

Write your name here					
Surname			Other names		
Pearson Edexcel		Centre Number		Candidate Number	
Level 1/Level 2 GCSE (9 - 1)		<input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/>		<input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/>	
<h1 style="margin: 0;">Mathematics A03</h1> <h2 style="margin: 0;">Specimen papers set 1</h2> <h3 style="margin: 0;">Bronze Test 1</h3>				 Grades 7-9	
Time: 45-60 minutes				Paper Reference 1MA1	
You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.					Total Marks <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto;"></div>

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 must not be used in questions marked with an asterisk (*).**
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out** with your **answer clearly identified** at the **end of your solution**.

*



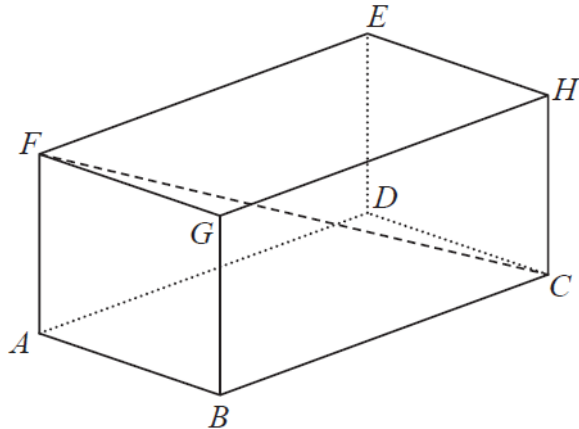
Information

- This gold test is aimed at students targeting grades 7-9.
- This test has 10 questions. The total mark for this paper is 40.
- 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.

1. The diagram shows a cuboid $ABCDEFGH$.



$AB = 7\text{ cm}$, $AF = 5\text{ cm}$ and $FC = 15\text{ cm}$.

Let $x = BC$.

- (a) The square of the diagonal of a cuboid is equal to the sum of the squares of its three sides.
Write an equation connecting AB , AF , BC and FC .

.....

- (b) Rearrange your equation to make x the subject.

.....

(2)

- (c) Write an equation for the volume of the cuboid.

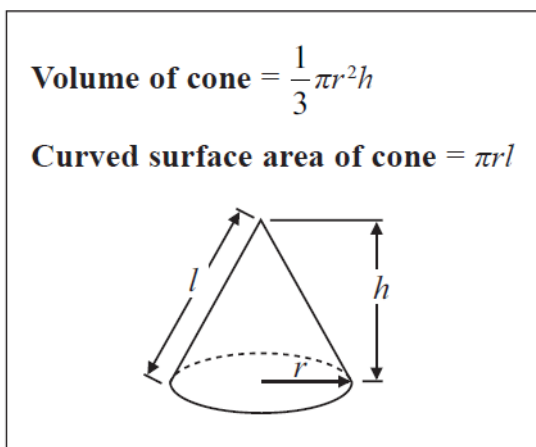
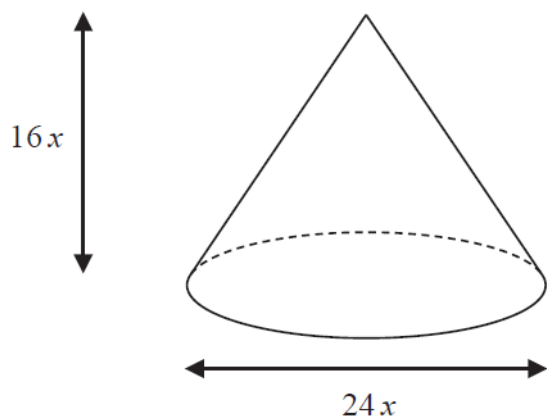
.....

- (d) Calculate the volume of the cuboid.
Give your answer correct to 3 significant figures.

..... cm³
(2)

(Total for Question 1 is 4 marks)

2. The diagram shows a solid cone.



The diameter of the base of the cone is $24x$ cm.

The height of the cone is $16x$ cm.

The curved surface area of the cone is 2160π cm².

