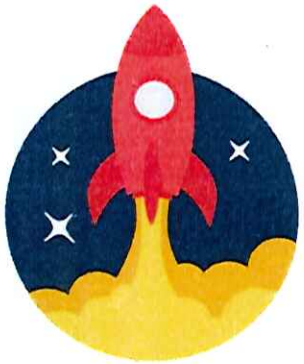


Name Solutions

Teacher _____

Mathematics

Paper 2

National 5 Booster Paper C2

Duration: 1 hour 50 minutes

Total Marks - 60

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.

Use **blue** or **black** ink.

Notes:

- This is a **Booster Paper**. Your May exam will be (a bit) harder than this.
- The Booster Papers get **more challenging** as you work through them.
- The final Booster Paper will be as challenging as your May exam.
- The number of marks indicated beside each question is intended as a guide and may differ slightly from SQA marking instructions.
- These original papers are **produced independently of the SQA** and are **free of charge**.
- All Booster Papers and answers can be found at www.maths180.com/BoosterPapers

National 5 Booster Paper C2

1. $4\sin x^\circ + 3 = 1$

$4\sin x^\circ = -2$

$\sin x^\circ = \frac{-2}{4}$

S	A 30°
T	C

$x = \sin^{-1}\left(-\frac{1}{2}\right)$

$= 210^\circ, 330^\circ$

2. $A = \frac{1}{2}ab\sin C$

$= \frac{1}{2} \times 4.5 \times 3.5 \times \sin 110^\circ$

$= 7.400079...$

$= 7.4\,m^2$ (1dp)

3 a) 10, 11, (12), 14, 15, 17, 17, (18), 18, 19

Q_1 Q_2 Q_3

Median $= Q_2 = 16$

$SIQR = \frac{Q_3 - Q_1}{2}$

$= \frac{18 - 12}{2}$

$= 3$

b) On average, the number of butterflies visiting the garden in 2008 was greater than 2018. $(16 > 14)$

In 2008, the number of butterflies visiting the garden was more consistent than in 2018 $(3 < 5)$

4. $\frac{3x+8}{4} + \frac{3x+2}{2} = 8$

$\frac{3x+8}{4} + \frac{6x+4}{4} = 8$

$\frac{9x+12}{4} = 8$

$9x + 12 = 32$

$9x = 20$

$x = \frac{20}{9}$

5. $\overrightarrow{AF} = \underset{\sim}{p} + \underset{\sim}{q}$

$\overrightarrow{EB} = -\underset{\sim}{q} - \underset{\sim}{q} - \underset{\sim}{p}$

$= -2\underset{\sim}{q} - \underset{\sim}{p}$

6. $12\frac{1}{2}\% = £9.60$

$1\% = £0.8$

$100\% = £80$

7. $x^3(2x^5 + x^{-2})$

$= 2x^8 + x.$

8. $\frac{x}{360} \times \pi \times 14 = 16.5$

$x = \frac{16.5 \times 360}{14\pi}$

$= 135.054\ldots$

$= 135^\circ$ (to nearest degree)

9. $y = 9x^2 - 12x + 4$

$a = 9$

$b = -12$

$c = 4$

$b^2 - 4ac$

$= (-12)^2 - 4(9)(4)$

$= 144 - 144$

$= 0$

Since $b^2 - 4ac = 0$ then there is only one real root

10. $vsf = \frac{625}{135}$

$= \frac{125}{27}$

$lsf = \sqrt[3]{\frac{125}{27}}$

$= \frac{5}{3}$

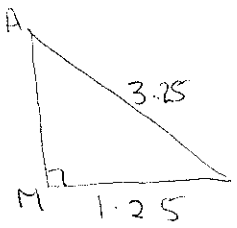
Height $= \frac{5}{3} \times 12$

$= 20\ cm$

11. a) $OM = 3.25 - 2$

$= 1.25\ m$

b)



$AM^2 = 3.25^2 - 1.25^2$

$= 9$

$AM = \sqrt{9}$

$= 3\ m$

$\therefore AB = 2 \times 3m$

$= 6m$

12. $\cos C\hat{A}B = \frac{15^2 + 11^2 - 7^2}{2 \times 15 \times 11}$

$= 0.9$

$C\hat{A}B = \cos^{-1}(0.9)$

$= 25.8419...$

$= 25.8^\circ$ (1dp)

13. $3x^2 - 4x - 8 = 0$

$a = 3 \quad b = -4 \quad c = -8$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{4 \pm \sqrt{16 - 4(3)(-8)}}{6}$$

$$= \frac{4 \pm \sqrt{112}}{6}$$

$$\therefore \frac{4 + \sqrt{112}}{6} \quad \text{or} \quad \frac{4 - \sqrt{112}}{6}$$

$= 2.4305\ldots$ $= -1.09716\ldots$

$= 2.43$ $= -1.10$

14. $\frac{1}{4x} + \frac{8}{x} = 11$

$$\therefore \frac{1}{4x} + \frac{32}{4x} = 11$$

$$\frac{33}{4x} = 11$$

$$44x = 33$$

$$x = \frac{3}{4}.$$

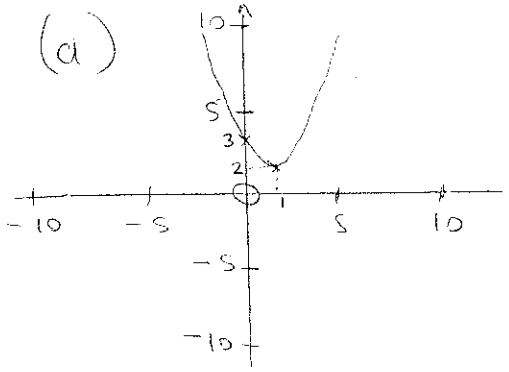
15. $a = 4, \quad b = 2, \quad c = 1$

16 (a) (1, 2)

(b) $x = 1$

(c) (0, 3)

(d)



17. $AC = \frac{20}{15} \times 9$

$= 12\text{ cm}$

$BC = 12 - 9$

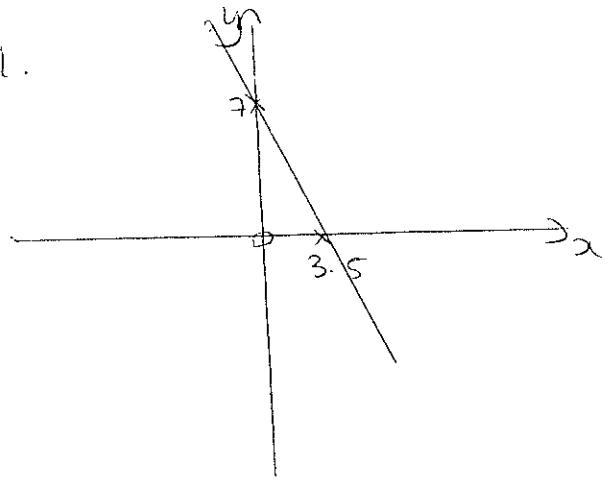
$= 3\text{ cm}$

18. $\dfrac{\cos x^\circ \left(\frac{\sin x^\circ}{\cos x^\circ}\right)}{\sin x^\circ}$

$= \dfrac{\sin x^\circ}{\sin x^\circ}$

$= 1$

19.



Crosses x-axis when $y = 0$

$0 = -2x + 7$

$2x = 7$

$x = 3.5$ (3.5, 0)

Crosses y-axis when $x = 0$

$y = -2(0) + 7$

$y = 7$ (0, 7)