

Great Circle Sailing Problems

Great Circle Initial Course and/or Distance

GRC B1. Determine the great circle initial course from $29^{\circ} 46'S$, $30^{\circ} 26'E$, to $31^{\circ} 52'S$, $115^{\circ} 22'E$.

- a) $074^{\circ} T$
- b) $113^{\circ} T$
- c) **$117^{\circ} T$ - correct**
- d) $121^{\circ} T$

GRC B2. Determine the great circle initial course from $07^{\circ} 05'N$, $81^{\circ} 45'W$, to $21^{\circ} 15'N$, $157^{\circ} 40'W$.

- a) $128^{\circ} T$
- b) $217^{\circ} T$
- c) **$290^{\circ} T$ - correct**
- d) $326^{\circ} T$

GRC B3. Determine the great circle distance and initial course from latitude $24^{\circ} 52.0' N$, longitude $78^{\circ} 27.0' W$ to latitude $47^{\circ} 19.0' N$, longitude $6^{\circ} 42.0' W$.

- e) **3593 miles, $048.1^{\circ} T$ - correct**
- f) 3457 miles, $053.3^{\circ} T$
- g) 3389 miles, $042.4^{\circ} T$
- h) 3367 miles, $045.0^{\circ} T$

GRC B4. Determine the great circle distance and initial course from latitude $26^{\circ} 00' S$, longitude $56^{\circ} 00' W$ to latitude $34^{\circ} 00' S$, longitude $18^{\circ} 15.0' E$.

- a) 3705 miles, $153^{\circ} T$
- b) 3841 miles, $068^{\circ} T$
- c) 3849 miles, $248^{\circ} T$
- d) **3805 miles, $117^{\circ} T$ - correct**

GRC B5. Determine the great circle distance and initial course from latitude $38^{\circ} 42' N$, longitude $09^{\circ} 10.5' W$ to latitude $32^{\circ} 05' N$, longitude $81^{\circ} 05' W$.

- a) 3402.0 miles, $072.5^{\circ} T$
- b) 3412.6 miles, $085.8^{\circ} T$
- c) 3432.0 miles, $278.3^{\circ} T$
- d) **3449.4 miles, $287.2^{\circ} T$ - correct**

Great Circle Latitude or Longitude of the Vertex

GRC B6. The great circle distance from latitude $08^{\circ} 50'$ N, $80^{\circ} 21'$ W, to a position $12^{\circ} 36'$ N, $128^{\circ} 16'$ E is 8664 miles and the initial course is 304.6° T. Determine the latitude of the vertex.

- a) $38^{\circ} 46.2'$ N
- b) $38^{\circ} 16.4'$ N
- c) **$37^{\circ} 30.2'$ N - correct**
- d) $37^{\circ} 05.3'$ N

GRC B7. The great circle distance from latitude $35^{\circ} 08'$ S, longitude $19^{\circ} 26'$ E to latitude $33^{\circ} 16'$ S, longitude $115^{\circ} 36'$ E is 4559 miles and the initial course is 121° T. Determine the latitude of the vertex.

- a) $44^{\circ} 29.1'$ S
- b) **$45^{\circ} 30.9'$ S - correct**
- c) $46^{\circ} 18.2'$ S
- d) $43^{\circ} 41.8'$ S

GRC B8. The great circle distance from latitude $38^{\circ} 17'$ N, longitude $123^{\circ} 16'$ W to latitude $35^{\circ} 01'$ N, longitude $142^{\circ} 21'$ W is 4330 miles and the initial course is 300.9° T. Determine the latitude of the vertex.

- a) $46^{\circ} 54.8'$ N
- b) $47^{\circ} 24.7'$ N
- c) $47^{\circ} 35.2'$ N
- d) **$47^{\circ} 40.5'$ N - correct**

GRC B9. The great circle distance from latitude $8^{\circ} 50.0'$ N, longitude $80^{\circ} 21.0'$ W to latitude $22^{\circ} 36.0'$ N, longitude $128^{\circ} 16.0'$ E is 7801 miles and the initial course is $318^{\circ} 45'$ T. The latitude of the vertex is $49^{\circ} 20.6'$ N. What is the longitude of the vertex?

- a) $156^{\circ} 43'$ W
- b) **$162^{\circ} 41'$ W - correct**
- c) $159^{\circ} 32'$ W
- d) $161^{\circ} 18'$ W

GRC B10. The great circle distance from latitude $35^{\circ} 08'$ S, longitude $19^{\circ} 26'$ E to latitude $33^{\circ} 16'$ S, longitude $115^{\circ} 36'$ E is 4559 miles and the initial course is 121° T. Determine the longitude of the vertex.

- a) $26^{\circ} 50.9'$ E
- b) **$65^{\circ} 45.9'$ E - correct**
- c) $69^{\circ} 19.1'$ E
- d) $72^{\circ} 18.3'$ E

GRC B11. The great circle distance from latitude $38^{\circ} 17.0' N$, longitude $123^{\circ} 16.0' W$ to latitude $35^{\circ} 01.0' N$, longitude $142^{\circ} 21.0' E$ is 4330 miles and the initial course is $300.9^{\circ} T$. The latitude of the vertex is $47^{\circ} 40.5' N$. What is the longitude of the vertex?

- a) $173^{\circ} 04.6' E$
- b) $167^{\circ} 18.0' E$
- c) $173^{\circ} 04.6' W$
- d) **$167^{\circ} 18.5' W$ - correct**

Points Along the Great Circle Route

GRC B12. You are on a great circle track departing latitude $25^{\circ} 50' N$, longitude $77^{\circ} 00' W$, and your initial course is $061.7^{\circ} T$. The position of the vertex is latitude $37^{\circ} 35.6' N$, longitude $25^{\circ} 57.8' W$. What is the distance along the great circle track between the point of departure and the vertex?

- a) 2735.1 miles
- b) 2664.9 miles- correct**
- c) 2583.2 miles
- d) 2420.0 miles

GRC B13. You are on a great circle track departing from position latitude $25^{\circ} 50' N$, longitude $77^{\circ} 00' W$. The position of the vertex is latitude $37^{\circ} 35.6' N$, longitude $25^{\circ} 57.8' W$. The distance along the great circle track from the vertex to a point (x) is 600 miles westward. Determine the position of point (x) on the great circle track.

- a) $36^{\circ} 47.5' N$, $38^{\circ} 21.8' W$
- b) $36^{\circ} 50.4' N$, $38^{\circ} 25.6' W$
- c) $36^{\circ} 55.6' N$, $38^{\circ} 30.0' W$ - correct**
- d) $37^{\circ} 02.3' N$, $38^{\circ} 34.4' W$

GRC B14. The great circle distance from latitude $25^{\circ} 50' N$, longitude $77^{\circ} 00' W$ to latitude $35^{\circ} 56' N$, longitude $06^{\circ} 15' W$ is 3616nm and the initial course is $061.7^{\circ} T$. The position of the vertex is latitude $37^{\circ} 34.9' N$, longitude $25^{\circ} 59.0' W$. The difference of longitude from the vertex to a point (X) on the great circle route is $10^{\circ} W$. Determine the latitude which intersects the great circle at point X.

- a) $37^{\circ} 02.5' N$
- b) $37^{\circ} 09.5' N$ - correct**
- c) $37^{\circ} 15.6' N$
- d) $37^{\circ} 21.2' N$