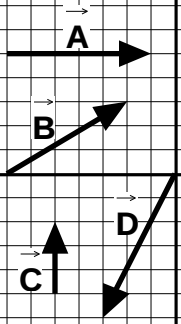


VECTORS

Objectives

Students will be able to:

- 1 Define Sine, Cosine and Tangent in terms of the opposite, adjacent and hypotenuse of a triangle.
- 2 Use the above trig functions to find angles and right triangle side lengths.
- 3 Define a vector in a sentence.
- 4 Describe a vector's two main features.
- 5 Define a scalar in a sentence.
- 6 Give examples of vectors and scalars.
- 7 Be able to identify if two vectors are equal
- 8 Graphically show the result of multiplying a vector by a positive scalar.
- 9 Graphically show the result of multiplying a vector by a negative scalar.
- 10 Graphically add vectors.
- 11 Graphically subtract vectors.
- 12 Graphically add, subtract and multiply vectors by a scalar in one equation.
- 13 Given a graphical representation of a vector equation, come up with the formula.
- 14 Calculate the magnitude of any vector's horizontal and vertical components.
- 15 Draw a vector's horizontal and vertical components.
- 16 Use trig to calculate a vector's direction.
- 17 Calculate a vector's direction as a degree measurement combined with compass directions.
- 18 Calculate a vector's magnitude using trig or Pythagorean theorem.
- 19 Add and subtract vectors by their components.



$\vec{2A}$

$\frac{1}{2}\vec{A}$

$-4\vec{C}$

$-\frac{1}{2}\vec{D}$

SECTION 1

$\vec{A} + \vec{B} = \vec{R_1}$

$\vec{A} + 4\vec{C} = \vec{R_2}$

$\vec{A} + 2\vec{B} + \frac{1}{2}\vec{C} = \vec{R_3}$

SECTION 2

$\vec{A} - \vec{C} = \vec{R_4}$

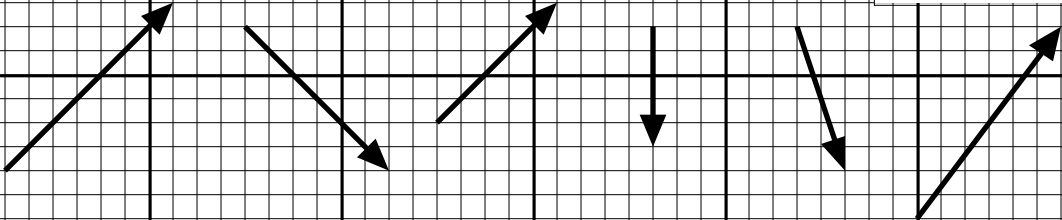
$\vec{B} - \vec{A} = \vec{R_5}$

$2\vec{C} - \vec{B} = \vec{R_6}$

$2\vec{C} - \vec{A} - \vec{B} = \vec{R_7}$

SECTION 3

For the vectors below, calculate the vector's magnitude, and direction.

