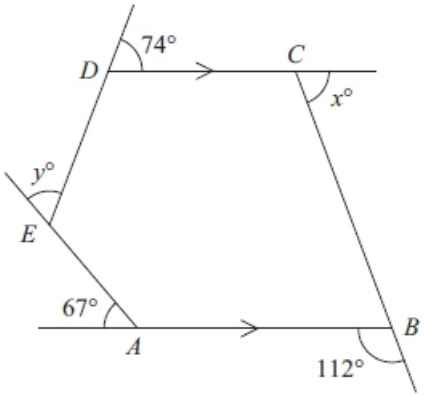


Diagram **NOT** accurately drawn

(a) (i) Work out the value of *x*.

(ii) Work out the value of *y*.

(4)

(b) Work out the sum of the interior angles of the pentagon *ABCDE*.

(2)

Q5. There are 6 batteries in a small packet of batteries.
There are 9 batteries in a large packet of batteries.

Chow buys *m* small packets of batteries and *g* large packets of batteries.

The total number of batteries Chow buys is *T*.

Write down a formula, in terms of *m* and *g*, for *T*.

(3)

Q6. The diagram shows a right-angled triangle and a rectangle.

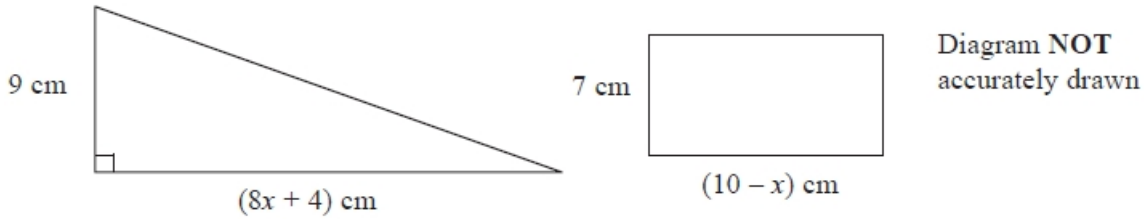


Diagram **NOT** accurately drawn

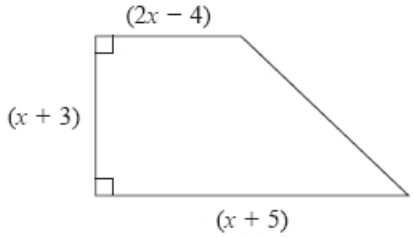
The area of the triangle is twice the area of the rectangle.

(i) Write down an equation for *x*.

(ii) Find the area of the rectangle.
Show clear algebraic working.

(7)

Q7. Here is a trapezium.



All measurements are in centimetres.

The area of the trapezium is 60 cm^2

Show that $3x^2 + 10x - 117 = 0$

(3)

(b) Work out the value of x

Show your working clearly. Give your answer correct to 3 significant figures.

(3)

Q8. The diagram shows a rectangular playground of width x metres and length $3x$ metres.

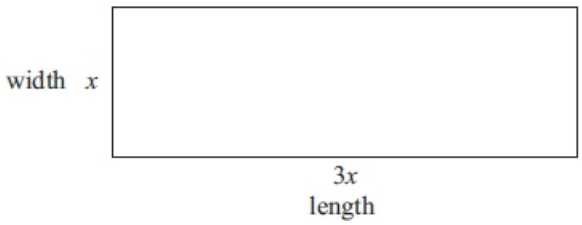


Diagram **NOT** accurately drawn

The playground is extended, by adding 10 metres to its width and 20 metres to its length, to form a larger rectangular playground.
The area of the larger rectangular playground is double the area of the original playground.
(a) Show that $3x^2 - 50x - 200 = 0$

(3)

(b) Calculate the area of the original playground.

(5)

Q9. Solve $2x^2 - 6x + 3 - 0$ Give your solutions correct to 3 significant figures.

(3)

Q10. Show that $(x + 1)(x + 2)(x + 3)$ can be written in the form $ax^3 + bx^2 + cx + d$ where a, b, c and d are positive integers.

