

**N5**

Trinity High School  
Practice Exams  
2019

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**Mathematics**  
**Paper 2 (calculator)**

Thursday, 10<sup>th</sup> January

1030 - 1200

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Fill in your details and then read the instructions below.

Forename(s)

Surname

Seat Number

Total marks — 50

Attempt **ALL** questions.

You may use a calculator.

To earn full marks you must show your working in your answers.

State the units for your answer where appropriate.

Write your answers clearly in the spaces provided in this booklet.

Additional space for answers is provided at the end of this booklet. If you use this space you must clearly identify the question number you are attempting.

Use blue or black ink.

Before leaving the examination room you must give this booklet to the Invigilator; if you do not, you may lose all the marks for this paper.

## Formulae List

The roots of  $ax^2 + bx + c = 0$  are  $x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

Sine rule:  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule:  $a^2 = b^2 + c^2 - 2bc \cos A$  or  $\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

Area of a triangle:  $A = \frac{1}{2}ab \sin C$

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

Volume of a cone:  $V = \frac{1}{3}\pi r^2 h$

Volume of a pyramid:  $V = \frac{1}{3}Ah$

Standard deviation:  $s = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}}$

or  $s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$ , where  $n$  is the sample size.

1. Factorise:

$$3x^2 - 20x + 12$$

2

2. Floyd's Bank samples the time that five customers had to wait to be served at their Renfrew Branch. The wait times (in minutes) were as follows:

6    3    11    15    4

- (a) Calculate the mean and the standard deviation of the wait time for these five customers.

4

- (b) The Paisley branch of Floyd's Bank conducted the same sample and found that their customers had a mean wait time of 8.5 minutes with a standard deviation of 2.1.

Make two valid comparisons between the length of time customers wait at the Renfrew branch and the Paisley branch.

2

3. Homestore sells plant pots in three sizes as shown in the diagram opposite.

The plant pots are all mathematically similar.



- (a) The small pot has a top diameter of 12cm and its volume is 2 litres.  
Calculate the volume of the medium pot, which has a top diameter of 18cm.

**3**

- (b) The large pot has a volume of 14 litres.  
Calculate the top diameter of the large pot.

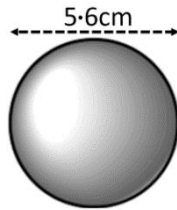
**3**

4. Brianna invests £40 000 in an account that pays 1.6% compound interest per annum.

Assuming Brianna makes no further deposits or withdrawals, how much will she have in the account three years after her investment?

**3**

5. A hotel bar uses spherical ice in their drinks. Each sphere has a diameter of 5.6cm as illustrated in diagram below.



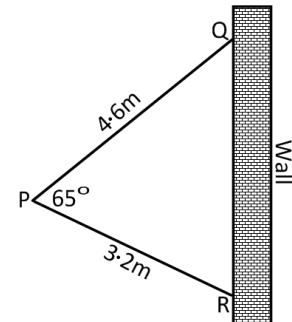
Calculate the volume of 1 sphere of ice. Round your answer to 2 significant figures.



the

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6. A farmer sets up a temporary pen by pushing two lengths of fence against a wall as shown in the diagram. The fence PQ is 4.6m long and the fence PR is 3.2m long. The angle between the fences is  $65^\circ$ . Calculate the length QR, representing the length of the wall covered by the pen.



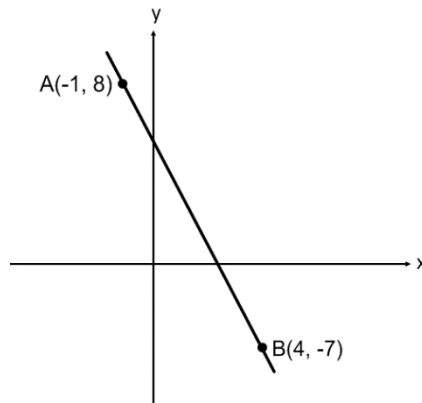
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7. Expand and simplify:

$$\sqrt{a} \left( a^2 + a^{-\frac{1}{2}} \right)$$

**3**

8. The straight line shown below passes through the points A(-1, 8) and B(4, -7).



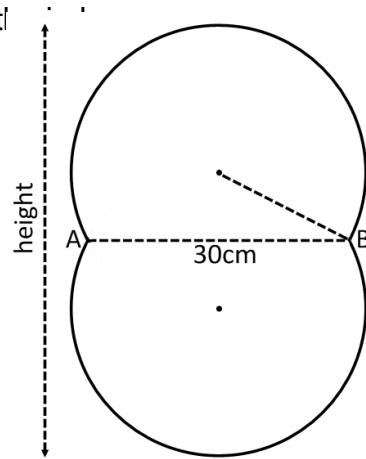
- (a) Find the equation of the line shown in the diagram.

**3**

- (b) The line also passes through the point (k, -19). Find the value of k.

**2**

9. Part of the design for a logo contains two identical circles, which overlap at points A and B such that AB is a chord of both circles. The radius of each circle is 17cm. The chord AB has length 30cm. Calculate the height of the logo.



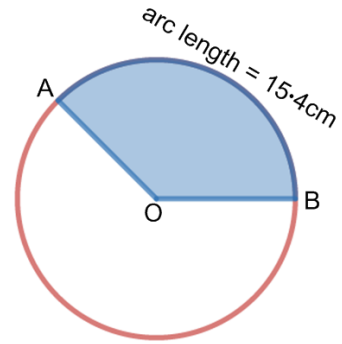
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10. Solve the inequality

$$2(3 - 4x) + 5 > 23 - 4x$$

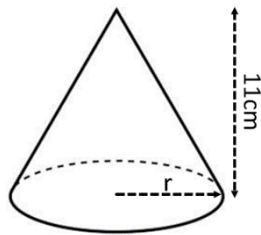
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11. AOB is a sector of the circle with centre O.  
The radius of the circle is 8cm.  
The minor arc AB has length 15.4cm.  
Calculate the size of angle AOB.



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12. A cone has a volume of  $288\text{cm}^3$ . It has a height of 11cm, as shown below.  
Calculate the value of  $r$ , the radius of the cone's base.



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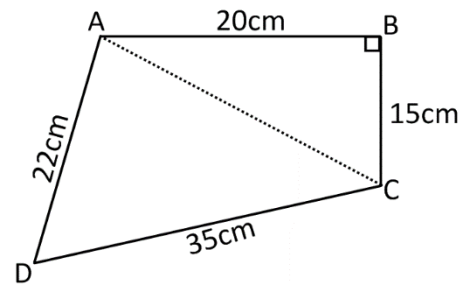


13. A straight line has equation  $5x - 3y + 7 = 0$ .  
Find the gradient of the line.

2

14. ABCD is a quadrilateral such that angle ABC is a right angle.

AB = 20cm  
BC = 15cm  
AD = 22cm  
DC = 35cm



Calculate the size of angle ADC.

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