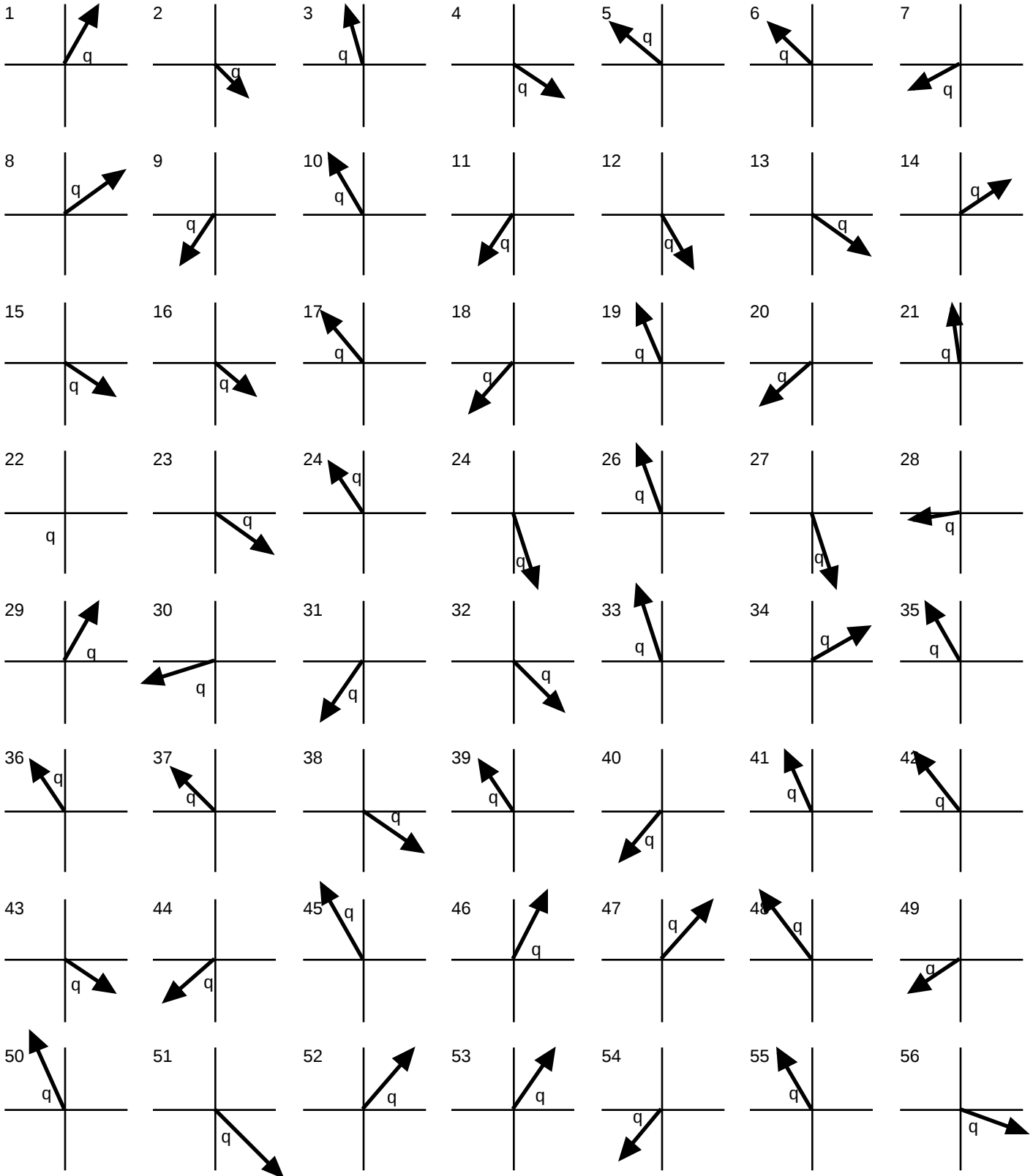


SECTION 4

VECTORS WORKSHEETS

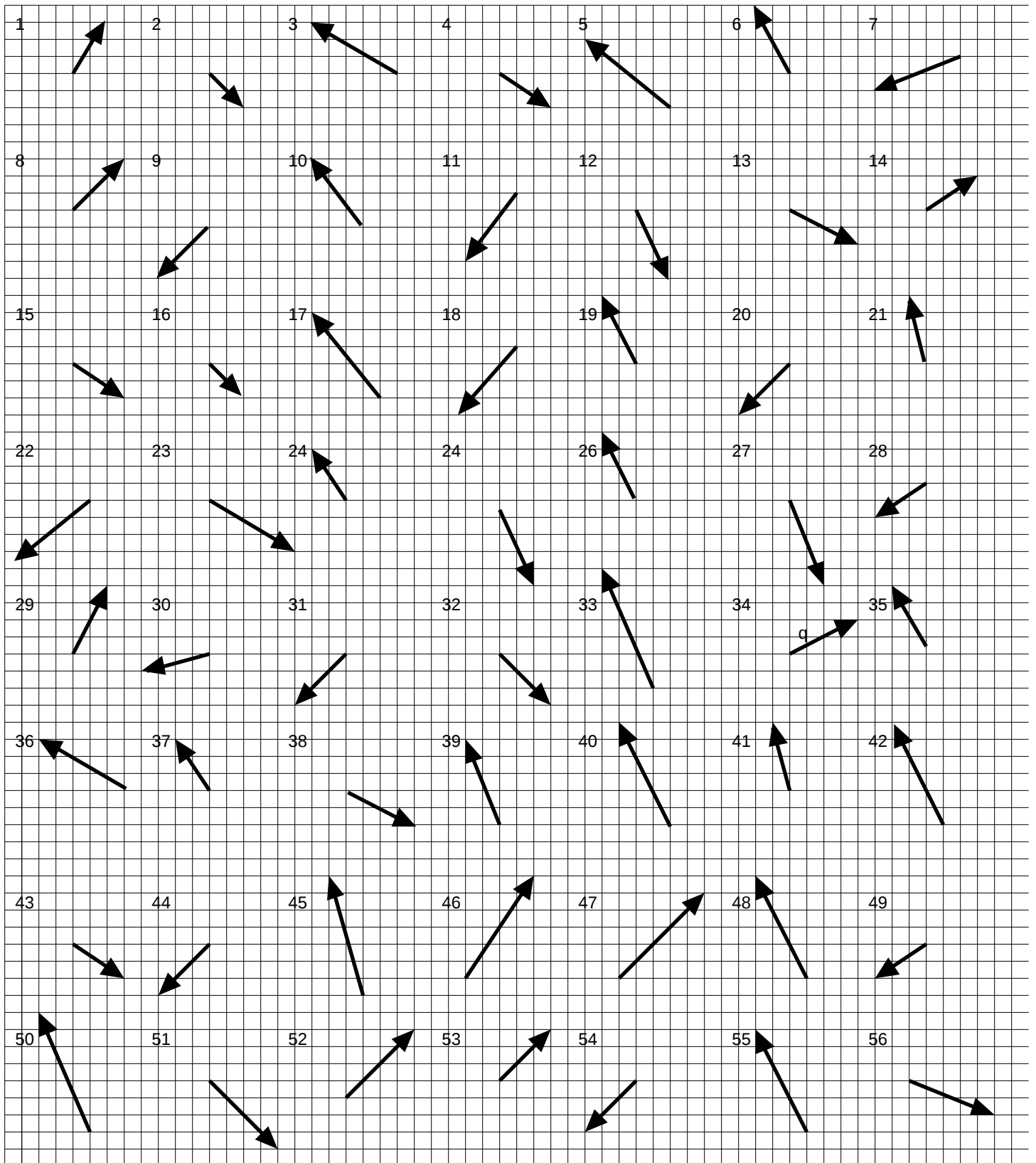
pg 3 of 13

For each vector drawn below on a coordinate axis, label the shown q with it proper compass headings, e.g. N of W, S, S of E, etc.



VECTORS WORKSHEETS

For each vector drawn below, calculate its magnitude and direction. NOTE: For the vector's direction, there will be two possible correct answers for each problem. The two answers are complimentary to each other.



