

UNIVERSITY OF MALTA JUNIOR COLLEGE
DEPARTMENT OF MATHEMATICS
APPLIED MATHEMATICS

INTERMEDIATE END-OF-YEAR TEST – ANSWERS

JUNE 2016

1. (i) $\frac{1}{2}\mathbf{a}$; (ii) $\mathbf{b} - \mathbf{a}$; (iii) $\frac{3}{4}(\mathbf{b} - \mathbf{a})$; (iv) $\frac{1}{4}(\mathbf{a} + 3\mathbf{b})$; (v) $\frac{1}{2}(2\mathbf{b} - \mathbf{a})$;
(vi) $\frac{1}{4}(3\mathbf{b} - \mathbf{a})$
 2. (i) 2, -6; (ii) $(-2\mathbf{i} + 6\mathbf{j})\text{ N}$, $2\sqrt{10}\text{ N}$; (iii) 5°
 3. (i) $(60\mathbf{i} + 60\sqrt{3}\mathbf{j})\text{ N}$, $100\mathbf{i}\text{ N}$, $(30.782\mathbf{i} - 84.572\mathbf{j})\text{ N}$, $(190.782\mathbf{i} + 19.351\mathbf{j})\text{ N}$;
(ii) $(-190.782\mathbf{i} - 19.351\mathbf{j})\text{ N}$; (iii) 16.3°
 4. (i) ; (ii) $mg \sin(\theta + \lambda)$, λ
 5. 41.4°
 6. $\frac{1}{5}\text{ m s}^{-2}$, 14.4 N
 7. (i) ; (ii) $\frac{5}{3}\text{ m s}^{-2}$, 1300 N ; (iii) $\frac{1}{3}\text{ m s}^{-2}$; (iv) 100 N , tension
 8. (i) ; (ii) 30° , $\frac{\sqrt{3}}{3}$; (iii) $\frac{W\sqrt{3}}{3}$
 9. (i) 16.4 N at an angle of 37.6° with AB at 5.5 m from A on AB produced; (ii) Same resultant force acting at B
 10. (i) 60 N , 80 N , 120 N ; (ii) 80 N , 80 N , 140 N ; (iii) 40 N , 80 N , 80 N
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