Accelerated Precalculus
Bearings Practice

Name______________________
Period_______Date_________

Sketch each of the following and find the magnitude and bearing of each resultant.

1. A plane flies N38°E for 300 miles, develops engine trouble and changes course to S71°E for 30 miles to land at the nearest airport.

2. A ship travels 1500 km heading 36° west of south, then changes course to travel 4000 km on a heading of 78° west of south.

3. On a treasure hunt, Sally walks 30 ft on a bearing of N56°W, then turns and walks N10°E for another 45 ft.

4. A jet flies 600 km heading 65° east of north, has a medical emergency and changes course to find an airport 40 km 10°west of south.

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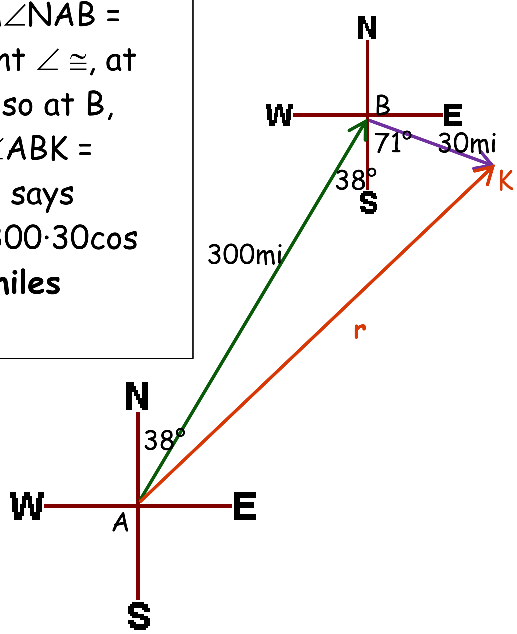
Sketch each of the following and find the magnitude and bearing of each resultant.

1. A plane flies N38°E for 300 miles, develops engine trouble and changes course to S71°E for 30 miles to land at the nearest airport. The initial path is in green and the next is in purple. The resultant is in orange.

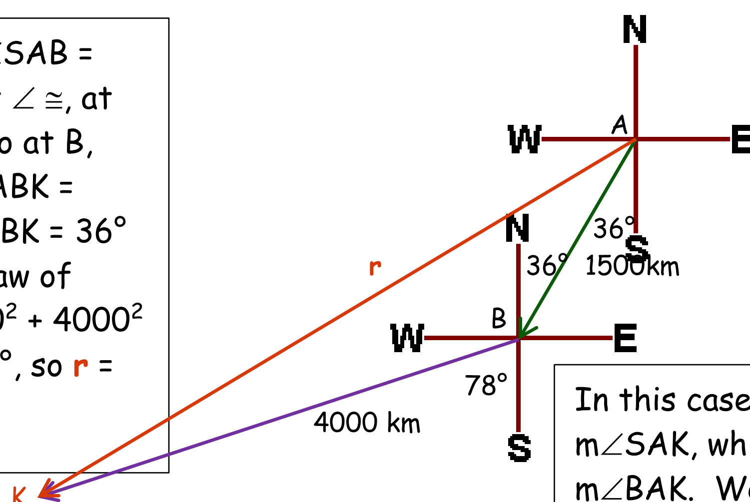
Notice that at A, ,m∠NAB = 38°. Since ∥ → alt. int ∠ ≅, at B, m∠ABS = 38°. Also at B, m∠SBK = 71°, so m∠ABK = 109°. Law of cosines says $r^2 = 300^2 + 30^2 - 2 \cdot 300 \cdot 30\cos 109°$, so **r** = **311.1 miles**



The bearing is sometimes more of a challenge because you must stop and find the angle made from the north or south and the resultant. This usually involves adding or subtracting angles. In this case, we need m∠NAK, which is 38° + m∠BAK. We find m∠BAK using the law of sines: r/sin 109° = 30/sin ∠BAK. So m∠BAK = 5.232°. (I used saved values for r.) So the bearing is **N43.232°E.**

