Vector fun

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1 Vector Basics

a) $\vec{b} = \binom{7}{8}$
b) $\binom{7}{8}$ - $\binom{4}{3} = \binom{3}{5}$
c) $\sqrt{3^2 + 5^2} = \sqrt{34}$
d) $\binom{2}{-2} + \binom{5}{2} = \binom{7}{0}$
e)

- 1. $\binom{3}{2} + \binom{5}{1} = \binom{7}{3}$
- 2. $\binom{5}{1} + \binom{-2}{6} = \binom{3}{7}$
- 3. $(\binom{3}{2} + \binom{5}{1}) + \binom{-2}{6} = \binom{6}{9}$
- 4. $\binom{3}{2} + (\binom{5}{1} + \binom{-2}{6}) = \binom{6}{9}$
- 5. $\binom{5}{1} + \binom{3}{2} = \binom{7}{3}$

2 Vector Decomposition

f) $5 \cdot \cos(\frac{\pi}{5})$
g) $\vec{F} = \binom{5 \cdot \cos(\frac{\pi}{5})}{5 \cdot \sin(\frac{\pi}{5})}$
h) $\sqrt{5 \cdot \cos(\frac{\pi}{5}) + 5 \cdot \sin(\frac{\pi}{5})} \approx 2.25$

3 Multiplication of a Vector with a Scalar

i) $\vec{b} = \binom{-4}{5} \cdot 5 = \binom{-4 \cdot 5}{5 \cdot 5} = \binom{-20}{25}$
j) $|\vec{a}| = \sqrt{(-4)^2 + 5^2} = \sqrt{41}$
k) $|\vec{b}| = \sqrt{(-20)^2 + 25^2} = 5 \cdot \sqrt{41}$

l) $\binom{1}{0} \cdot 4 = \binom{4}{0}$
m) $\binom{1}{3} \cdot \frac{1}{2} = \binom{\frac{1}{2}}{\frac{3}{2}}$

4 Unit Vectors

n) $\hat{e} = \binom{\cos(arg(\hat{e}))}{\sin(arg(\hat{e}))} = \binom{\frac{x}{\sqrt{x^2+y^2}}}{\frac{y}{\sqrt{x^2+y^2}}}$
o) $\binom{\frac{3}{\sqrt{3^2+2^2}}}{\frac{2}{\sqrt{3^2+2^2}}} \approx \binom{0.83}{0.55}$
p) $\binom{\frac{7}{\sqrt{7^2+(-2)^2}}}{\frac{-2}{\sqrt{7^2+(-2)^2}}} \approx \binom{-0.27}{0.96}$

5 (

Dot Product / Scalar Product)
q) $\sqrt{2^2+3^2} \cdot \sqrt{4^2+6^2} \cdot \cos(0) = 26$
r) $\sqrt{2^2+3^2} \cdot \sqrt{(-3))^2+2^2} \cdot \cos(90) = 13 \cdot 0 = 0$

6 python

See file : vectorfun$_p$*ython.py*