Non-perpendicular vector resolution

Step 1: Draw a diagram of the vectors in a head to tail fashion:

**+**

Step 2: Find the x and y components of each vector and sketch them on your figure.

Step 3: Add all the x components together to get **ONE** X vector and all the y components together to get **ONE** y vector.

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| --- | --- | --- |
| Vector | X component | Y component |
| V1 = 250 m/s @ 30° | 216.5 x | 125 y |
| V2 = 150 m/s @ 60° | 75 x |  129.9 y |
| Net Vectors to plot | 291.5 x | 255 y |
| Resultant | 387.3 (Pyth Theorum) | @ 41 ° (tan-1) |

Step 4: To find the resultant vector, Vr = plot the vectors above on a new origin and resolve them for magnitude (hypotenuse) and direction (from positive x

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| **Vector** | **X comp****Cos Θ)(V)** | **Y comp** | **resultant** | **Angle**  | **Θ in triangle** |
| 75 m @ 120 | -37.5 m | 65 m  |  |  |  |
| 100 M @ 150 | -86.6 m | 50 m |  |  |  |
|  | -124 X | 115 m Y | 169 m | 137 | 43 |

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| **Vector** | **X comp****Cos Θ)(V)** | **Y comp** | **resultant** | **Angle**  | **Θ in triangle** |
| 200 mi/h@30 | 173 mi/h | 100 Y |  |  |  |
| 75 mi/h @ 110 | -25.6 mi/h | 70.5 Y |  |  |  |
|  | 147.4mi/hX | 170.5 Y | 225 mi/h  | 49° | 49° |

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| **Vector** | **X comp****Cos Θ)(V)** | **Y comp** | **resultant** | **Angle**  | **Θ in triangle** |
| 350 @ 220 | -268 | -225 |  |  |  |
| 500 @ 110 | -171 | 470 |  |  |  |
|  | -439 km/h X  | 245 km/h Y | 503 km/h | 151 | 29 |

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| **Vector** | **X comp****Cos Θ)(V)** | **Y comp** | **resultant** | **Angle**  | **Θ in triangle** |
| 2800 @ -40° | 2145 x | -1800 Y |  |  |  |
| 4500 @ 60° | 2250 x | 3897 Y |  |  |  |
|  | 4395 m X | 2097 Y | 4870 m  | 25.5 | 25.5 |

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| **Vector** | **X comp****Cos Θ)(V)** | **Y comp** | **resultant** | **Angle**  | **Θ in triangle** |
| 150 m/s @ - 75 | 38.8 m/s | - 145 m/s  |  |  |  |
| 250 m/s @ 135 | - 177 m/s | 177 m/s |  |  |  |
|  | - 138 m/s X | 32 m/s Y | 141 m/s | 167° | 13° |

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| **Vector** | **X comp****Cos Θ)(V)** | **Y comp** | **resultant** | **Angle**  | **Θ in triangle** |
| 75 @ 110 | * 25.7
 | 70.5 |  |  |  |
| 100 @ - 60  | * 50.0
 | * 86.6
 |  |  |  |
|  | 24.3 X | - 16.1 Y | 29.1 @  | - 33.5 | 33.5 |

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| **Vector** | **X comp****Cos Θ)(V)** | **Y comp** | **resultant** | **Angle**  | **Θ in triangle** |
| 200 @ 30 | 173.2 x | 100 y |  |  |  |
| 75 @ 135 | * 53. 0 x
 | 53.0 y |  |  |  |
|  | 120.2 x | 153.0 y | 194.6  | 51.8° | 51.8 ° |

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| **Vector** | **X comp****Cos Θ)(V)** | **Y comp** | **resultant** | **Angle**  | **Θ in triangle** |
| 350 @ 210 | * 303.1 x
 | * 175 y
 |  |  |  |
| 500 @ 70 | 171.0 x | 469.8 y |  |  |  |
|  | * 132.1 x
 | 294.8 y  | 323 @ | 114.1° | 65.8 ° |

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| **Vector** | **X comp****Cos Θ)(V)** | **Y comp** | **resultant** | **Angle**  | **Θ in triangle** |
| 2800 @ - 25 | 2537.7 x | - 1183.3 y |  |  |  |
| 4500 @ 50 | 2892.5 x | 3447.2 y |  |  |  |
|  | 5430.2 x | 2263.9 y | 5883 @  | 22.6 | 22.6 |

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| **Vector** | **X comp****Cos Θ)(V)** | **Y comp** | **resultant** | **Angle**  | **Θ in triangle** |
| 1. @ 180
 | - 350 x | 0 y |  |  |  |
| 250 @ 130 | - 160.7 x | 191.5 y |  |  |  |
|  | - 510.7 x | 191.5 y | 545 @  | 159.4  | 20.5 |