1. Give two examples of scalar quantities: includes mass, time, distance, speed, volume, density
2. Give two examples of vector quantities: includes velocity, displacement, force, weight
3. $\qquad$ quantities have magnitude only. Magnitude is expressed by a $\qquad$ and a $\qquad$ unit
4. Vector quantities have $\qquad$ and $\qquad$ direction
5. Vectors may be represented by $\qquad$ with the magnitude shown by the $\qquad$ arrows
6. One vector having the same effect as two or more vectors combined is a
$\qquad$ resultant vector.
7. To find the resultant of two component vectors acting in the same direction,
$\qquad$ .
8. To find the resultant of two component vectors acting in opposite directions, subtract $\qquad$
9. Identify the following quantities as vector or scalar:
a. $5.0 \mathrm{~m} / \mathrm{s}$ South $\qquad$ c. 7.4 g

| scalar |
| :---: |
| scalar |

Use math to solve these problems:

1. What is the resultant of two component vectors of 78.3 units $W$ and 15.2 units $N$ ?


$$
\begin{aligned}
& a=15.2 \quad b=78.3 \quad c=? \\
& c=\sqrt{15.2^{2}+78.3^{2}}=79.8 \text { units } \\
& \tan \Theta=\frac{15.2}{78.3} \quad \Theta=11.0^{\circ}
\end{aligned}
$$

$$
79.8 \text { units, } 11.0^{\circ} \mathrm{N} \text { of } \mathrm{E}
$$

2. An airplane flies southward with a velocity of $922 \mathrm{~km} / \mathrm{h}$. There is a brisk tailwind (meaning blowing on the tail of the plane) with a velocity of $25 \mathrm{~km} / \mathrm{h}$. What is the resultant velocity of the plane?

$$
922 \mathrm{~km} / \mathrm{h}+25 \mathrm{~km} / \mathrm{h}=947 \mathrm{~km} / \mathrm{h} \text { South }
$$

3. Calculate the components of a resultant vector of 804 units, $17^{\circ} \mathrm{W}$ of S .


$$
\begin{array}{lll}
\Theta=17^{\circ} & c=804 & a=\text { west }=? \quad b=\text { south }=? \\
\sin 17^{\circ}=\frac{\text { west }}{804} \quad \text { west }=235 \text { units }
\end{array}
$$

$$
\cos 17^{\circ}=\frac{\text { south }}{804} \quad \text { south }=769 \text { units }
$$

4. A person can row a boat $6.93 \mathrm{~km} / \mathrm{h}$ in still water. If the person rows directly west across a river that flows north at $5.00 \mathrm{~km} / \mathrm{h}$, what is the magnitude and direction of the resultant velocity?


$$
\begin{aligned}
& a=5.00 \quad b=6.93 \quad c=? \\
& c=\sqrt{5.00^{2}+6.93^{2}}=8.55 \mathrm{~km} / \mathrm{h} \\
& \tan \Theta=\frac{5.00}{6.93} \quad \Theta=35.8^{\circ}
\end{aligned}
$$

$$
8.55 \mathrm{~km} / \mathrm{h}, 35.8^{\circ} \mathrm{N} \text { of } \mathrm{W}
$$

Use the head-to-tail method to solve the following:

1. A car travels 150 km east before turning and traveling 275 km north. What is the car's displacement?
approx. $310 \mathrm{~km}, 29^{\circ}$ E of $N$


2. A student walks 15 paces West then 7 paces South then 8 paces East and finally 5 paces North. What is the resultant from the start to the finish?
approx. 7 paces, $16^{\circ} S$ of $W$