The volume of the cone is $V\pi$ cm³, where V is an integer.

- (a) Draw a suitable right-angled triangle and find l , the slant height of the cone, in terms of x .

.....
(1)

- (b) Write an equation for the curved surface area of the cone in terms of x .

.....
(1)

(c) Solve your equation to find the value of x .

.....
(1)

(d) Use your answer to part (c) to find the height and radius of the cone.

$h =$

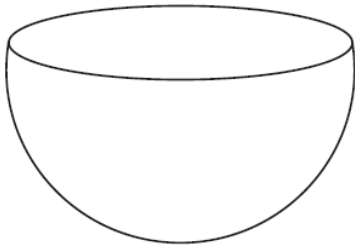
$r =$

(e) Use the formula for the volume of a cone to find the value of V .

.....
(2)

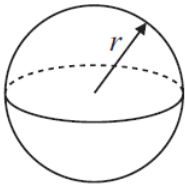
(Total for Question 2 is 5 marks)

***3.** The diagram shows a solid hemisphere.



Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$



The volume of the hemisphere is $\frac{250}{3} \pi$



(a) Write a formula for the volume of a hemisphere.

..... cm

(b) Use your answer to part (a) and the given volume of the hemisphere to find the radius of the hemisphere.

..... cm
(1)

(c) Write a formula for the curved surface area of a hemisphere.

..... cm

- (d) Use your answers to parts (b) and (c) to work out the curved surface area of the hemisphere.
Give your answer as a multiple of π .

..... cm^2
(1)

- (e) Work out the surface area of the flat circular face of the hemisphere.
Give your answer as a multiple of π .

..... cm^2
(1)

- (f) Find the total surface area of the hemisphere.
Give your answer as a multiple of π .

..... cm^2
(1)

(Total for Question 3 is 4 marks)

4. Thelma spins a biased coin twice.
The probability that it will come down heads both times is 0.09

(a) Calculate the probability that the coin will come down heads when it is spun once.

..... cm
(1)

(b) Calculate the probability that the coin will come down tails when it is spun once.

..... cm

(c) Calculate the probability that the coin will come down tails both times when it is spun twice.

..... cm
(2)

(Total for Question 4 is 3 marks)

5. A pendulum of length L cm has time period T seconds.
 T is directly proportional to the square root of L .

(a) Write an equation to show the relationship between L and T .

.....
(1)

The length of the pendulum is increased by 40%.

Let $L = 1$ represent the original length of the pendulum.

(b) What value can you use to represent L after the increase?

.....

(c) Write a pair of simultaneous equations to show the relationship between L and T before and after the increase.

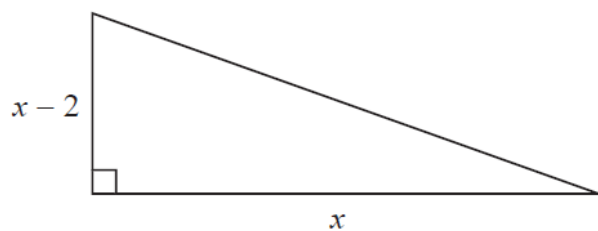
.....
(1)

(d) Solve your simultaneous equations to find the percentage increase in the time period.

..... %
(1)

(Total for Question 5 is 3 marks)

6. Here is a right-angled triangle.



All measurements are in centimetres.

The area of the triangle is 2.5 cm^2 .

- (a) Write an equation for the area of the triangle in terms of x .

.....
(1)

- (b) Show that $x^2 - 2x - 5 = 0$.

.....
(1)

- (c) Solve the quadratic equation.
Give your answers to 4 significant figures.

.....
(1)

(d) Choose the appropriate value of x and use it to find the base and height of the triangle.

..... cm

..... cm

(e) Use Pythagoras' theorem to find the length of the hypotenuse.
Give your answer to 4 significant figures.

..... cm
(1)

(f) Find the perimeter of the triangle.
Give your answer correct to 3 significant figures.

..... cm
(2)

(Total for Question 6 is 6 marks)

*7. There are 10 pens in a box.



