Vector word problems solutions

1. 120 E and 15 E both go same direction, so just add them to get 135 E as a resultant
2. Find components of the girl. West cos 231˚)(26 m) = 16.4 W or – 16.4 x

South sin231)(26 m ) = – 20.2 y or 20.2 S

1. X component (cos110˚)(620 mi/hr) = – 212 x

Y component (sin110˚)(620 mi/hr) = 583 Y

1. Plane west 275, wind N 54

|  |  |  |
| --- | --- | --- |
|  |  X component | Y component |
| Plane W 275 |  – 275 x | 0 y  |
| Wind N 54 | 0 x | 54 y |
|  |  – 275 x  | 54 Y |

 Vr = (2752 + 542)1/2 = 280 @ tan-1(54/275) = 11˚ (W and N is Quad 2 so subtract

11 from 180 to get 169˚ from the pos x axis

1. Boat 35 E water 15 knots at 35˚

|  |  |  |
| --- | --- | --- |
| Vector | X component |  Y component |
| Boat 35 E | + 35 X | 0 y |
| Water 15 @ 35˚ | Cos 35(15)12.3 X | Sin35(15)8.6 Y |
|  | 47.5 x | 8.6 y |

 Vr = (47.52 + 8.62)1/2= 48 @ tan-1 (8.6/47.5) = 10˚

1. Plane 345 @ 45˚ and Wind E at 85

|  |  |  |
| --- | --- | --- |
| Vector | X component | Y component |
| Plane 345 @ 45˚ | Cos 45(345)244 X | Sin45 (345)244 Y |
| Wind 85 E | 85 x | 0 y |
| total | 329 x | 244 Y |

Vr = (3292 + 2442)1/2 = 410 @ tan-1 (244/329) = 37˚

1. Plane 275 @ 215 wind 95.5 @ 180 (West)

|  |  |  |
| --- | --- | --- |
| Vector | X component | Y component |
| Plane 275 @ 215 | Cos 215()275)  – 225 x | Sin 215(275) – 158 y |
| Wind 95.5 W |  – 95.5 x | 0 y |
|  |  – 320 x | – 158 y |

Vr = (3202 + 1582)1/2 = 357 @ tan-1(158/320) = 26˚. This is the angle in the triangle, but we are in quad III so add 180 to get 206˚

1. 350 km @ 45˚ x component cos 45 (350) = 247.5 X

y component sin45˚(350) = 247.5 y