Navigation General

Navigational Procedures

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Your vessel has changed course and is heading 285°T, you are on the charted range and it appears as in illustration D048NG below. After several minutes the range appears as in illustration D047NG below and your heading is still 285°T. What does this indicate?
*north-setting current*

**Illustrations**: D048NG_WM_091018, D047NG_WM_091018

You are entering port and have been instructed to anchor, as your berth is not yet available. You are on a SW'ly heading, preparing to drop anchor, when you observe the range lights as shown in illustration D047NG below, on your starboard beam. What action should you take?
*ensure your ship will NOT block the channel or obstruct the range while at anchor*

**Illustrations**: D047NG_WM_091018

Your vessel is entering port when you change course and steady up on a range with the lights in line. After a few minutes you observe the range lights as shown in illustration D047NG below. How should your heading be altered?
*left, and when the range lights are in line again, steer to keep them in line fine on the starboard bow*

**Illustrations**: D047NG_WM_091018

Your vessel is entering port and you have steadied up on a range, dead ahead, in line with your keel. After a few minutes the range, still dead ahead, appears as shown in illustration D047NG below. Which action should you take?
*Alter heading to the left*

**Illustrations**: D047NG_WM_091018

You are inbound in a channel marked by a range. The range line is 309°T. You are steering 306°T and have the range in sight as shown in illustration D047NG below. The range continues to open. What action should you take?
*Alter course to the left until the range closes, then steer to the left of 306°T.*

**Illustrations**: D047NG_WM_091018

You are outbound in a channel marked by a range astern. The range line is 309°T. You are steering 127°T and have the range in sight as shown in illustration D047NG below. What action should you take?
*Come right to close the range then when on the range steer 129°T.*

**Illustrations**: D047NG_WM_091018

You are inbound in a channel marked by a range. The range line is 040°T. You are steering 036°T. The range is in sight as shown in illustration D047NG below, and is closing. Which action should you take?
*Continue on course until the range is closed, then alter course to the right.*

**Illustrations**: D047NG_WM_091018

You are outbound in a channel marked by a range astern. The range line is 273°T. You are steering 090°T and have the range in sight as shown in illustration D047NG below. What action should you take?
*Come right to close the range then when on the range steer 093° T.*

**Illustrations**: D047NG_WM_091018

You are inbound in a channel marked by a range. The range line is 309°T. You are steering 306°T and have the range in sight as shown in illustration D048NG below. Which action should you take?
*Immediately alter course to the right to bring the range in line.*

**Illustrations**: D048NG_WM_091018

You are inbound in a channel marked by a range. The range line is 216°T. You are steering 213°T and have the range in sight as shown in illustration D048NG below. Which action should you take?
***Immediately alter course to the right to bring the range in line.***

**Illustrations**: D048NG_WM_091018

You are inbound in a channel marked by a range. The range line is 133°T. You are steering 129°T and have the range in sight as shown in illustration D048NG below. Which action should you take?
***Immediately alter course to the right to bring the range in line.***

**Illustrations**: D048NG_WM_091018

Your vessel has changed course and is heading 285°T, you are on the charted range and it appears as in illustration D048NG below. After several minutes the range appears as in illustration D047NG below and your heading is still 285°T. What does this indicate?
***north-setting current***

**Illustrations**: D048NG_WM_091018, D047NG_WM_091018

You are outbound in a channel marked by a range astern. The range line is 133°T. You are steering 315°T and have the range in sight as shown in illustration D048NG below. What action should you take?
***Come left to close the range then when on the range steer 313°T.***

**Illustrations**: D048NG_WM_091018

In illustration D051NG below, why was the position labeled "C" plotted?
***running fixes are better estimates of true position than dead-reckoning positions***

**Illustrations**: D051NG_WM_091118
See REF1081

In illustration D051NG below, why was the position labeled "D" plotted?
***a dead reckoning position is plotted for each course change***

**Illustrations**: D051NG_WM_091118
See REF1081

In illustration D051NG below, why was the position labeled "E" plotted?
***a dead reckoning position is plotted for each speed change***

**Illustrations**: D051NG_WM_091118
See REF1081

In illustration D051NG below what is indicated by the position labeled "C"?
***running fix***