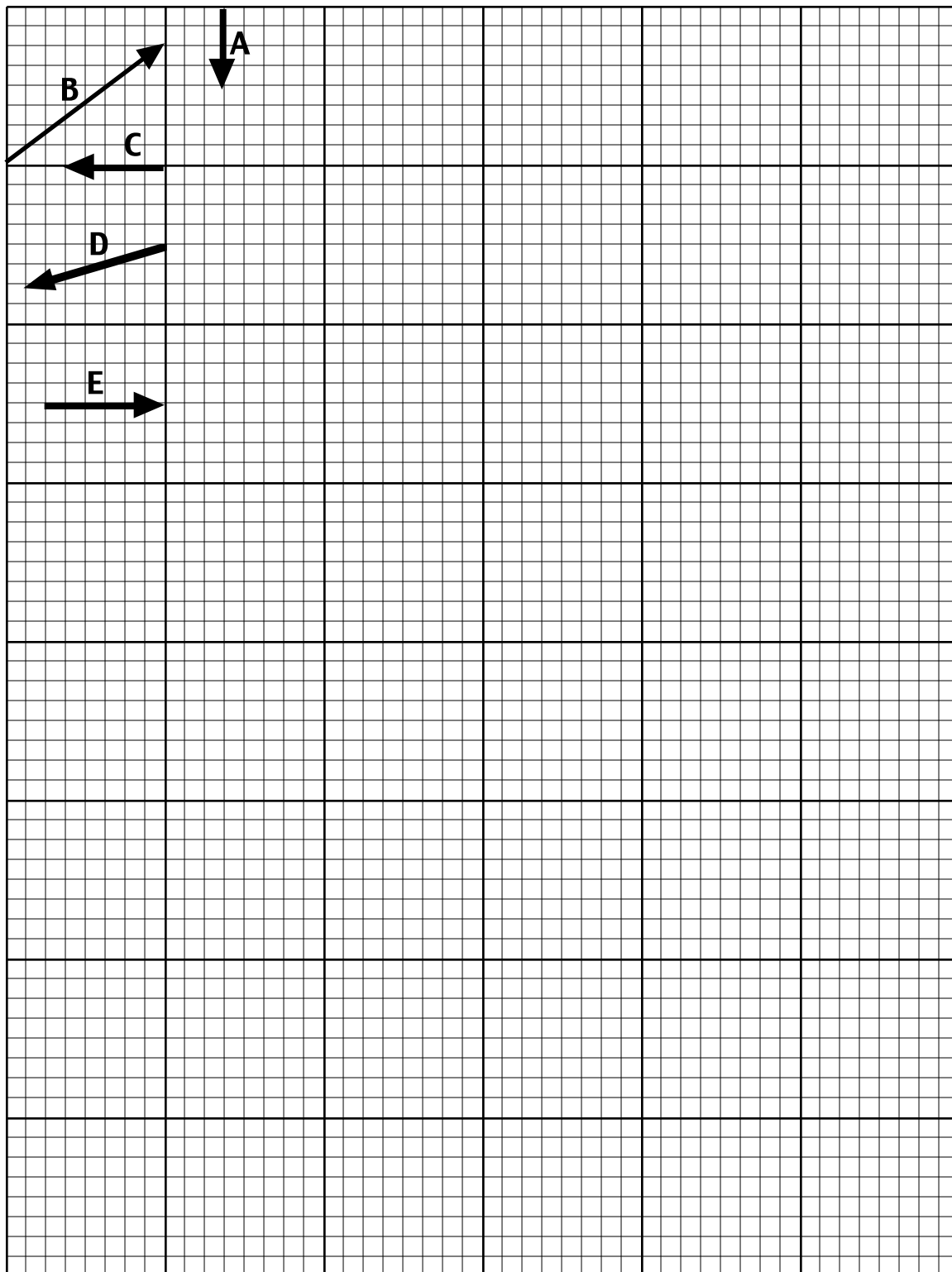
VECTORS - GRAPHICAL MEANS

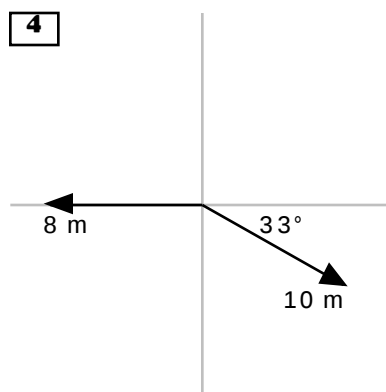
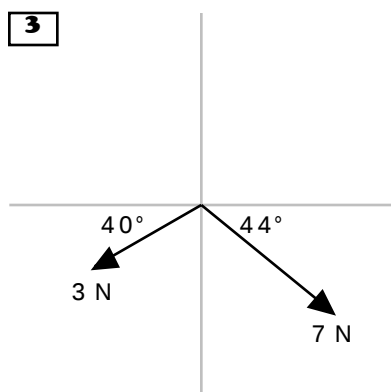
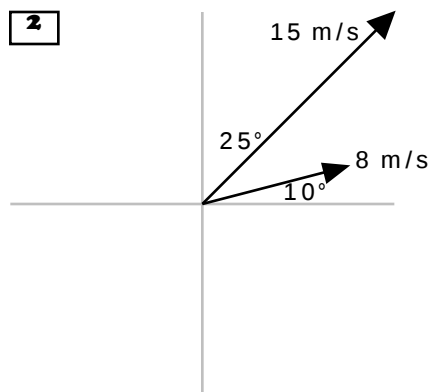
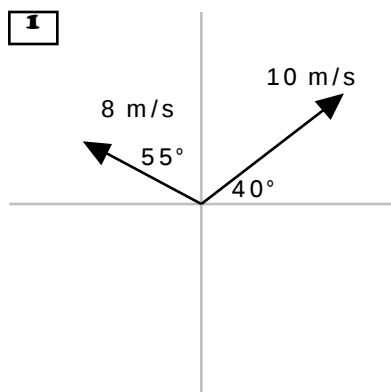
FIND THE RESULTANTS, ($R_{\#}$):

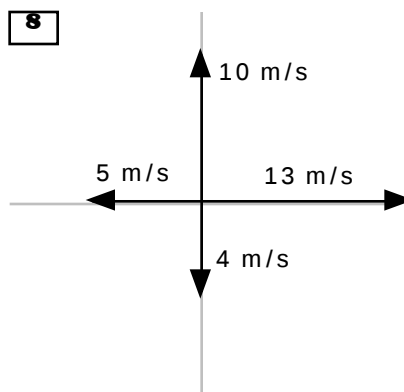
