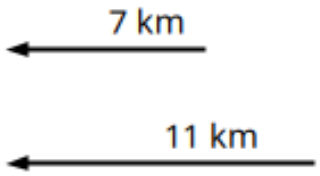
4.2 Vector Addition Worksheet

This document was composed and formatted by Annie Bernatchez.

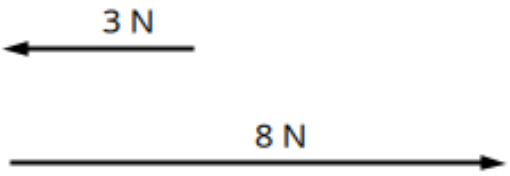
The course material originated from www.jensenmath.ca

1) Draw a diagram to illustrate each vector sum or difference.

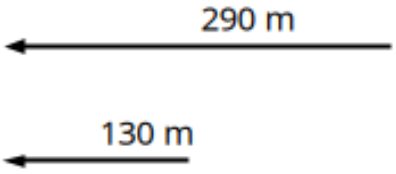
a) 7 km + 11 km



b) 3 N—8 N

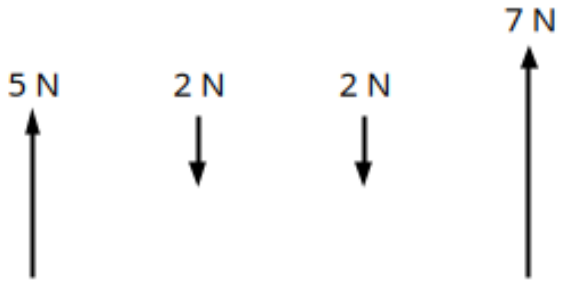


c) 290 m—130 m



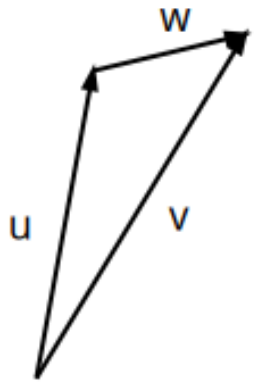
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d) 5 N + 2 N + 2 N + 7 N

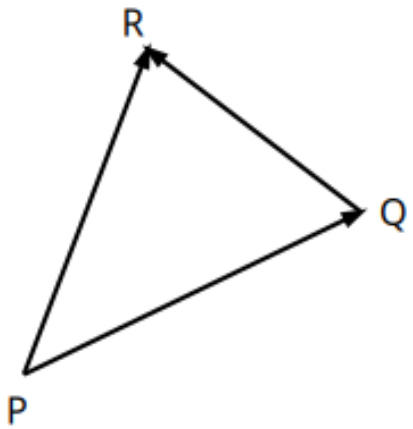


2) Express the shortest vector in each diagram as the sum or difference of the other two vectors.

a)

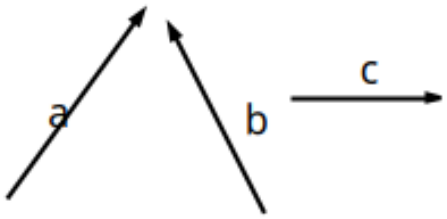


b)



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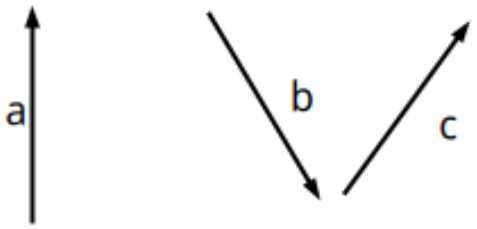
3) Given the vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$, construct $\vec{a}+\vec{b}$ and $(\vec{a}+\vec{b})+\vec{c}$.