**Illustrations**: D051NG_WM_091118
See REF1081

You take a bearing of 191° and 313° to two objects. Which bearing of a third object will give the best fix?
***249°***

**Illustrations**: BEARINGROSE_WM

You take a bearing of 086° of a lighthouse. Which bearing of another object would give the best fix?
**196°**

**Illustrations**: BEARINGROSE_WM

You take a bearing of 264° of a lighthouse. Which bearing of another object would give the best fix?
**182°**

**Illustrations**: BEARINGROSE_WM

You take a bearing of 191° and 313° to two objects. Which bearing of a third object will give the best fix?
**069°**

**Illustrations**: BEARINGROSE_WM

You take a bearing of 142° and 259° of two objects. Which bearing of a third object will give the best fix?
**201°**

**Illustrations**: BEARINGROSE_WM

You take a bearing of 142° and 259° of two objects. What bearing of a third object will give the best fix?
**019°**

**Illustrations**: BEARINGROSE_WM

You take a bearing of 043° and 169° of two objects. What bearing of a third object will give the best fix?
**102°**

**Illustrations**: BEARINGROSE_WM

You take a bearing of 043° and 169° of two objects. What bearing of a third object will give the best fix?
**309°**

**Illustrations**: BEARINGROSE_WM

You take bearings of 313°T and 076°T on two objects. Which bearing of a third object will give the best fix?
**187°T**

**Illustrations**: BEARGROSE_WM

You take a bearing of 264° of a lighthouse. What bearing of another object would give the best fix?
**350°**

**Illustrations**: BEARINGROSE_WM

You take a bearing of 086° of a lighthouse. What bearing of another object would give the best fix?
**000°**

**Illustrations**: BEARINGROSE_WM

You take a bearing of 176° of a lighthouse. Which bearing of another object would give the best fix?
**079°**

**Illustrations**: BEARINGROSE_WM

You take a bearing of 176° of a lighthouse. What bearing of another object would give the best fix?
***272°***

**Illustrations**: BEARINGROSE_WM

You are taking bearings on two known objects ashore. The BEST fix is obtained when the angle between the lines of position is _____.
***90°***

**Illustrations**: BEARINGROSE_WM
See REF1081

You take a bearing of 356° of a lighthouse. What bearing of another object would give the best fix?
***082°***

**Illustrations**: BEARINGROSE_WM

You take a bearing of 356° of a lighthouse. Which bearing of another object would give the best fix?
***256°***

**Illustrations**: BEARINGROSE_WM

You take a bearing of 313° and 076° of two objects. Which bearing of a third object will give the best fix?
***014°***

**Illustrations**: BEARINGROSE_WM

A great circle crosses the equator at 134°E. It will also cross the equator at what other longitude?
***46°W***

**Illustrations**: GNOMONICCHART
See REF972

A great circle crosses the equator at 173°E. It will also cross the equator at what other longitude?
***7°W***

**Illustrations**: GNOMONICCHART
See REF972

A great circle crosses the equator at 127°W. It will also cross the equator at what other longitude?
***53°E***

**Illustrations**: GNOMONICCHART
See REF972

A great circle crosses the equator at 93°W. It will also cross the equator at what other longitude?
***87°E***

**Illustrations**: GNOMONICCHART
See REF972

What is NOT an advantage of the rhumb line track over a great circle track?
***Plots as a straight line on Lambert conformal charts***

**Illustrations**: GNOMONICCHART
See REF972

A great circle crosses the equator at 17°W. It will also cross the equator at what other longitude?
*163°E*

**Illustrations**: GNOMONICCHART
See REF972

What is the major advantage of a rhumb line track?
*The vessel can steam on a constant heading (disregarding wind, current, etc.).*

**Illustrations**: GNOMONICCHART
See REF972

A great circle crosses the equator at 157°W. It will also cross the equator at what other longitude?
*23°E*

**Illustrations**: GNOMONICCHART
See REF972

When is the rhumb line distance the same as the great circle distance?
*Course 180°T when you cross the equator*

**Illustrations**: GNOMONICCHART
See REF1086

A great circle will intersect the equator at how many degrees of longitude apart?
*180°*

