

Name: \_\_\_\_\_

**WORKSHEET****Addition of vectors using components****1** Evaluate the following.

**a**  $(1, 3) + (2, 5)$

**b**  $(5, 1) + (8, 4)$

**c**  $(-2, 9) + (7, 3)$

**d**  $(-8, -5) + (9, 4)$

**e**  $(1, 0) + (-3, -7)$

**f**  $(-5, -2) + (-6, -10)$

**g**  $(0, 11) - (6, -4)$

**h**  $(-3, 7) - (-1, 5)$

**i**  $(1, 1) + (2, 2) + (3, 3)$

**j**  $(2, -5) + (9, 3) + (-6, 4)$

**2** Convert to component form and evaluate.

**a**  $(2, 90^\circ) + (5, 0^\circ)$

**b**  $(4, 180^\circ) + (8, 90^\circ)$

**c**  $(12, 270^\circ) + (3, 180^\circ)$

**d**  $(7, 0^\circ) + (9, 270^\circ)$

**e**  $(5, 100^\circ) + (3, 45^\circ)$

**f**  $(11, 160^\circ) + (4, 189^\circ)$

**g**  $(0.5, 250^\circ) + (2, 300^\circ)$

**h**  $(4.7, 216^\circ) + (9.8, 333^\circ)$

**i**  $(10, 10^\circ) + (5, 305^\circ)$

**j**  $(r_1, \theta_1) + (r_2, \theta_2)$

3 Convert to component form and evaluate.

a  $\mathbf{i} + \mathbf{j}$

b  $[2\mathbf{i} + 5\mathbf{j}]$

c  $8\mathbf{i} + 3\mathbf{j}$

d  $6\mathbf{i} + \mathbf{j}$

e  $0\mathbf{i} + 9\mathbf{j}$

f  $2\mathbf{i} - 3\mathbf{j}$

g  $5\mathbf{i} - 7\mathbf{j}$

h  $[3\mathbf{i} - 8\mathbf{j}]$

i  $-6\mathbf{i} - 9\mathbf{j}$

j  $-5\mathbf{i} - 0\mathbf{j}$

4 Given  $\mathbf{u} = (3, 7)$ ,  $\mathbf{v} = (5, 210^\circ)$  and  $\mathbf{w} = 9\mathbf{i} - 4\mathbf{j}$  evaluate.

a  $\mathbf{u} + \mathbf{v}$

b  $\mathbf{u} + \mathbf{w}$

c  $\mathbf{u} + \mathbf{v} + \mathbf{w}$

d  $3\mathbf{u} - 2\mathbf{v} - 4\mathbf{w}$

**e**  $-5\mathbf{u} + 9\mathbf{v} - 2\mathbf{w}$

**f**  $8\mathbf{u} - 2\mathbf{v} + 8\mathbf{w}$

**g**  $0\mathbf{u} + 3\mathbf{v} + 7\mathbf{w}$

**h**  $-6\mathbf{u} - 5\mathbf{v} + 2\mathbf{w}$

**Answers****1 a** (3, 8)**b** (13, 5)**c** (5, 12)**d** (1, -1)**e** (-2, -7)**f** (-11, -12)**g** (-6, 15)**h** (-2, 2)**i** (6, 6)**j** (5, 2)**2 a** (5, 2)**b** (-4, 8)**c** (-3, -12)**d** (7, -9)**e** (1.25, 7.05)**f** (-14.29, 3.14)**g** (0.83, -2.20)**h** (4.93, -7.21)**i** (12.72, -2.36)**j** ( $r_1 \cos \theta_1 + r_2 \cos \theta_2, r_1 \sin \theta_1 + r_2 \sin \theta_2$ )**3 a** (1, 1)**b** (2, 5)**c** (8, 3)**d** (6, 1)**e** (0, 9)**f** (2, -3)**g** (5, -7)**h** (3, -8)**i** (-6, -9)**j** (-5, 0)**4 a** (-1.33, 4.5)**b** (12, 3)**c** (7.67, 0.5)**d** (-18.34, 42)**e** (-71.97, -49.5)**f** (104.66, 29)**g** (50.01, -35.5)**h** (21.65, -37.5)