(3)

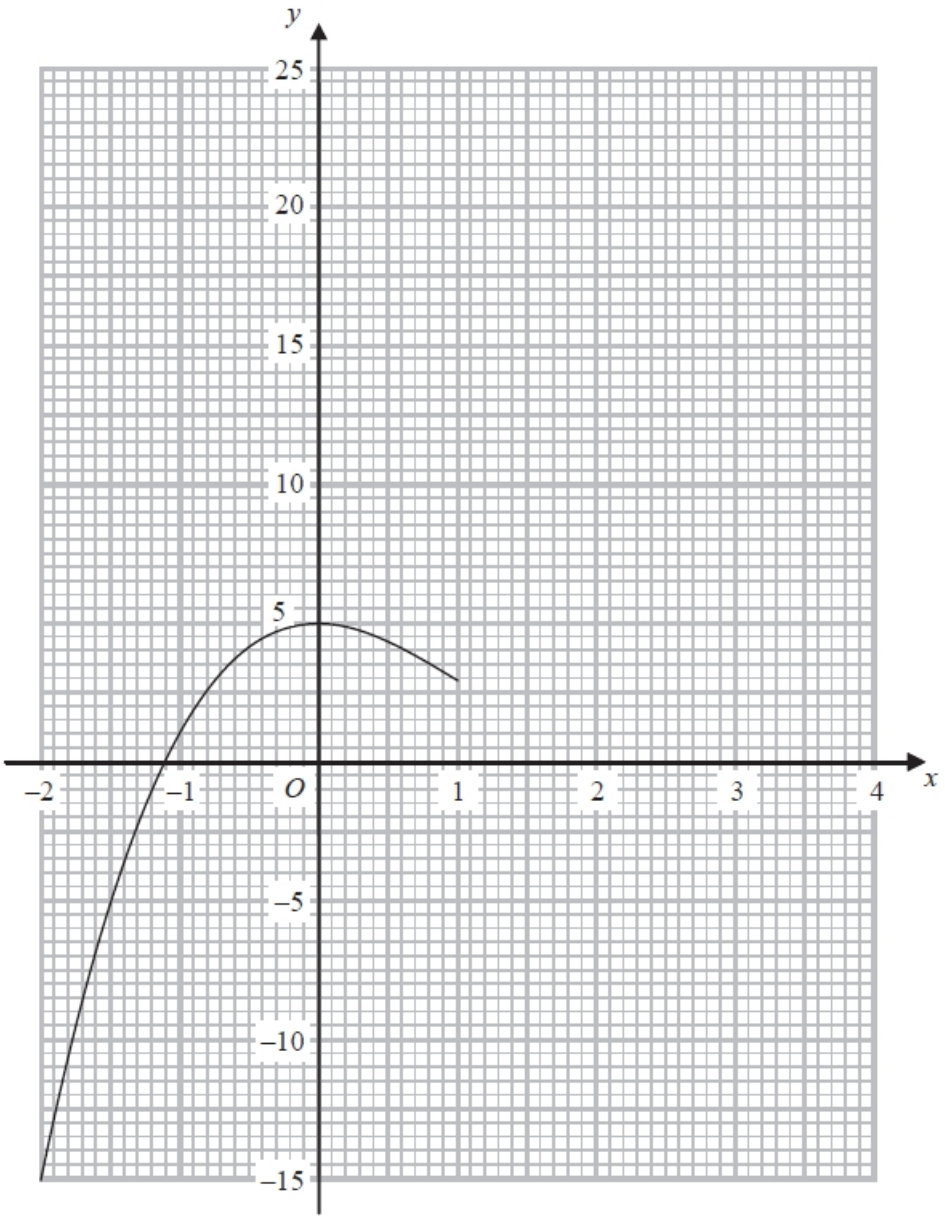
Q11. (a) Complete the table of values for $y = x^3 - 3x^2 + 5$

x	-2	-1	0	1	2	3	4
y	-15	1	5	3			

(1)

(b) On the grid, complete the graph of $y = x^3 - 3x^2 + 5$ for $-2 \leq x \leq 4$

