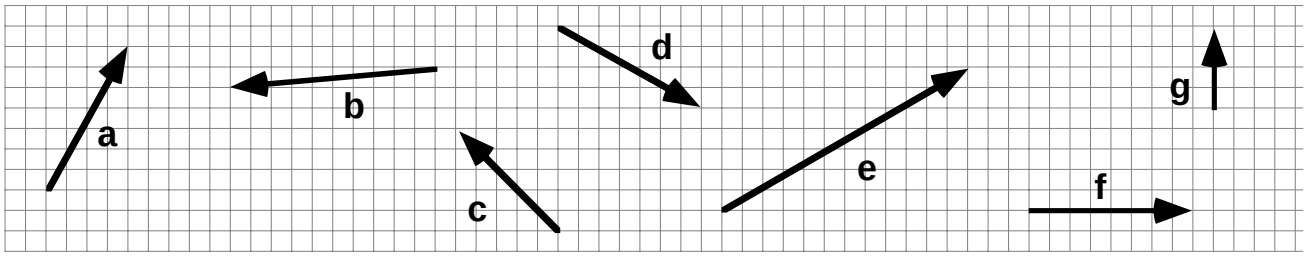
PhyzJob: Composition Classics
From Rectangular to Polar Coordinates

FELIX



Write all the displacement vectors above in rectangular form and then convert to polar form (magnitude and angle). Each square is 1.0m by 1.0m. All *x*– and *y*–components have integer values.

a = (4.0m, 7.0m)

$a = \sqrt{(a_x^2+a_y^2)}$
$a = \sqrt{((4m)^2 + (7m)^2)}$
$a = 8.1m$

$\theta = \text{Tan}^{-1}(a_y/a_x)$
$\theta = \text{Tan}^{-1}(7m/4m)$
$\theta = 60°$

a = (8.1m; 60°)

b = (–10m, –1m)
(10.0m; 186°)

$b = \sqrt{b_x^2 + b_y^2}$
$b = \sqrt{((-10m)^2 + (-1m)^2)}$
$b = 10.0m$

$\theta = \text{Tan}^{-1}(b_y/b_x)$
$\theta = \text{Tan}^{-1}(-1m/-10m)$
$\theta = 186°$

c = (–5m, 5m)
(7.1m; 135°)

$c = \sqrt{c_x^2 + c_y^2}$
$c = \sqrt{((-5m)^2 + (5m)^2)}$
$c = 7.1m$

$\theta = \text{Tan}^{-1}(c_y/c_x)$
$\theta = \text{Tan}^{-1}(5m/-5m)$
$\theta = 135°$

d = (7m, –4m)
(8.1m; 330°)

$d = \sqrt{d_x^2 + d_y^2}$
$d = \sqrt{((7m)^2 + (-4m)^2)}$
$d = 8.1m$

$\theta = \text{Tan}^{-1}(d_y/d_x)$
$\theta = \text{Tan}^{-1}(-4m/7m)$
$\theta = 330°$

e = (12m, 7m)
(14m; 30°)

$e = \sqrt{e_x^2 + e_y^2}$
$e = \sqrt{((12m)^2 + (7m)^2)}$
$e = 14m$

$\theta = \text{Tan}^{-1}(e_y/e_x)$
$\theta = \text{Tan}^{-1}(7m/12m)$
$\theta = 30°$

f = (8m, 0m)
(8.0m; 0°)

$f = \sqrt{f_x^2 + f_y^2}$
$f = \sqrt{((8m)^2 + (0m)^2)}$
$f = 8.0m$

$\theta = \text{Tan}^{-1}(f_y/f_x)$
$\theta = \text{Tan}^{-1}(0m/8m)$
$\theta = 0°$

g = (0m, 4m)
(4.0m; 90°)

$g = \sqrt{g_x^2 + g_y^2}$
$g = \sqrt{((0m)^2 + (4m)^2)}$
$g = 4.0m$

$\theta = \text{Tan}^{-1}(g_y/g_x)$
$\theta = \text{Tan}^{-1}(4m/0m)$
$\theta = 90°$

c = (7.1m; 135°) e = (14m; 30°) g = (4.0m; 90°)

db