COMP3421

Week 2 - Transformations in 2D and Vector Geometry Revision Solutions

Exercises

1. What is the vector **v** from P to Q if P = (4,0), Q = (1,3) ?

2. Normalise the vector (8,6)

3. Find the angle between vectors (1,1) and (-1,-1)

4. Is vector (3,4) perpendicular to (2,1)?

5. Find a vector perpendicular to vectors **a** and **b** where **a** = (3,0,2) **b** = (4,1,8)

Solutions

1. What is the vector **v** from P to Q if
P = (4,0), Q = (1,3) ?

v = Q − P

$\quad$ = (1,3) − (4,0)

$\quad$ = (-3,3)
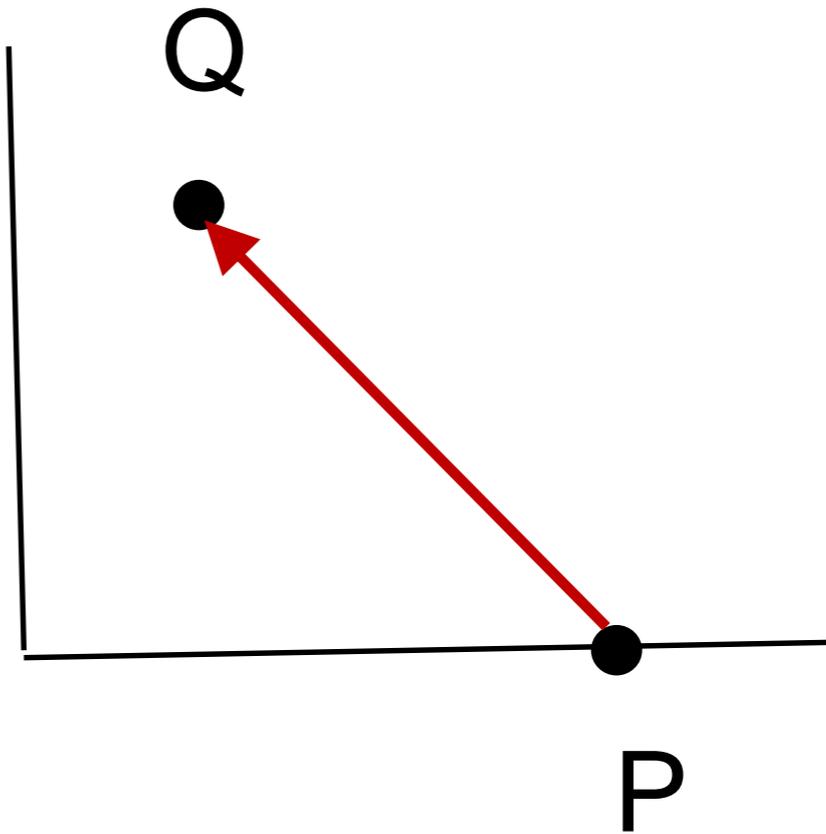
Solutions

2. Normalise the vector (8,6)

|(8,6)| = sqrt(8^2 + 6^2)

= sqrt(64+36)

= 10

Normalised vector is (0.8,0.6)

Solutions

3. Find the angle between vectors (1,1) and (-1,-1)

|(1,1)| = sqrt(2)

|(-1,-1)| = sqrt(2)

cos(t) = (1/sqrt(2),1/sqrt(2)).(-1/sqrt(2),-1/sqrt(2))

$\qquad$ = -1

t = 180 degrees (ie anti-parallel)

Solutions

5. Is (3,4) perpendicular to (2,1)?

(3,4).(2,1) = 6 + 4 = 10

10 != 0 so not perpendicular (< 90degrees)

6. Find a vector perpendicular to vectors **a** and **b** where **a** = (3,0,2) **b** = (4,1,8)

ax**b** = (0-2, 8-24,3-0)

$\qquad$ = (-2,-16,3) OR **b**x**a** = (2,16,-3)