National 5 Mathematics

2015 Paper 1

Time allowed = 1 hr Marks available = 40

For each question, you can scan the QR codes if using a paper copy or click on the links viewing this document electronically. This will allow you to view the worked solutions for each question. You can also either scan this QR Code or click on the link below to view this paper's marking scheme;

https://www.sqa.org.uk/pastpapers/papers/instructions/2015/mi_N5_Mathematics_all_2015.pdf

Remember to record your percentage for this paper in your analysis grid (your score ÷ 40 × 100).

FORMULAE LIST

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

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

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

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 $s=\sqrt{\dfrac{\Sigma(x-\bar{x})^2}{n-1}}$

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

Total marks — 40

Attempt ALL questions

1. Evaluate $6\frac{1}{5} - 2\frac{1}{3}$. 2

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/ScvGWiaexkc

Video Lesson: APP 1·3b Gold Outcome 1

2. Solve algebraically the inequality

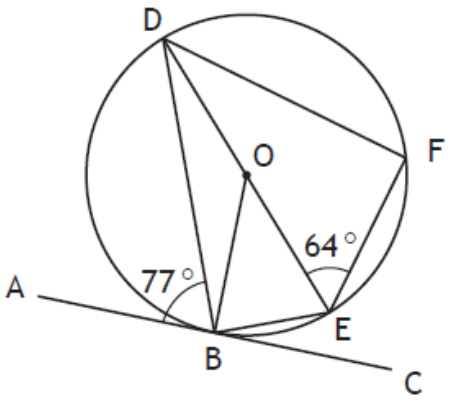
$$11-2(1+3x)<39$$ 3

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/FF609DJCI2M

Video Lessons: REL 1·1c Silver Outcome 1

3.



AC is a tangent to the circle, centre O, with point of contact B.
DE is a diameter of the circle and F is a point on the circumference.
Angle ABD is 77° and angle DEF is 64°.
Calculate the size of angle BDF. 3