There are x red pens in the box.
All the other pens are blue.

Jack takes at random two pens from the box.

(a) Write an expression, in terms of x , for the probability that the first pen Jack takes is red.

.....
(1)

(b) Write an expression, in terms of x , for the probability that the first pen Jack takes is red and the second pen is blue.

.....
(1)

(c) Write an expression, in terms of x , for the probability that the first pen Jack takes is blue.

.....

(d) Write an expression, in terms of x , for the probability that the first pen Jack takes is blue and the second pen is red.

.....
(1)

- (e) Use your answers to parts (b) and (d) to form an expression, in terms of x , for the probability that Jack takes one pen of each colour.

.....

- (f) Simplify your answer to part (e) as far as possible.

.....

(2)

(Total for Question 7 is 5 marks)

8. Mark has made a clay model.
He will now make a clay statue that is mathematically similar to the clay model.

The model has a base area of 6 cm^2 .

The statue will have a base area of 253.5 cm^2 .

- (a) Find the linear scale factor between the model and the statue.

.....
(1)

- (b) Find the volume scale factor between the model and the statue.

.....
Mark used 2 kg of clay to make the model.

- (c) Work out how much clay Mark needs to make the statue.

.....
Clay is sold in 10 kg bags.

Mark has to buy all the clay he needs to make the statue.

- (d) How many bags of clay will Mark need to buy?

.....
(2)

(Total for Question 8 is 3 marks)

9. The number of bees in a beehive at the start of year n is P_n .
The number of bees in the beehive at the start of the following year is given by

$$P_{n+1} = 1.05(P_n - 250)$$

At the start of 2015 there were 9500 bees in the beehive.

- (a) How many bees will there be in the beehive at the start of 2016?

.....
(1)

- (b) How many bees will there be in the beehive at the start of 2017?

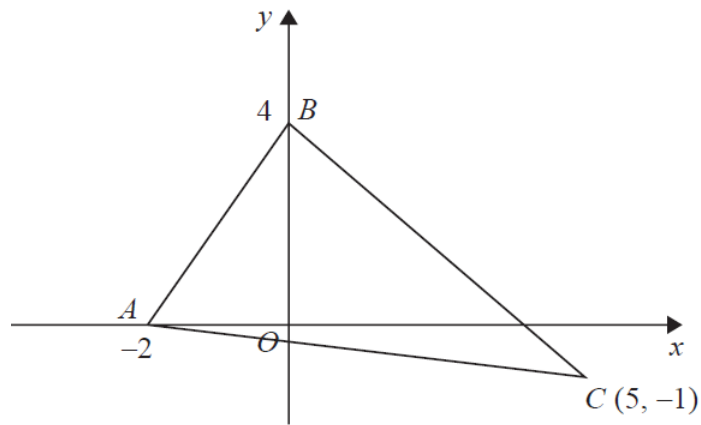
.....

- (c) How many bees will there be in the beehive at the start of 2018?

.....
(2)

(Total for Question 9 is 3 marks)

***10.**



(a) Find the gradient of line AB .

.....
(1)

(b) Find the gradient of a line that is perpendicular to AB .

.....
(1)

(c) Substitute your answer to part (b) and the coordinates of C into the equation $y = mx + c$ and solve it to find c .

.....
(1)

(d) Write the equation of the line that passes through C and is perpendicular to AB .

.....
(1)

(Total for Question 10 is 4 marks)

TOTAL FOR PAPER IS 40 MARKS

Question	Origin	Question	Origin
1	3H qu.12	6	2H qu.19
2	3H qu.17	7*	1H qu.21
3*	1H qu.18	8	3H qu.20
4	3H qu.18	9	2H qu.21
5	2H qu.15	10*	1H qu.23