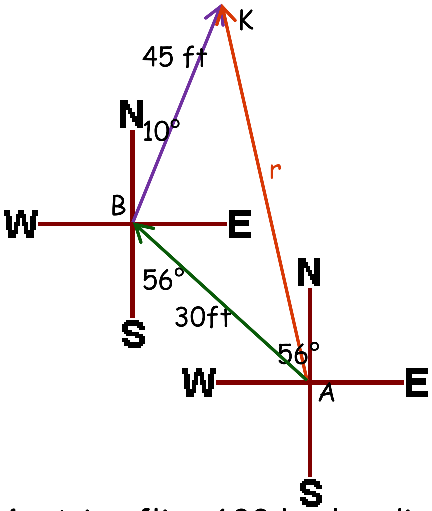
2. A ship travels 1500 km heading 36° west of south, then changes course to travel 4000 km on a heading of 78° west of south.

Notice that at A, ,m∠SAB = 36°. Since ∥ → alt. int ∠ ≅, at B, m∠ABN = 36°. Also at B, m∠SBK = 78°, so m∠ABK = m∠ABN + 90° + m∠WBK = 36° + 90° + 12° = 138°. Law of cosines says $r^2 = 1500^2 + 4000^2 - 2 \cdot 1500 \cdot 4000\cos 138°$, so **r** = **5212 km**



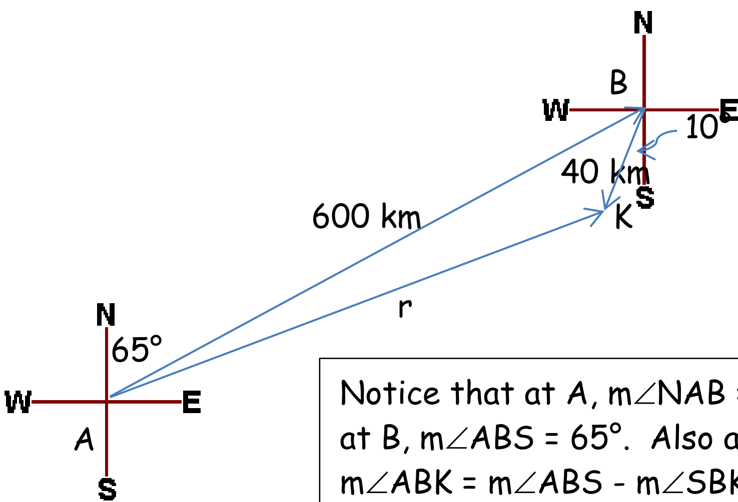
In this case, we need m∠SAK, which is 36° + m∠BAK. We find m∠BAK using the law of sines: r/sin 138° = 4000/sin ∠BAK. So m∠BAK = 30.90°. So the bearing is **S66.90°W.**

3. On a treasure hunt, Sally walks 30 ft on a bearing of N56°W, then turns and walks N10°E for another 45 ft.



Notice that at A, ,m∠NAB = 56°. Since ∥ → alt. int ∠ ≅, at B, m∠ABS = 56°. Also at B, m∠NBK = 10°, so m∠ABK = 180° - m∠ABS - m∠NBK = 180° - 56° - 10° = 114°. Law of cosines says $r^2 = 30^2 + 45^2 - 2 \cdot 30 \cdot 45\cos 114°$, so **r = 63.43 ft.**
In this case, we need m∠NAK, which is 56° - m∠BAK. We find m∠BAK using the law of sines: r/sin 114° = 45/sin ∠BAK. So m∠BAK = 40.40°. So the bearing is **N15.60°W.**

4. A jet flies 600 km heading 65° east of north, has a medical emergency and changes course to find an airport 40 km 10°west of south.



Notice that at A, m∠NAB = 65°. Since ∥ → alt. int ∠ ≅, at B, m∠ABS = 65°. Also at B, m∠SBK = 10°, so m∠ABK = m∠ABS - m∠SBK = 65° - 10° = 55°. Law of cosines says $r^2 = 600^2 + 40^2 - 2 \cdot 40 \cdot 600\cos 55°$, so **r = 578.0 ft.**
In this case, we need m∠NAK, which is 65° + m∠BAK. We find m∠BAK using the law of sines: r/sin 55° = 40/sin ∠BAK. So m∠BAK = 3.250° So the bearing is **N68.25°W.**