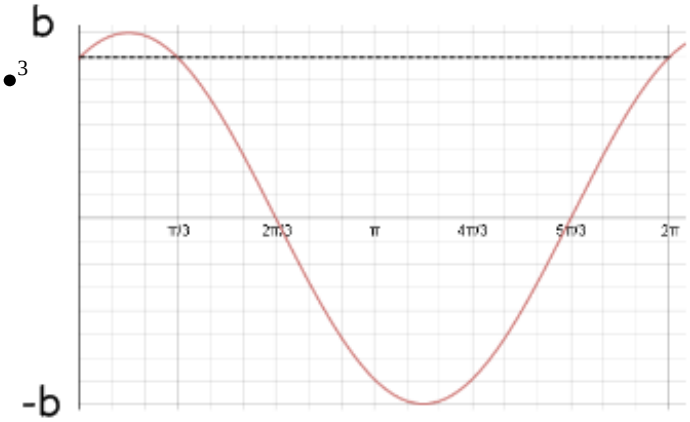
Practice NAB A - Solutions

Question	Points of expected responses	Illustrative scheme
1	•[1] interprets gradient •[2] obtains equation	•[1] $m = -\,^3/_2$ •[2] $y - 5 = -\,^3/_2 (x - 2)$ NB can be left in this form
2	•[1] interprets perpendicular •[2] substitutes correctly	•[1] $m_{AC} = -\frac{1}{2}$ •[2] $y - (-4) = -\,^1/_2 (x + 1)$
3	•[1] finds acute angle #2.1 uses correct strategy •[2] finds obtuse angle	•[1] $\tan^{-1}(3) = 71.56^o$ (1.25 rads) #2.1 evidence of $m = \tan a^\circ$ and attempting to find obtuse angle •[2] 180° – 71.56° = 108.44° (1.89 rad) (rounding not required)
4	•[1] uses $m = \tan a^\circ$ #2.2 interprets correct angle and correct explanation	•[1] $m = \tan(\ )^\circ = \ldots$ (stated or implied by #2.2) #2.2 dry slope category = Extreme skiing, m = 1 > 0.6 (so outwith general category)
5 (a) (b)	•[1] interpret composite process •[2] completes •[3] interpret domain of $g(f(x))$ function #2.2 Explain a solution	•[1] $g(f(x)) = g(3x - 2)$ •[2] $g(f(x)) = \sqrt{(3x - 2)}$ •[3] $3x - 2 \geq 0$ $3x \geq 2$ $x \geq {}^2/_3$ #2.2 Because on the set of real numbers, the square root of a negative number cannot be found.
6	•[1] start inverse process •[2] state inverse function	•[1] $4 + y = 3x$ •[2] $f^{-1}(x) = {}^1/_3(x + 4)$

7	•^{1} correct horizontal translation •^{2} correct vertical translation •^{3} correctly annotated diagram	•^{1} *x*-coordinates must be correct •^{2} *y*-coordinates must be correct •^{3} correct shape and annotation Graph moves 4 units right and 2 up (-6, 0) → (-2, 0) → **(-2, 2)** (1, -7) → (5, -7) → **(5, -5)** (3, 0) → (7, 0) → **(7, 2)**
8	•^{1} finds one unknown •^{2} finds final unknown	•^{1} a = 3 •^{2} b = 4
9	•^{1} max/min correct •^{2} *x* intercepts •^{3} correct shape (starts and finishes graph slightly above *b*	•^{1} max *b* and min −*b* •^{2} ($^{2\pi}/_3$, 0) and ($^{5\pi}/_3$, 0) •^{3}  NB the *y*-intercept does not require to be annotated.
10	•^{1} finds one unknown •^{2} finds second unknown •^{3} finds final unknown	•^{1} *a* = 4 •^{2} *b* = 2 •^{3} *c* = −3
11	•^{1} starts to solve •^{2} solves for 2*x* •^{3} solves for *x*	•^{1} $2x = \sin^{-1}(\sqrt{3}/2)$ •^{2} $2x = 60^o$ and 120^o •^{3} $x = 30^o$ and 60^o NB •^{2} and •^{3} can be marked horizontally or vertically
		Total of 26 marks plus 1 x #2.1 and 2 x #2.2