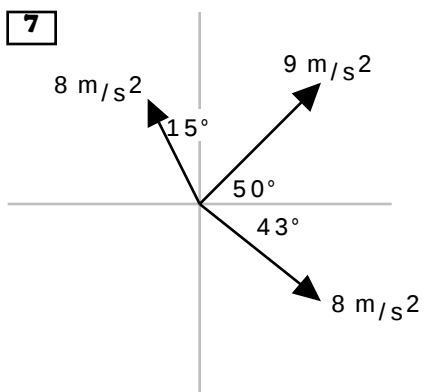
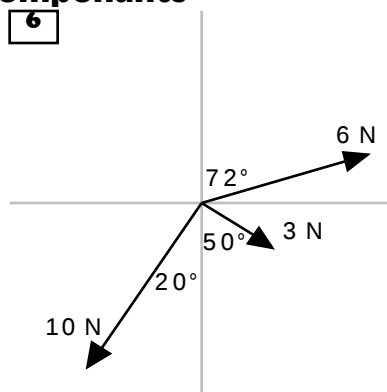
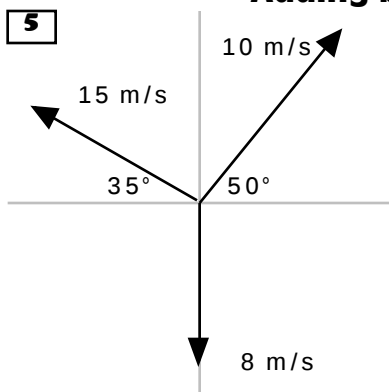
$$A + B = R_1, \quad B + C = R_2, \quad E + D = R_3, \quad A - B = R_4, \quad B - D = R_5, \quad E - C = R_6,$$

$$A + B + D = R_7, \quad E + A + C = R_8, \quad A + (-B) = R_9, \quad -B + C + (-D) = R_{10},$$