**Illustrations**: GNOMONICCHART
See REF972

In which voyage, between two points, is the rhumb line distance NOT approximately the same as the great circle distance?
*The two points are in high latitudes in the same hemisphere.*

**Illustrations**: GNOMONICCHART
See REF1086

What is a characteristic of a rhumb line?
*It cuts each meridian at the same angle.*

**Illustrations**: GNOMONICCHART
See REF972

The vertex of a great circle track is in LONG 109°E. An eastbound vessel would cross the equator in LONG _____.
*161°W*

**Illustrations**: GNOMONICCHART
See REF972

A great circle track provides the maximum saving in distance on _____.
*easterly courses in high latitudes*

**Illustrations**: GNOMONICCHART
See REF972

Except for N-S courses, and E-W courses on the equator, a great circle track between two points, when compared to a rhumb line track between the same two points, will _____.
***always be nearer to the elevated pole***

**Illustrations**: GNOMONICCHART
See REF972

The shortest distance between any two points on earth defines a _____.
***great circle***

**Illustrations**: GNOMONICCHART
See REF972

What defines a great circle?
***The intersection of a plane passing through the center of a sphere.***

**Illustrations**: GNOMONICCHART
See REF972

The latitude of the upper vertex of a great circle is 36°N. What is the latitude of the lower vertex?
***36°S***

**Illustrations**: GNOMONICCHART
See REF972

A great circle crosses the equator at 141°E. It will also cross the equator at what other longitude?
***39°W***

**Illustrations**: GNOMONICCHART
See REF972

A great circle crosses the equator at 162°E. It will also cross the equator at what other longitude?
***18°W***

**Illustrations**: GNOMONICCHART
See REF972

A body can only be observed at lower transit when _____.
***the body is circumpolar***

Why are low altitude sun sights not generally used?
***Errors due to unusual refraction may exist.***

At 0000 you fix your position and change course to 270°T. At 0030 you again fix your position, and it is 0.5 mile east of your DR. Which statement is TRUE?
***The set is 090°, drift 1.0 knot.***

You are navigating in pilotage waters using running fixes. The maximum time between fixes should be about _____.
***30 minutes***
See REF1081

You are running parallel to the coast and estimate that the current is against you. In plotting a running fix using bearings from the same object on the coast, the greatest safety margin from inshore dangers will result if what speed is used to determine the fix?
***Minimum speed estimate***
See REF1081

A line of position formed by sighting two charted objects in line is called a(n) _____.
*range line*
See REF1081


What is the relative bearing of an object on the port beam?
*270°*
See REF1080


When you are steering on a pair of range lights and find the upper light is above the lower light you should _____.
*continue on the present course*


You are on course 138°T. To check the latitude of your vessel you should observe a celestial body on which bearing?
*000°*


When taking stars, those bodies to the east and west will _____.
*change altitude rapidly*


In high latitudes, celestial observations can be made over a horizon covered with pack ice by bringing the sun tangent to the ice and _____.
*using a dip correction based on the height of eye above the ice*


Which statement concerning current is TRUE?
*The drift of the current should be averaged out on a one hour basis.*


How many fixed objects are needed to plot a running fix?
*One*
See REF1081


You are running parallel to the coast and take a running fix using bearings of the same object. If you are making less speed than used for the running fix, in relation to the position indicated by the fix, you will be _____.
*closer to the coast*
See REF1081


A line of position derived by radar range from an identified point on a coast will be a(n) _____.
*arc*
See REF1081


You are on course 355°T and take a relative bearing of a lighthouse of 275°. What is the true bearing of the lighthouse?
*270°*
See REF1080


What is the relative bearing of an object broad on the port beam?
*270°*
See REF1080


You are on course 030°T. The relative bearing of a lighthouse is 45°. What is the true bearing?
*075°*
See REF1088


When you are steering on a pair of range lights and find the upper light is above the lower light you should _____.
*continue on the present course*


When taking an amplitude, the Sun's center should be observed on the visible horizon when _____.
*in high latitudes*

At morning stars, the first stars that should be observed are those with an azimuth in which quadrant?
*Eastern*

Which error is NOT included in the term "current" when used in relation to a fix?
*Known compass error*

You are running parallel to the coast and plotting running fixes using bearings of the same object. You are making more speed than assumed for the running fix. In relation to the position indicated by the fix you will be _____.
*farther from the coast*
See REF1081

