Practice worksheet | Vectors in two dimensions

Vector geometry proofs

Name: _____ Date: _____

6 questions | 19 marks

1. A, B have position vectors a, b. Write the midpoint M position vector. [2 marks]

2. A, B, C have position vectors a, b, c. M and N are midpoints of AB and AC. Show that $MN=\frac{1}{2}$ BC. [3 marks]

3. In a parallelogram with adjacent side vectors a and b, show that the diagonals have the same midpoint. [3 marks]

4. For non-zero perpendicular a and b, prove $|\mathbf{a}+\mathbf{b}|^2 = |\mathbf{a}|^2 + |\mathbf{b}|^2$. [3 marks]

5. A parallelogram has $|\mathbf{a}| = |\mathbf{b}|$. Prove that its diagonal directions a+b and a-b are perpendicular, assuming neither diagonal is zero. [4 marks]

6. A quadrilateral's diagonals have the same midpoint. Use position vectors a,b,c,d to show AB=DC. [4 marks]