$$E - A + C - D = R_{11},$$



Adding by Vector Components

Adding by Vector Components

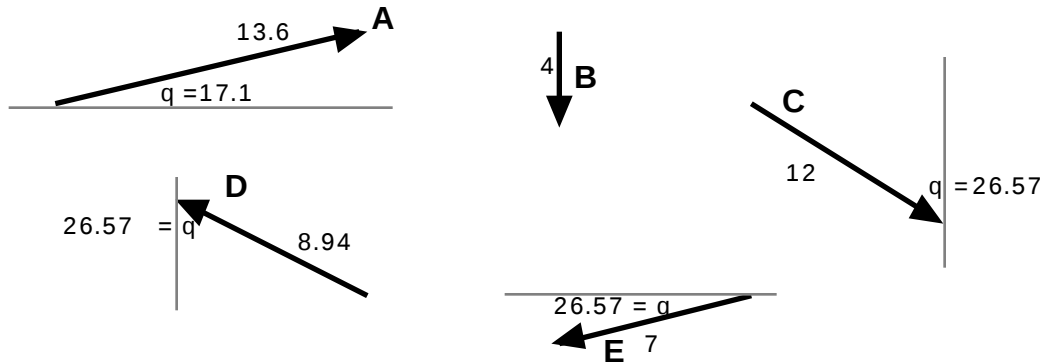
Basic Math by Vector Components

FIND THE RESULTANT'S LENGTH AND ACUTE ANGLE WITH THE HORIZONTAL FOR EACH $R_{\#}$:

$$A + B = R_1, \quad B + C = R_2, \quad E + D = R_3, \quad A - B = R_4, \quad B - D = R_5, \quad E - C = R_6,$$

$$A + B + D = R_7, \quad E + A + C = R_8, \quad A + (-B) = R_9, \quad -B + C + (-D) = R_{10},$$

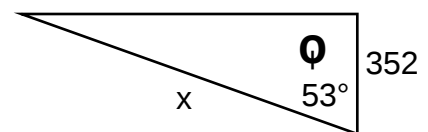
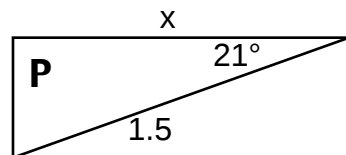
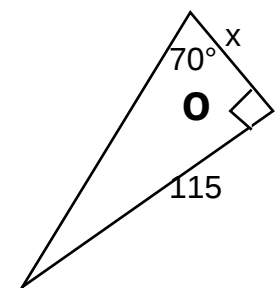
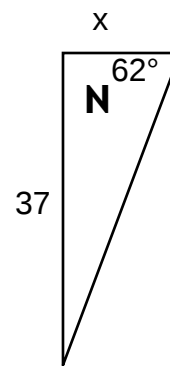
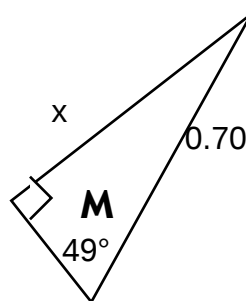
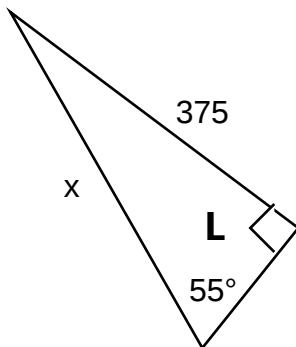
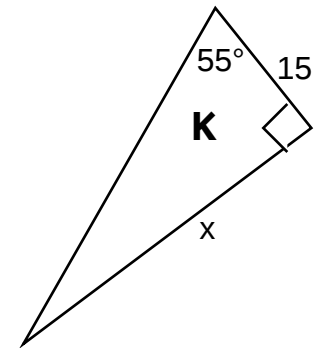
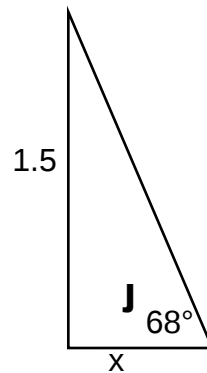
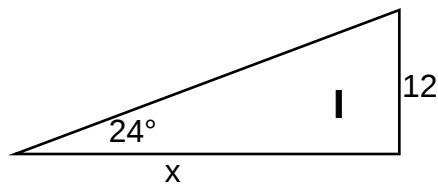
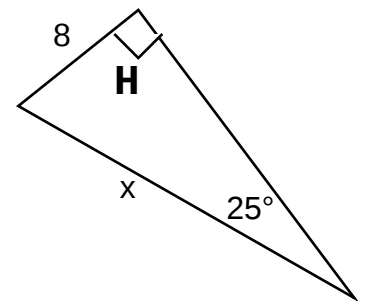
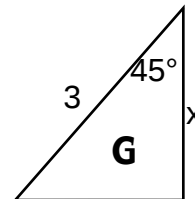
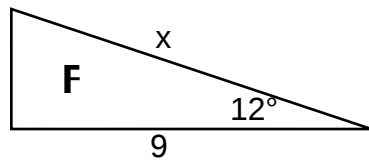
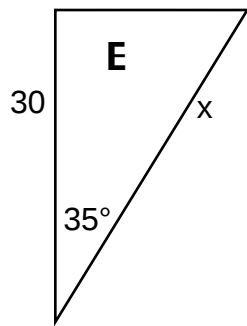
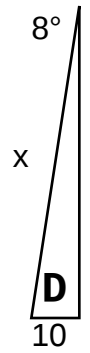
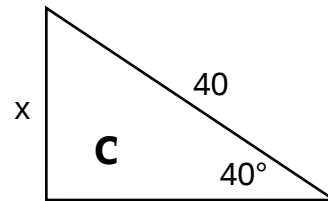
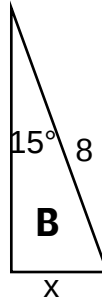
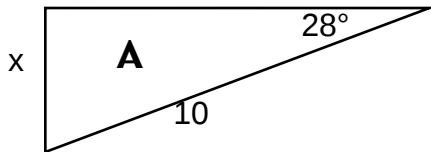
$$E - A + C - D = R_{11},$$



