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## athematics Lab - Part II

Work all these problems on separate sheets of paper and attach those sheets to this handout. Show all work. Include a diagram of the vectors for each case.

Name \_\_\_\_\_ Box \_\_\_\_\_

### Exercises with Vectors (xy-plane)

1. Vector Addition:

a)  $37\angle 12^\circ + 84\angle 77^\circ =$

b)  $44\angle 177^\circ + 91\angle 79^\circ =$

c)  $88\angle 175^\circ + 88\angle 280^\circ =$

d)  $365\angle 260^\circ + 256\angle 12^\circ =$

2. Write the vector that, if added to these, will cancel out each of these given vectors.

a)  $37\angle 12^\circ$

b)  $44\angle 177^\circ$

c)  $88\angle 175^\circ$

d)  $365\angle 260^\circ$

3. Find the two vectors with the same magnitudes as the given vector, that are perpendicular to each of these given vectors.

a)  $84\angle 77^\circ$

b)  $91\angle 79^\circ$

c)  $88\angle 280^\circ$

d)  $256\angle 12^\circ$

4. Find the negative of each of these given vectors

a)  $84\angle 77^\circ$

b)  $91\angle 79^\circ$

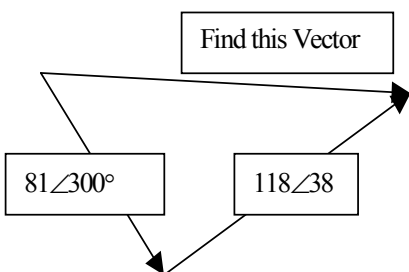
c)  $88\angle 280^\circ$

d)  $256\angle 12^\circ$

5. Complete the following vector triangles.

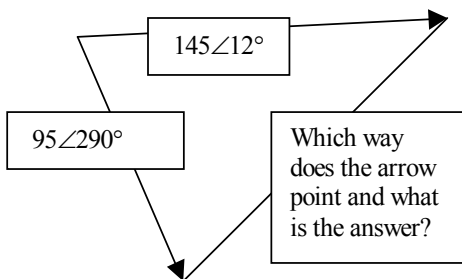
a) Two Vector Addition

$$81\angle 300^\circ + 118\angle 38^\circ =$$

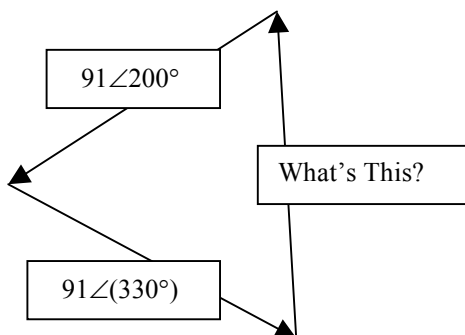


b) Two Vector Subtraction

$$145\angle 12^\circ - 95\angle 290^\circ =$$



c) Three Vectors Adding up to Zero



6. Complete the vector additions listed here.

a)  $37\angle 12^\circ + 84\angle 77^\circ =$

e)  $44\angle 177^\circ + 91\angle 79^\circ =$

f)  $88\angle 175^\circ + 88\angle 280^\circ =$

g)  $365\angle 260^\circ + 256\angle 12^\circ =$

7. Complete the vector subtractions listed here. (Remember to add the first vector to the negative of the second vector.)

a)  $37\angle 12^\circ - 84\angle 77^\circ =$

h)  $44\angle 177^\circ - 91\angle 79^\circ =$

i)  $88\angle 175^\circ - 88\angle 280^\circ =$

j)  $365\angle 260^\circ - 256\angle 12^\circ =$

8. Complete the vector triangles listed here. That means; find the vector which when added to the two listed vectors completes the triangle yielding a vector sum equal to zero.

a)  $37\angle 12^\circ + 84\angle 77^\circ + R\angle \theta = 0$

b)  $44\angle 177^\circ + 91\angle 79^\circ + R\angle \theta = 0$

c)  $88\angle 175^\circ + 88\angle 280^\circ + R\angle \theta = 0$

d)  $365\angle 260^\circ + 256\angle 12^\circ + R\angle \theta = 0$