N5

Mathematics

National 5 Practice Paper C

Paper 1

Duration – 1 hour

Total marks – 40

- You may NOT use a calculator
- Attempt all the questions.
- Use **blue** or **black** ink.
- Full credit will only be given to solutions which contain appropriate working.
- State the units for your answer where appropriate.

FORMULAE LIST

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

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

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

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

Volume of a Sphere: $V = \dfrac{4}{3}\pi r^3$

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

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

Standard deviation: $s = \sqrt{\dfrac{\sum(x-\bar{x})^2}{n-1}} = \sqrt{\dfrac{\sum x^2 - (\sum x)^2/n}{n-1}}$, where n is the sample size.

1. Evaluate $5.04 + 8.4 \div 7$. 2

2. Evaluate $\frac{2}{7}\left(1\frac{3}{4}+\frac{3}{8}\right)$. 2

3. Simplify $3(2x-4)-4(3x+1)$ 3

4. $f(x) = 7 - 4x$

   (a) Evaluate $f(-2)$. 1

   (b) Given that $f(t) = 9$, find t. 2

5. Solve, by factorising

   $7 + 6x - x^2 = 0$. 3

6. A hotel books taxis from a company called Quick-Cars.
The receptionist notes the waiting time for every taxi ordered over a period of two weeks. These times, in minutes, are shown below.

12	25	29	37	6	13	26
32	42	7	14	29	35	44

(a) For the given data, calculate:

(i) the median 1

(ii) the lower quartile 1

(iii) the upper quartile 1

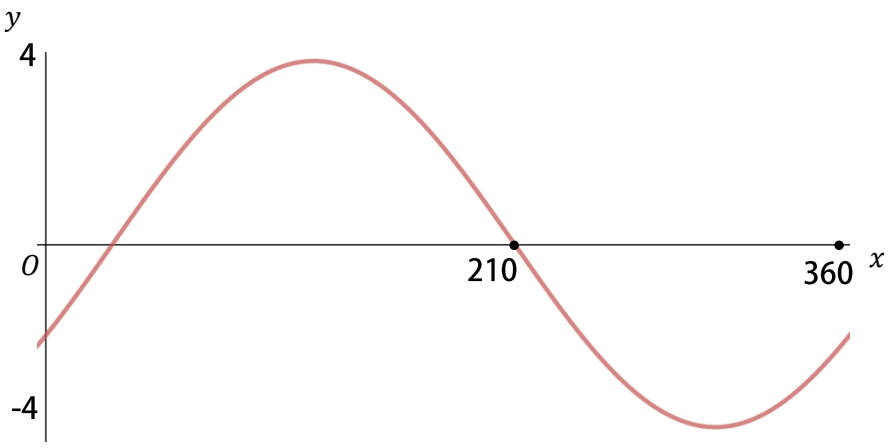
(b) Calculate the semi-interquartile range. 1

In another two week period, the hotel books taxis from a company called Fast-Cabs.

The median waiting time for Fast-Cabs is found to be 27.5 minutes and the semi-interquartile range for Fast-Cabs is found to be 2.5 minutes.

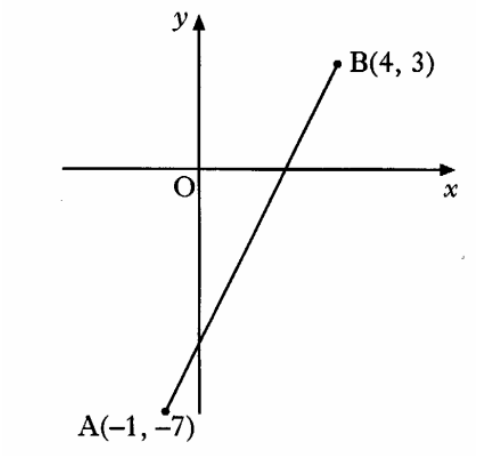
(c) Use this information to compare the two companies. 2

7. Part of the graph of $y = a\sin(x + b)°$ is shown in the diagram.



State the values of a and b. 2

8. In the diagram below, A is the point $(-1,-7)$ and B is the point $(4,3)$.



(a) Find the gradient of the line AB. 2

(b) AB cuts the y-axis at the point $(0,-5)$.
Write down the equation of the line AB. 1

(c) The point $(3k,k)$ lies on AB. Find the value of k. 2

9. $f(x) = x^2 + 6x - 7$

(a) Write $f(x)$ in the form $(x+a)^2 + b$. 2

(b) State the coordinates of the turning point of $f(x)$. 1

10. Andrew and Daisy each book in at the Sleepwell Lodge.

(a) Andrew stays for 3 nights and has breakfast on 2 mornings.
His bill is £145.
Write down an algebraic equation to illustrate this information. 1

(b) Daisy stays for 5 nights and has breakfast on 3 mornings.
Her bill is £240.
Write down an algebraic equation to illustrate this information. 1

(c) Find the cost of one breakfast 3

11. (a) Evaluate $8^{\frac{2}{3}}$ 2

(b) Simplify $\frac{\sqrt{24}}{\sqrt{2}}$ 2

(c) Simplify $\frac{2x+2}{(x+1)^2}$ 2

[End of question paper]