Vector	Magnitude	Direction	OR	Direction
R_1	$2 \div 17 = 8.25$	18.43° N of E		71.57° E of N
R_2	$2 \div 13 = 7.21$	56.31° N of W		33.69° W of N
R_3	$\div 5 = 2.24$	63.43° S of W		26.57° W of S
R_4	$2 \div 41 = 12.81$	38.66° W of S		51.34° S of W
R_5	17	28.07° N of E		61.93° E of N
R_6	11	Due East		----
R_7	1	Due West		----
R_8	17	14.04° E of S		75.96° S of E
R_9	$2 \div 41 = 12.81$	38.66° W of S		51.34° S of W
R_{10}	$2 \div 13 = 7.21$	56.31° W of S		33.69° S of W

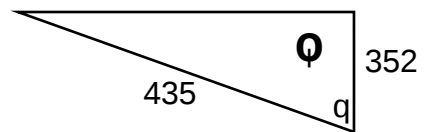
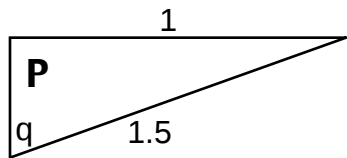
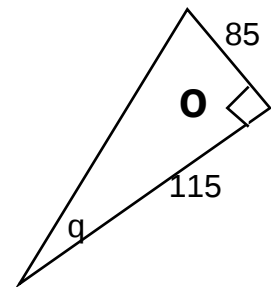
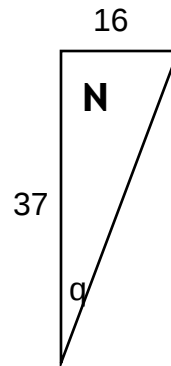
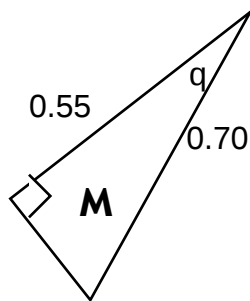
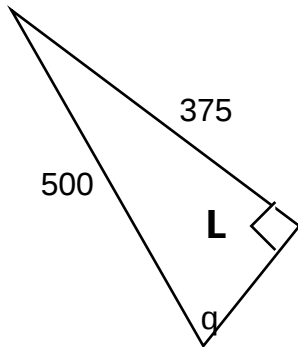
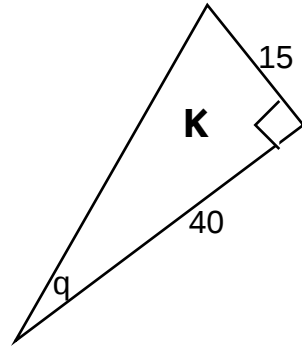
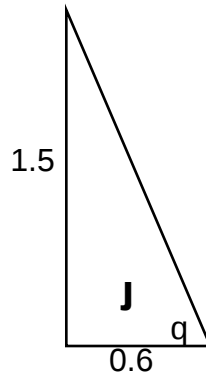
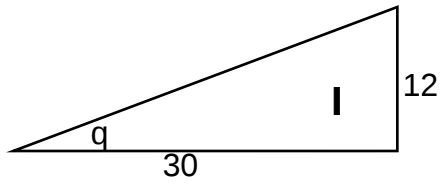
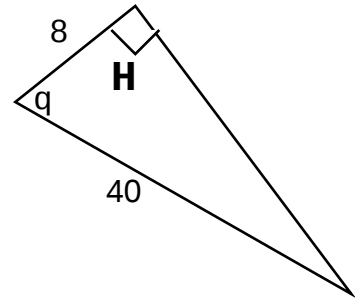
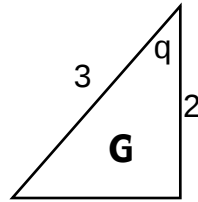
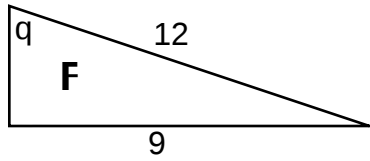
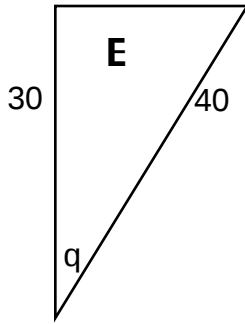
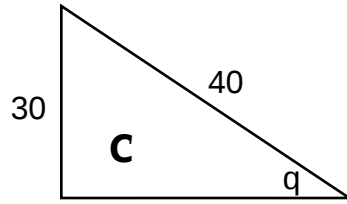
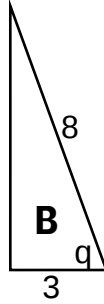
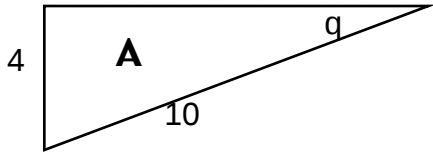
VECTORS WORKSHEETS