Specimen papers set 1 problem solving:			Gold Test Grades 7-9
Question	Working	Answer	Notes
1 (a)-(b) (c)-(d)		431	B1 for use of Pythagoras involving the unknown length P1 for setting up an equation equivalent to $x^2 = 15^2 - 5^2 - 7^2$ P1 for finding the volume using their " $\sqrt{15^2 - 5^2 - 7^2}$ " A1awrt 430.5
2 (a) (b) (c) (d)-(e)	$l = 20x$ $x = 3$	20736	P1 for a method to find the slant height of the cone eg $\sqrt{16x^2 + 12x^2}$ or by similar triangles and Pythagorean triples P1 for setting up an equation for the curved surface area in terms of x eg $2160\pi = \pi \times 12x \times 20x$ P1 for complete method to find the value of x P1 for a method to find the volume A1 cao
3 (a)-(b) (c)-(d) (e) (f)		75π	P1 starts process by using $\frac{250}{3}\pi$ and $\frac{1}{2} \times \frac{4}{3}\pi r^3$ to find radius as 5 P1 starts process using $\frac{1}{2}$ curved surface area eg $(4 \times \pi \times 5^2) \div 2$ P1 complete process shown eg $(4 \times \pi \times 5^2) \div 2 + (\pi \times 5^2)$ A1 for 75π
4 (a) (b)-(c)		0.49	P1 for $\sqrt{0.09}$ P1 for $(1 - \sqrt{0.09})^2$ A1 cao

Specimen papers set 1 problem solving:			Gold Test Grades 7-9	
Question	Working	Answer	Notes	
5 (a) (b)-(c) (d)		18.3	P1 P1 A1	for a start to the process interpreting the information correctly, eg. $T = k\sqrt{L}$ oe for next stage in process to find percentage change in T , eg. $\sqrt{1.4}$ for 18.3 to 18.4
6 (a) (b) (c) (d)-(e) (f)		8.63 to 8.65	P1 P1 P1 P1 P1 A1	for a start of process, eg. $0.5x(x-2) = 2.5$ for rearranging to give a quadratic equation, eg $x^2 - 2x - 5 = 0$ oe. for a process to solve the quadratic equation, condoning one sign error in use of formula ($x = 3.449\dots$ and $x = -1.449\dots$) for selecting the positive value of x and applying Pythagoras to find the hypotenuse, eg. $\sqrt{(3.449^2 + 1.449^2)}$ (= 3.74...) for complete process to find perimeter for answer in the range 8.63 to 8.65
7 (a) (b) (c)-(d) (e)-(f)		$\frac{10x - x^2}{45}$	P1 P1 P1 P1 A1	for $\frac{x}{10}$ or $\frac{10-x}{10}$ or $\frac{x-1}{9}$ or $\frac{10-x}{9}$ or $\frac{x}{9}$ or $\frac{9-x}{9}$ seen on diagram or in a calculation for $\frac{x}{10} \times \frac{10-x}{9}$ or $\frac{10-x}{10} \times \frac{x}{9}$ for $\frac{x}{10} \times \frac{10-x}{9} + \frac{10-x}{10} \times \frac{x}{9}$ for $1 - (\frac{x}{10} \times \frac{x-1}{9} + \frac{10-x}{10} \times \frac{9-x}{9})$ for beginning to process the algebra $\frac{10x - x^2}{45}$ oe

Specimen papers set 1 problem solving:			Gold Test Grades 7-9
Question	Working	Answer	Notes
8 (a) (b)-(d)		55	P1 for $\sqrt{\frac{253.5}{6}}$ (=6.5) P1 for $2 \times "6.5" \div 10$ (=54.925) A1 cao
9 (a) (b)-(c)		10169 or 10170	P1 for correct use of formula to find number in 2016, eg. $1.05(9500 - 250)$ (= 9712.5) P1 for complete iterative process, eg. 2017: $1.05(9712.5 - 250)$ (= 9935.625) 2018: $1.05(9935.625 - 250)$ C1 for answer of 10169.90... correctly rounded or truncated to nearest whole number
10 (a) (b) (c) (d)		$y = -\frac{1}{2}x + \frac{3}{2}$	P1 for a process to find the gradient of the line AB P1 (dep) for a process to find the gradient of a perpendicular line eg use of $-1/m$ P1 (dep on P2) for substitution of $x=5$, $y=-1$ A1 equation stated oe