(1)



(c) Use the graph to find an estimate for the solution of the equation $x^3 - 3x^2 + 5 = 0$

(1)

(d) By drawing a suitable straight line on the grid, find an estimate for the solution of the equation $x^3 - 3x^2 + 2x + 4 = 0$

(3)

Q12. (a) Show that the equation $2x^3 + 4x = 3$ has a solution between 0 and 1

(2)

(b) Show that $2x^3 + 4x = 3$ can be rearranged to give $x = \frac{3}{4} - \frac{x^3}{2}$

(1)

(c) Starting with $x_0 = 0$, use the iteration formula $x_{n+1} = \frac{3}{4} - \frac{x_n^3}{2}$ times to find an estimate for the solution to $2x^3 + 4x = 3$

(3)

Q13. T is directly proportional to $\sqrt{x}$ $T = 400$ when $x = 625$

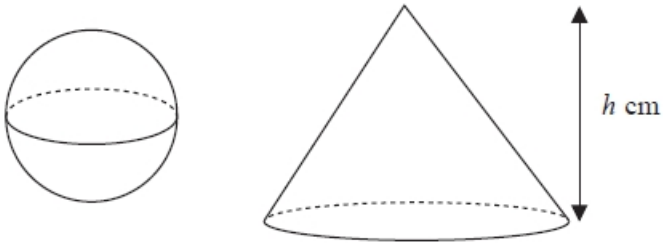
(a) Find a formula for T in terms of x.

(3)

(b) Calculate the value of T when $x = 56.25$

(1)

Q14. The diagram shows a sphere and a cone.



The cone has height h cm.
The radius of the base of the cone is 3 times the radius of the sphere.

Given that the volume of the sphere is equal to the volume of the cone, find an expression for the radius of the sphere in terms of h.
Give your expression in its simplest form.

(3)

Q15. y is directly proportional to x^3 When $x = 10$, $y = 250$

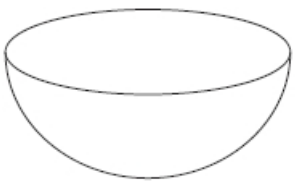
(a) Find a formula for y in terms of x.

(3)

(b) Calculate the value of x when $y = 54$

(2)

Q16. The diagram shows a solid hemisphere.



The hemisphere has a total surface area of $\frac{16}{3}\pi$ cm^2

The hemisphere has a volume of $k\pi$ cm^3

Find the value of k.

(4)

Q17. Solve $\frac{3}{(x+1)} + \frac{2}{(2x-3)} = 1$

Show clear algebraic working.

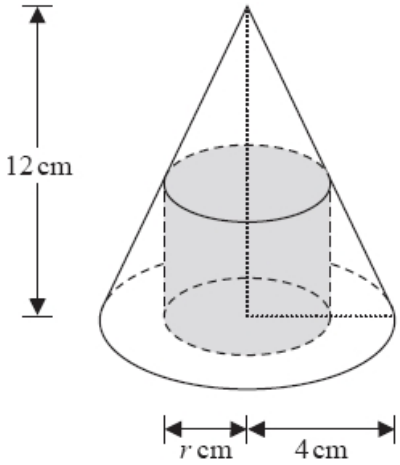
(5)

Q18. Solve the simultaneous equations

$$y = 3x + 2$$
$$x^2 + y^2 = 20$$

(6)

Q19. The diagram shows a cylinder inside a cone on a horizontal base.
The cone and the cylinder have the same vertical axis.
The base of the cylinder lies on the base of the cone.
The circumference of the top face of the cylinder touches the curved surface of the cone.



The height of the cone is 12cm and the radius of the base of the cone is 4cm.

(a) Work out the curved surface area of the cone.

Give your answer correct to 3 significant figures.

(3)

The cylinder has radius r cm and volume V cm^3

(b) Show that $V = 12\pi r^2 - 3\pi r^3$

(3)

(c) $V = 12\pi r^2 - 3\pi r^3$

Find the value of r for which V is a maximum.

(4)