National 5 Maths

Mock Exam A (2022) – Paper 2

Marking Scheme – Total 50 Marks

1.

•[1]	increases by 4.5%	$\times 1.045$
•[2]	evidences of compound increase	94000×1.045^3
•[3]	calculates correctly with valid strategy	$107269.61\ldots$
•	rounds answer to 2 s.f.	$(£)110{,}000$

Correct answer with no working award 4/4

For an incorrect percentage, Marks 2, 3 and 4 are still available with working

Where division is used with 1.045, Mark 1 is not available

Where division is used with any other value, Marks 1 and 2 are not available

2.

•[1]	correct calculation	$2.8 \times 10^4 \times 24$
•[2]	answer in scientific notation	6.72×10^5 (miles)

Correct answer with no working award 0/2

3.

•[1]	correct fraction	$\frac{220}{360}$ or equivalent
•[2]	correct substitution into arc length formula	$\frac{220}{360} \times \pi \times 24$
•[3]	calculate arc length	46(.07…)(cm)

Correct answer with no working award 0/3

Do not penalise variations in π

Premature rounding must be to at least 2 significant figures

Mark 3 not available for subsequent incorrect working

4.

•[1]	correct substitution into cosine rule to find cosL	$\frac{28^2+24^2-18^2}{2\times28\times24}$
•[2]	evaluates	$\frac{1036}{1344}$ or equivalent
•[3]	calculates angle	$39.571\ldots$

Correct answer with no working award 0/3

Where all 3 angles are calculated correctly award 3/3

Where 2 angles are calculated and 39.6 has NOT been clearly identified award 2/3

Disregard premature rounding provided there is evidence

5.

•[1]	correct bracket with square	$(x + 6)^2$...
•[2]	complete process	$(x...6)^2$ - 38

Correct answer with no working award 2/2

Answer for Mark 2 must be consistent with Mark 1 eg $(x + 12)^2$ – 146 award 1/2

6.

•[1]	know that 105% = 180.60	$105\% = 180.60$
•[2]	begin valid strategy	1% = 180.60 ÷ 105 or equivalent
•[3]	complete calculation within valid strategy	(£)172

Correct answer with no valid working award 3/3

7. (a)

•[1]	calculates mean	142
•[2]	calculates $(x - \bar{x})^2$	9, 9, 0, 1, 9, 16
•[3]	substitutes into formula	$\sqrt{\frac{44}{5}}$
•[4]	calculates standard deviation	$2.966\ldots$

For 142 and 2.966 with no working award 1/4

For 142 and $\frac{\sqrt{44}}{5} = 2.966\ldots$ award 4/4

For 142 and $\frac{\sqrt{44}}{5} = 1.326\ldots$ award 3/4

(b)

•[5]	valid comment comparing means	e.g. "On average the potatoes from the supermarket were heavier"
•[6]	valid comment comparing standard deviations	e.g. "The weight of the potatoes from the supermarket were more consistent"

Comments must be consistent with part (a) and must refer to <u>weight</u> of potatoes, as well as the supermarket and/or the farmer's market. Do not accept "better"/"worse"

For the award of mark 5 comment must include "on average" or "in general"

For the award of mark 6 comment must include reference to consistency, variability or spread

8.

•[1]	start valid strategy	$20^2 + 5^2$ or $11^2 + 5^2$ or $20^2 + 11^1$
•[2]	continue strategy	$\sqrt{20^2 + 11^2 + 5^2}$
•[3]	calculate MN	$23.366\ldots$(cm)

Correct answer with no working award 0/3

Accept $\sqrt{20^2 + 11^2 + 5^2}$ for Marks 1 and 2

9.

- •[1] simplify $\left(n^{\frac{1}{2}}\right)^6$ — $n^{\frac{6}{2}}$ or equivalent
- •[2] simplify $n^3 \times n^{-5}$ — n^{-2}
- •[3] express with a positive power — $\frac{1}{n^2}$

Correct answer with no working award 3/3

10.

- •[1] expand brackets — $1 - \cos x + \cos x - \cos^2 x \, (= 1 - \cos^2 x)$
- •[2] simplify expression — $1 - \cos^2 x = \sin^2 x$

Correct answer with no working award 0/2

Accept $(\cos x)^2$

Do not accept $\cos x^2$ or $\sin x^2$

Mark 1 is not available if there are no variables

11.

- •[1] substitutes into quadratic formula — $\frac{-7 \pm \sqrt{7^2 - 4 \times 2 \times (-6)}}{2 \times 2}$
- •[2] evaluates discriminant — 97
- •[3] calculates both roots to 1 decimal place — -4.2 and 0.7

Correct answer with no working award 0/3

Mark 3 is only available if $b^2 - 4ac > 0$ and roots require rounding

12.

- •[1] start to divide fractions — $\frac{c}{3c-15} \times \frac{c-5}{2}$
- •[2] factorise — $3(c-5)$
- •[3] multiply and simplify — $\frac{c}{6}$

Correct answer with no working award 0/3

Mark 3 not available for subsequent incorrect working

13.

•[1] rearrange equation $\tan x = -\frac{4}{3}$

•[2] find one value of x 126.86…

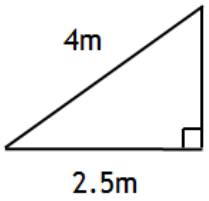
•[3] find second value of x 306.86…

Correct answer with no valid working award 0/3

If tanx > 0 then Mark 2 is not available

14.

•[1] marshal facts and use of RAT



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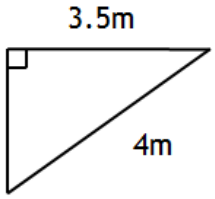

•[2] consistent use of Pythagoras $4^2 - 2.5^2$ or $4^2 - 3.5^2$

•[3] finds upper length 1.93…

•[4] finds lower length 3.12…

•[5] adds lengths to find height 5(m)

Correct answer with no working award 0/5

Accept $4^2 - 2.5^2$ or $4^2 - 3.5^2$ as evidence for Marks 1 and 2

15.

•[1] correct use of sine rule $\frac{BT}{\sin 43} = \frac{180}{\sin 25}$ or $\frac{AT}{\sin 112} = \frac{180}{\sin 25}$

•[2] rearrange formula $BT = \frac{180}{\sin 25} \times \sin 43$ or $AT = \frac{180}{\sin 25} \times \sin 112$

•[3] calculate BT or AT 290.47… or 394.90…

•[4] consistent substitution into appropriate trig formula $\frac{GT}{\sin 68} = \frac{290.47}{\sin 90}$ or $\sin 68 = \frac{GT}{290.47}$ or $\frac{GT}{\sin 43} = \frac{394.90}{\sin 90}$ or $\sin 43 = \frac{GT}{394.40}$

•[5] calculate GT **using trigonometry** 269.32…(cm)

Correct answer with no working award 0/5

A wrong value for BT or AT must be accepted as a basis for calculating GT