Find the missing variable



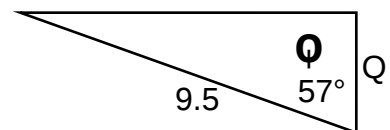
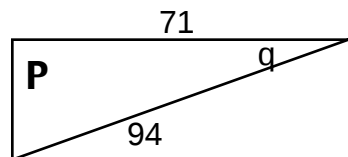
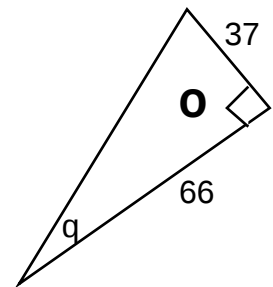
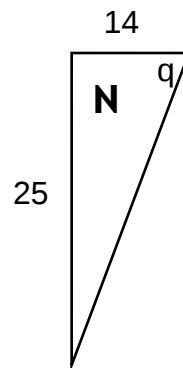
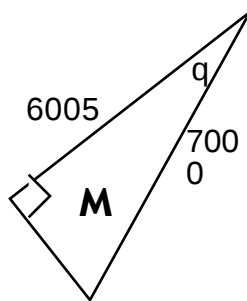
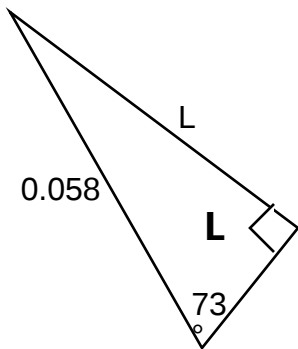
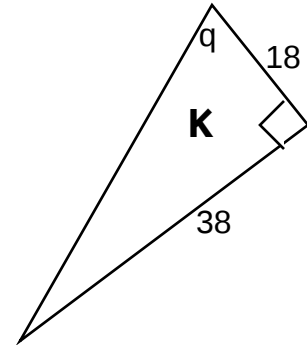
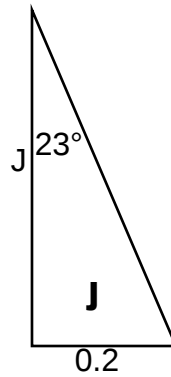
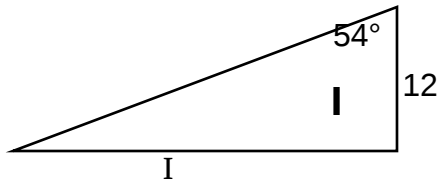
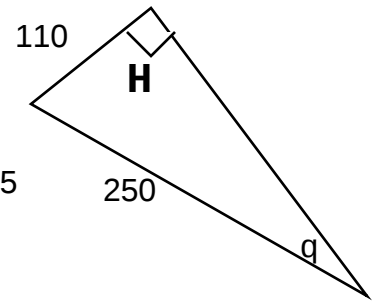
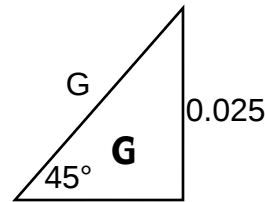
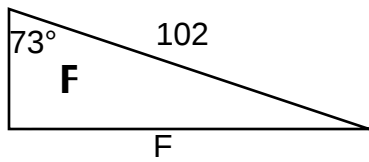
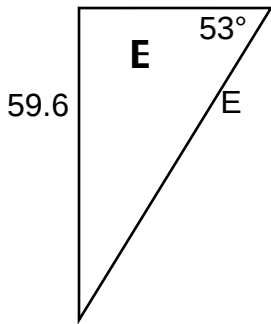
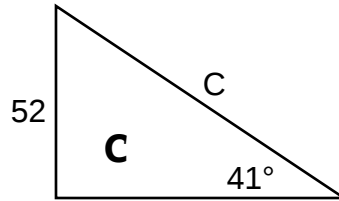
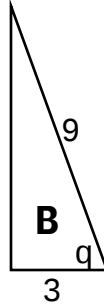
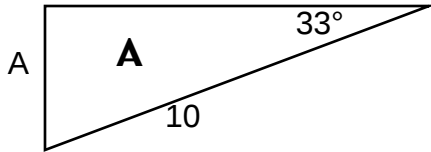
VECTORS WORKSHEETS

