National 5 Maths

Mock Exam A (2022) – Paper 1

Marking Scheme – Total 40 Marks

1.

- •[1] substitution $(-10)^2 - (-10)$
- •[2] evaluation 110

Correct answer with no working award 2/2

Accept -10^2 - -10 for Mark 1

Mark 2 not available for subsequent incorrect working

For 10^2 - 10 = 90 or 10^2 - (-10) = 110 award 0/2

2.

- •[1] identify common denominator $5\frac{\cdots}{35} - 2\frac{\cdots}{35}$ or $\frac{\cdots}{35} - \frac{\cdots}{35}$
- •[2] answer $\frac{103}{35}$ or $2\frac{33}{35}$

Correct answer with no working award 0/2

Do not penalise incorrect conversion of $\frac{103}{35}$ to a mixed number

3.

- •[1] start expansion $2x^2 + 4x - 3x - 6$ **or** $4x^2 - 8$
- •[2] complete expansion $2x^2 + 4x - 3x - 6 + 4x^2 - 8$
- •[3] collect like terms $6x^2 + x - 14$

Correct answer with no working award 3/3

Mark 3 only available if expression for Mark 2 includes a constant and two different powers of x

Mark 3 not available for subsequent incorrect working

4.

- •[1] calculate size of angle OBC or OCB — $53°$
- •[2] calculate size of angle ADB or ABD — ADB = $49°$ or ABD = $41°$
- •[3] calculate size of angle ABC — $94°$

Correct answer with no relevant working award 0/3

Full marks may be awarded for information marked on a diagram

5.

- •[1] evidence of scaling — eg $18x + 6y = -6$, $18x - 6y = 18$
- •[2] follow a valid strategy to produce values for x and y — values for x and y
- •[3] calculate correct values for x and y — x = $\frac{1}{3}$, y = -2

Correct answer with no working award 0/3

Answer obtained by guess and check award 0/3

6.

- •[1] simplify $\sqrt{300}$ — $10\sqrt{3}$
- •[2] simplify $\sqrt{27}$ — $3\sqrt{3}$
- •[3] state answer in simplest form — $9\sqrt{3}$

Correct answer with no working award 0/3

Mark 3 not available for subsequent incorrect working

7.

- •[1] correct substitution into area rule $\frac{1}{2} \times 12 \times 10 \times \frac{3}{4}$
- •[2] calculate area 45cm^2

Correct answer with no working award 1/2

For $\frac{1}{2} \times 12 \times 10 \times \sin\frac{3}{4} = 45$ **award 1/2**

8.

- •[1] find gradient $\frac{9}{15}$ or equivalent
- •[2] substitute gradient and a point eg y – 1 = $\frac{9}{15}$(x – 5)
- •[3] state equation in simplest form y = $\frac{3}{5}$x – 2

Correct answer with no working award 0/3

Gradient need not be simplified for Marks 1 and 2

9.

- •[1] substitutes into formula for volume of pyramid $270 = \frac{1}{3} \times x^2 \times 10$
- •[2] rearranges for x^2 $x^2 = \frac{270 \times 3}{10}$ or equivalent
- •[3] solves for x $x = 9$(cm)

Correct answer with no working award 0/3

For an answer obtained by guess and check award 0/3

Mark 3 not available for $= \pm 9$

Mark 3 is available for expressing $\sqrt{x}$ **as a surd in its simplest form so long as it can be simplified to begin with**

10.

•[1]	state the value of a	-3
•[2]	state the value of b	2

For y = -3sin2x award 2/2

For a = 2, b = -3 or y = 2sin(-3x) award 1/2

For -3, 2 award 1/2

For 2, -3 or y = 2sin-3x award 0/2

11.

•[1]	state period	90^o

Accept omission of degree symbol

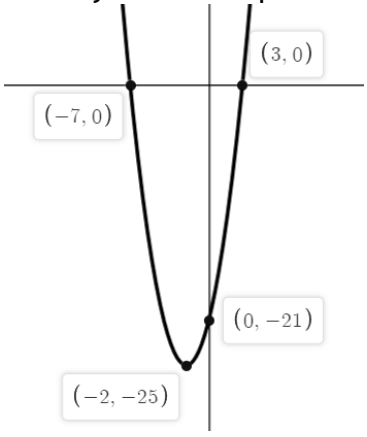
12.

•[1]	state correct order	$\sin 280^0$, $\sin 180^0$, $\sin 80^0$
•[2]	explicit justification	$\sin 280^0 < 0$, $\sin 180^0 = 0$, $\sin 80 > 0$ or equivalent

Accept positions of $\sin 80^0$, $\sin 180^0$ and $\sin 280^0$ indicated on a sine curve for Mark 2

13.

•[1]	identify roots	3 **AND** -7
•[2]	identify turning point **OR** y-intercept	(-2,-25) **OR** -21
•[3]	identify turning point **AND** y-intercept and sketch a consistently annotated parabola	(-2,-25) **AND** -21 and consistently annotated parabola



14.

- •[1] starts to process left hand side — $8 - 6 + 3x$
- •[2] collect like terms — $2 < 6x$ or $-6x < -2$
- •[3] solve for x — $\frac{1}{3} < x$ or $x > \frac{1}{3}$

Correct answer with no valid working award 0/3

Mark 3 not available for subsequent incorrect working

15. (a)

- •[1] calculate height — $(9 \times 3 - 2 \times 3^2) = 9(m)$

(b)

- •[2] construct equation — $9t - 2t^2 = -35$
- •[3] rearrange and equate to zero — eg $2t^2 - 9t - 35 = 0$
- •[4] consistent factorisation — $(2t + 5)(t - 7)$ (=0)
- •[5] solve equation and select correct value — (t =) 7 (seconds)

Correct answer with no working award 0/4

For a solution obtained by guess and check award 0/4

Mark 4 available for eg $\frac{\mathbf{9 \pm \sqrt{(-9)^2 - 4 \times 2 \times -35}}}{\mathbf{2 \times 2}}$