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/JSbOJQS5EPU

Video Lesson: REL 1·4b Gold Outcome 1

4. Multiply out the brackets and collect like terms

$$(x-4)(x^2+x-2).$$ 3

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/tG580LDSkHE

Video Lesson: E+F 1·2a Gold Outcome 3

5. The standard deviation of 1, 2, 2, 2, 8 is equal to $\sqrt{a}$.

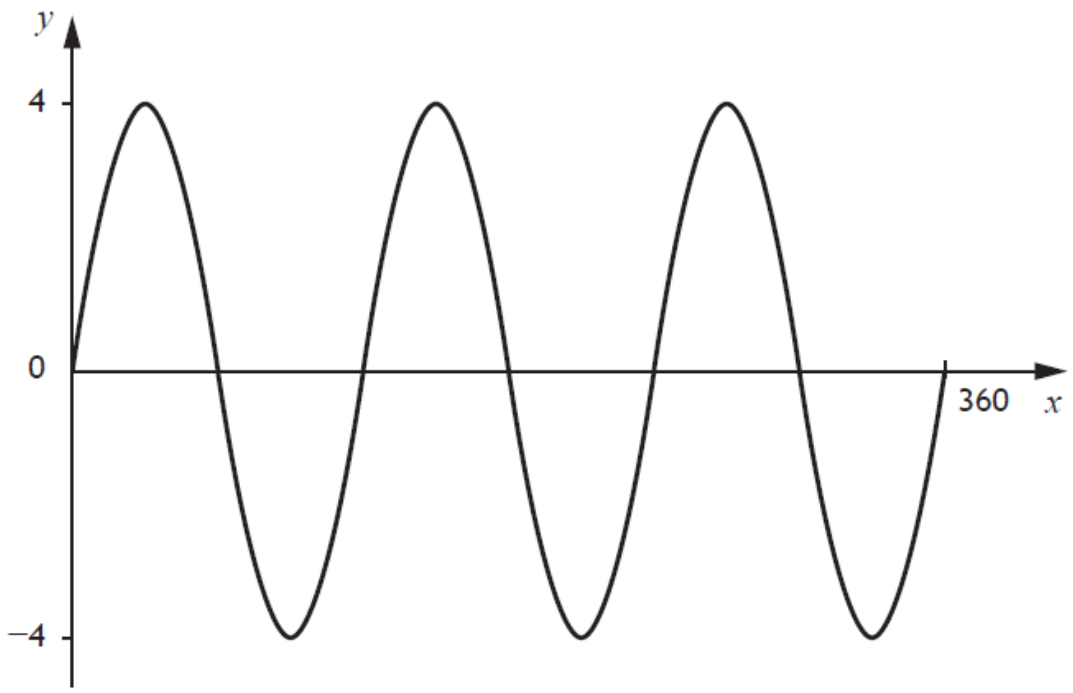
Find the value of a. 3

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/b60JYsbfFEU

Video Lesson: APP 1·4 Bronze Outcome 2

6. Part of the graph of $y = a\sin bx^\circ$ is shown in the diagram.



State the values of a and b. 2

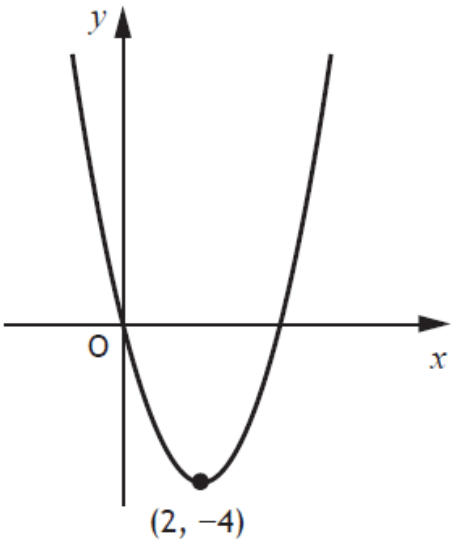
Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/VtaubS81z4I

Video Lesson: REL 1·5a Bronze Outcome 1

7. The graph below shows part of the parabola with equation of the form

$$y = (x+a)^2 + b.$$



The minimum turning point $(2, -4)$ is shown in the diagram.

(a) State the values of

(i) a 1

(ii) b. 1

(b) Write down the equation of the axis of symmetry of the graph. 1

Scan the QR code or click on it to view the worked solutions;

https://youtu.be/7fGWdIrr_e4

Video Lessons: REL 1·2 Bronze Outcomes 1 and 3

8. Find the equation of the line joining the points $(-2, 5)$ and $(3, 15)$.
Give the equation in its simplest form. 3

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/jTaeLfPsGx0

Video Lesson: REL 1·1a Silver Outcome 3

9. Write the following in order of size starting with the smallest.

$\cos 90°$ $\cos 100°$ $\cos 300°$

Justify your answer. 2

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/cv-gJyrieag

Video Lesson: REL 1·5a Gold Outcome 3

10. Ten couples took part in a dance competition.

The couples were given a score in each round.

The scores in the first round were

16 27 12 18 26 21 27 22 18 17

(a) Calculate the median and semi-interquartile range of these scores. 3

(b) In the second round, the median was 26 and the semi-interquartile range was 2·5.

Make two valid comparisons between the scores in the first and second rounds. 2

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/47eZeVIznmw

Video Lesson: APP 1·4 Silver Outcome 1

11. Solve algebraically the system of equations

$$3x + 2y = 17$$
$$2x + 5y = 4.$$

3

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/_UCgVuDiDn4

Video Lesson: REL 1·1d Gold Outcome 1

12. Simplify $\frac{x^2-4x}{x^2+x-20}$. 3

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/oukwZ5YPeq4

Video Lesson: E+F 1·3 Gold Outcome 1

13. Express $\frac{4}{\sqrt{8}}$ with a rational denominator.

Give your answer in its simplest form. 3

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/U6hYrDGDIHk

Video Lesson: E+F 1·1a Silver Outcome 2

14. Evaluate $8^{\frac{5}{3}}$. 2

Scan the QR code or click on the link to view the worked solutions;

https://youtu.be/JtJBiqG2CQ4

Video Lesson: E+F 1·1b Gold Outcome 2

[END OF QUESTION PAPER]