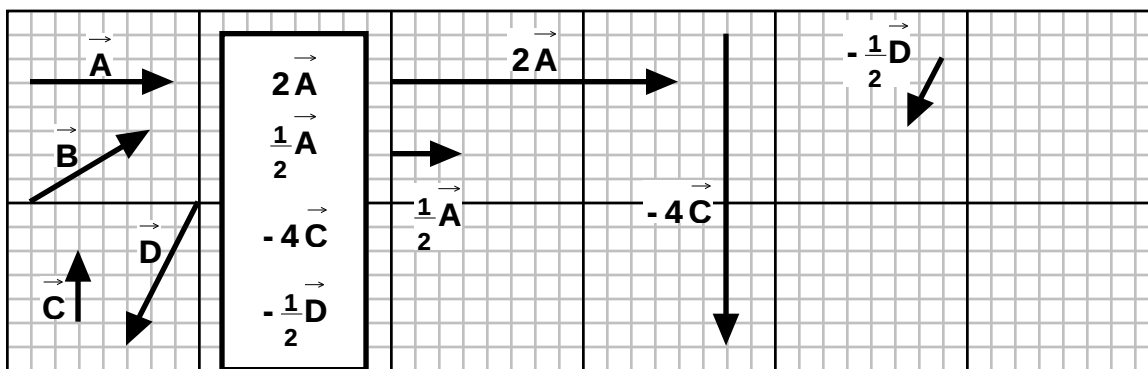
Find the angle q



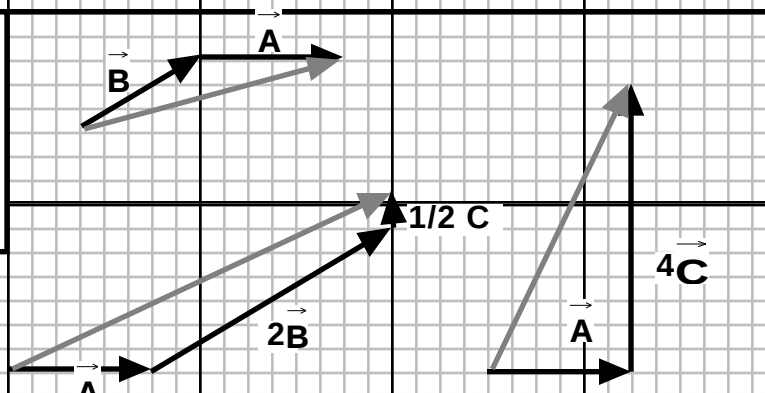
VECTORS WORKSHEETS

Find the missing variable

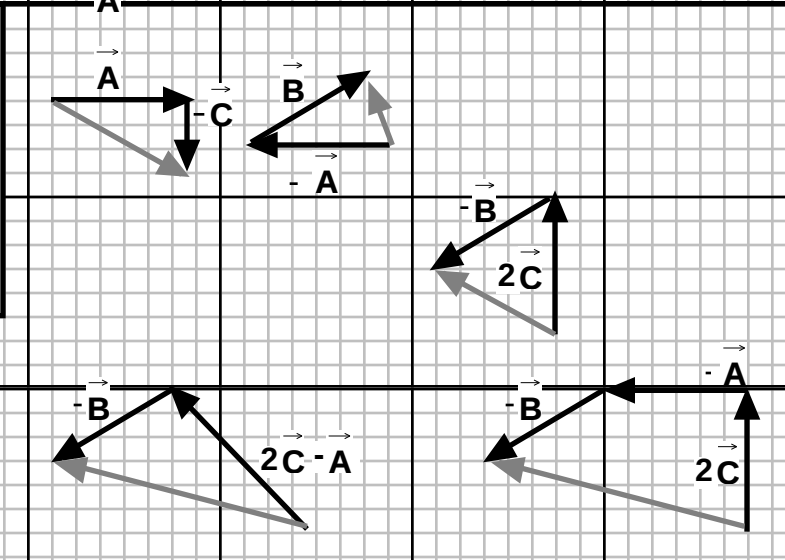




$$\begin{aligned}\vec{A} + \vec{B} &= \vec{R}_1 \\ \vec{A} + 4\vec{C} &= \vec{R}_2 \\ \vec{A} + 2\vec{B} + \frac{1}{2}\vec{C} &= \vec{R}_3\end{aligned}$$



$$\begin{aligned}\vec{A} - \vec{C} &= \vec{R}_4 \\ \vec{B} - \vec{A} &= \vec{R}_5 \\ 2\vec{C} - \vec{B} &= \vec{R}_6 \\ 2\vec{C} - \vec{A} - \vec{B} &= \vec{R}_7\end{aligned}$$



For the vectors below, calculate the vector's magnitude, and direction.

