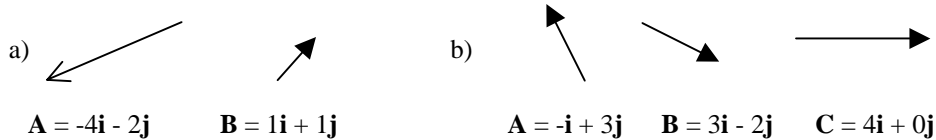


**Reading:**

- ◆ Sections 1.1-1.9, Baruh.
- ◆ Start reading chapter 2, Baruh
- ◆ Also recommend reading 1.10-1.13
- ◆ [ftp://alchemy.me.pitt.edu/me2027/Math\\_Review.PDF](ftp://alchemy.me.pitt.edu/me2027/Math_Review.PDF)
- ◆ Also can be found by following the links from <http://www.pitt.edu/~jsv/courses> homepage

**Review Problems:**

- 1) Graphically add the following vectors a)  $\mathbf{A}+\mathbf{B}$  and b)  $\mathbf{A}+\mathbf{B}+\mathbf{C}$ , using the parallelogram (2 vectors) or polygon (3 vectors) rules (pictures not necessarily to scale)



- 2) For Vector  $\mathbf{A} = -4\mathbf{i} + 2\mathbf{j}$ , write the magnitude and direction,  $\theta$ , from the horizontal

- 3) For  $\mathbf{A} = A_x\mathbf{i} + A_y\mathbf{j} + A_z\mathbf{k}$ ,  $\mathbf{B} = B_x\mathbf{i} + B_y\mathbf{j} + B_z\mathbf{k}$ , and  $\mathbf{C} = C_x\mathbf{i} + C_y\mathbf{j} + C_z\mathbf{k}$

- a) Find  $\mathbf{A}-\mathbf{B}+\mathbf{C}$
- b) Show that  $\mathbf{A}\cdot\mathbf{B} = \mathbf{B}\cdot\mathbf{A}$  (commutative)
- c) Show that  $\mathbf{A}\times\mathbf{B} = -\mathbf{B}\times\mathbf{A}$  (non commutative)
- d) Show that  $\mathbf{A}\times(\mathbf{B}+\mathbf{C}) = \mathbf{A}\times\mathbf{B} + \mathbf{A}\times\mathbf{C}$  (distributive)

- e) Take the scalar triple product:  $\mathbf{A}\cdot(\mathbf{B}\times\mathbf{C})$

- 4) Take the derivative of the following functions of  $x$

- a)  $\cos^2(x)$
- b)  $x^3-x^{1/2}$
- c)  $f(x)g(x)$ , where  $f(\bullet)$  and  $g(\bullet)$  are arbitrary functions
- d)  $f(g(x))$

- e)  $\mathbf{A} \cdot \mathbf{B}$ , where  $\mathbf{A} = f(x)$ ,  $\mathbf{B} = g(x)$  and both are vectors
- f)  $\mathbf{A} \times \mathbf{B}$ , where  $\mathbf{A} = f(x)$ ,  $\mathbf{B} = g(x)$  and both are vectors
- 5) Take  $d/dt$  of the  $x\dot{x}$ , where the dot represents the time derivative.

- 6) Take the following indefinite integrals of the functions

a)  $\int \sin^2(x) dx$

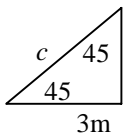
b)  $\int \left( x^4 - \frac{x}{2} \right) dx$

- 7) Take the following indefinite integrals of the functions

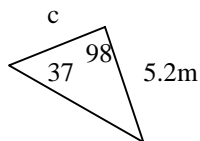
a)  $\int_0^{\pi} \sin^2(x) dx$

b)  $\int_a^b \left( x^4 - \frac{x}{2} \right) dx$

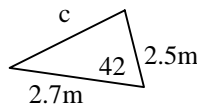
- 8) Find the length of side  $c$  for the following triangles. Angles are in degrees.



a)



b)



c)

- 9) Write the general equation for and sketch the following four geometrical shapes.

a) line

b) circle

c) parabola

d) cubic

