

SOLUTIONS AND MARK SCHEME

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|------|-------|-------|
| 1. A | 6. A | 11. C |
| 2. B | 7. C | 12. B |
| 3. C | 8. B | 13. D |
| 4. D | 9. B | 14. A |
| 5. B | 10. C | 15. C |

Question	Working	Marks & comments
16.(i)		<p>$[\frac{1}{2}$ mark for each subset correctly enumerated .]</p> <p style="text-align: right;">4</p>
(ii)	$3x + 65 = 80$ $x = 5$	<p>1 [for summing his terms from 16(i) AND equating to 80]</p> <p>1 [correct answer only] 2</p>
(iii)	$n(s \cap (w \cup C)) = 11 + 8 + 15 = 34$	<p>1 [for summing his terms from appropriate subsets] 1</p>
17. (i)	$10xy - 8x - 15ny + 12n$ $= 2x(5y - 4) - 3n(5y - 4)$ $= (5y - 4)(2x - 3n)$	<p>1 [c.a.o]</p> <p>1 [c.a.o] 2</p>
(ii)	$5x^2 - 125$ $= 5(x^2 - 25)$ $= 5(x - 5)(x + 5)$	<p>1</p> <p>1[correct answer only] 2</p>
(iii)	$2x^2 - 9x - 5 = (2x + 1)(x - 5)$	<p>2 2</p>

18.(i)	$2x^2 - 6x + 3 = 0$ $x = \frac{6 \pm \sqrt{6^2 - 4(2)(3)}}{2(2)}$ $x = \frac{6 \pm \sqrt{12}}{4}$ $x = 0.63$ $x = 2.37$	1 [use of quadratic formula] 1 [maximum of 2 marks for correct use of his expression] 1 [c.a.o] 1 [c.a.o]	4
(ii)	$y = 20 - 3x$ $y = 2x^2$ $2x^2 = 20 - 3x$ $2x^2 + 3x - 20 = 0$ $(2x - 5)(x + 4) = 0$ $x = \frac{5}{2} \quad x = -4$ $y = \frac{25}{2} \quad y = 32$	1 equating expressions 1 factorising 1 correct values of x 1 correct values of y	4

19(i)	$fg(2) = f(2^2 + 2 + 2) = f(8)$ $= 2(8) + 3 = 19$	1 1	2
(ii)(a)	$fg(x) = 2(x^2 + x + 2) + 3$ $= 2x^2 + 2x + 7$	1 1	2
(ii)(b)	$f^{-1}(x) = \frac{x - 3}{2}$	1 attempting to make "y" the subject. 1 c.a.o	2
(iii)	$2(2x + 3) + 3 = 2x + 3$ $4x + 9 = 2x + 3$ $2x = -6$ $x = -3$	1 substituting 1 simplifying 1 c.a.o	3

20(a)	Bearing of C from B = $360 - 215 = 145^\circ$	1 1 [correct answer only]	2
(b)	$AC^2 = 40^2 + 60^2 - 2 \times 40 \times 60 \times \cos 115 =$ $AC^2 = 38.64$ $AC = 85.02$	1 [for use of cosine rule] 1 for use of correct lengths and angle 1 1 [correct evaluation of his expression]	4
(iii)	$\frac{\sin A}{60} = \frac{\sin 115}{85.02}$ $\sin A =$ $angle A = 39.76^\circ$ Bearing of C from A = $80 + 39.76 = 119.8^\circ$	1 [use of either sine or cosine rule correctly] 1 1 [correct evaluation of his expression] 1	4
21.(i)	$\overline{OQ} = 3\mathbf{b} + 3\mathbf{a}$	1	1
	$\overline{OE} = \frac{2}{3}(3\mathbf{b} + 3\mathbf{a})$ $= 2\mathbf{a} + 2\mathbf{b}$	1	1
	$\overline{DE} = -\mathbf{a} + 2\mathbf{a} + 2\mathbf{b}$ $= \mathbf{a} + 2\mathbf{b}$	1	1
(ii)	$\overline{EF} = \mathbf{a} + 2\mathbf{b}$ $\overline{DE} = \overline{EF}$ So DE and EF are parallel and since E is a common point D, E and F are collinear.	1 1	2