$\vec{a}+\vec{b}$:

$(\vec{a}+\vec{b})+\vec{c}$:

4) Given the vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$, draw a diagram of each expression.



a) $\vec{a}+\vec{b}+\vec{c}$

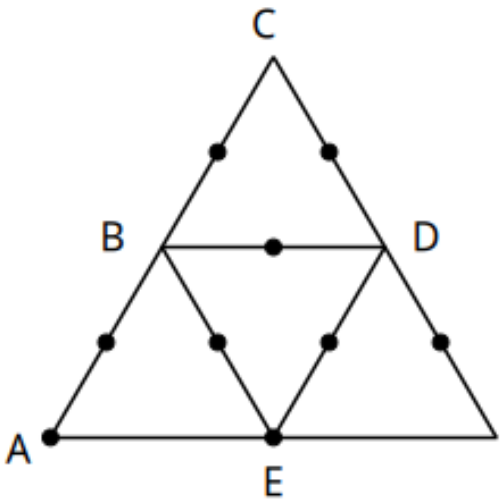
b) $\vec{a}+\vec{b}-\vec{c}$

c) $\vec{a}-\vec{b}-\vec{c}$

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d) $-\vec{a} - \vec{b} + \vec{c}$

5) The diagram shows three congruent equilateral triangles. Express each difference as a single vector. Show your simplification steps.



a) $\overrightarrow{AB} - \overrightarrow{AE}$

b) $-\overrightarrow{AB} + \overrightarrow{AE} + \overrightarrow{ED}$

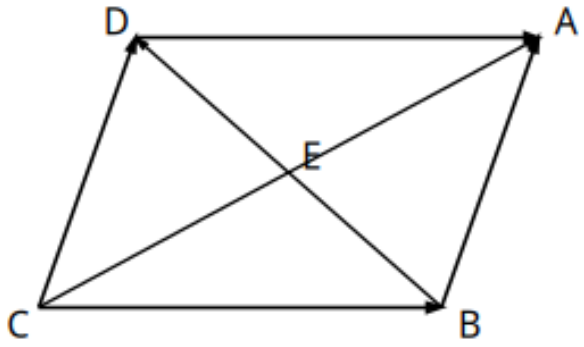
c) $\overrightarrow{BD} - \overrightarrow{BE}$

d) $\overrightarrow{CD} - \overrightarrow{BD}$

6) An airplane leaves the airport travelling N30°W at 720 km/h. After 1 h, the airplane then turns north and travels another 1.5 h at 850 km/h. What is the displacement of the airplane after 2.5 h?

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7) ABCD is a parallelogram, and E is the intersection point of the diagonal AC and BD. Name a single vector equivalent to each expression.



a) $\overrightarrow{AE} + \overrightarrow{EB}$

b) $\overrightarrow{BC} + \overrightarrow{BA}$

c) $\overrightarrow{AE} + \overrightarrow{AE}$

d) $\overrightarrow{AD} + \overrightarrow{AB}$

e) $\overrightarrow{BA} + \overrightarrow{AE} + \overrightarrow{ED} + \overrightarrow{DC}$

f) $\overrightarrow{AB} - \overrightarrow{DB} = \overrightarrow{AB} + \overrightarrow{BD}$

g) $\overrightarrow{AB} - \overrightarrow{CB} - \overrightarrow{DC}$

h) $\overrightarrow{AE} - \overrightarrow{EB} - \overrightarrow{BC}$

Answer Key

1) a) 18 km b) 11 N c) 160 m d) 8 N

2) a) $\vec{w} = \vec{v} - \vec{u}$ b) $\overrightarrow{QR} = \overrightarrow{PR} - \overrightarrow{PQ}$

3) Diagrams may vary.

4) Diagrams may vary.

5) a) $\overrightarrow{EB}$ b) $\overrightarrow{BD}$ c) $\overrightarrow{ED}$ d) $\overrightarrow{CB}$

6) 1932.4 km at $N10.74°W$

7) a) $\overrightarrow{AB}$ b) $\overrightarrow{BD}$ c) $\overrightarrow{AC}$ d) $\overrightarrow{AC}$ e) $\overrightarrow{BC}$ f) $\overrightarrow{AD}$ g) $\overrightarrow{AD}$ h) $\vec{0}$

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