A radar range to a small, charted object such as a light will provide a line of position in which form?
*Arc*
See REF1081

You are on course 222°T and take a relative bearing of a lighthouse of 025°. What is the true bearing to the lighthouse?
*247°*
See REF1080

You are underway in an area where the charted depth is 8 fathoms. You compute the height of tide to be -4.0 feet. The draft of your vessel is 5.0 feet (1.52 meters). You determine the depth of the water beneath your keel to be _____.
*39 feet (11.9 meters)*

You are on course 226°T. In order to check the latitude of your vessel, you should observe a celestial body on which bearing?
*000°*
See REF1080

An amplitude of the Sun in high latitudes _____.
*is most accurate when the Sun's center is observed on the visible horizon*

At morning stars, the last stars that should be observed are those with an azimuth in which quadrant?
*Western*

You are proceeding up a channel at night. It is marked by a range which bears 185°T. You steady up on a compass course of 180° with the range in line dead ahead. This indicates that you(r) _____.
*compass has some easterly error*

You should plot your dead reckoning position _____.
*from every fix or running fix*
See REF1081

A navigator fixing a vessel's position by radar _____.
*can use radar information from one object to fix the position*
See REF1081

A true bearing of a charted object, when plotted on a chart, will establish a _____.
*line of position*
See REF1081

You are on course 357°T and take a relative bearing of a lighthouse of 180°. What is the true bearing to the lighthouse?
*177°*
See REF1080

You are underway in a vessel with a draft of 7.0 feet (2.1 meters). The charted depth for your position is 9 fathoms. You compute the height of tide to be +3.0 feet (0.9 meters). You determine the depth of the water beneath your keel to be
_____.
*50 feet (15.3 meters)*

You are on course 312°T. To check the speed of your vessel you should observe a celestial body on which bearing?
*312°*
See REF1080

You are on course 355°T and take a relative bearing of a lighthouse of 275°. What is the true bearing of the lighthouse?
*270°*
See REF1080

What is the longitude of the geographical position of a body whose Greenwich hour angle is 210°30'?
*149°30'E*

At evening stars, the first stars that should be observed are those with an azimuth in what quadrant?
*Eastern*

You are steering a southerly course, and you note that the chart predicts an easterly current. Without considering wind, how may you allow for the set?
*Head your vessel slightly to the right*

You should plot a dead reckoning position after every _____.
*fix or running fix*
*course change*
*speed change*
*All of the above.*
See REF1081

When using a radar in an unstabilized mode, fixes are determined most easily from _____.
*ranges*
See REF1085

You are on course 344°T and take a relative bearing of a lighthouse of 270°. What is the true bearing to the lighthouse?
*254°*
See REF1080

You are underway in a vessel with a draft of 6.0 feet. You are in an area where the charted depth of the water is 4 fathoms. You would expect the depth of water beneath your keel to be approximately _____.
*18 feet*

You are on course 238°T. To check the course of your vessel you should observe a celestial body on which bearing?
*328°*
See REF1080

You are on course 222°T and take a relative bearing of a lighthouse of 025°. What is the true bearing to the lighthouse?
*247°*
See REF1080

What is the geographic longitude of a body whose GHA is 232°27'?
*127°33'E*

At evening stars, the last stars that should be observed are those with an azimuth in what quadrant?
*Western*

Your vessel is making way through the water at a speed of 12 knots. Your vessel traveled 30 nautical miles in 2 hours 20 minutes. What current are you experiencing?
***A following current of 0.9 knot***

You are plotting a running fix. The LOP to be run forward is an arc from a radar range, what technique should be used?
***The position of the object observed should be advanced to the new time and a new arc swung using the radius of the old arc.***
See REF1081

You are on course 344°T and take a relative bearing of a lighthouse of 090°. What is the true bearing to the lighthouse?
***074°***
See REF1080

What is the relative bearing of an object broad on the port bow?
***315°***
See REF1080

If a chart indicates the depth of water to be 6 fathoms and your draft is 6.0 feet, what is the depth of the water under your keel? (Assume the actual depth and charted depth to be the same)
***30.0 feet***

You are on course 303°T. To check the speed of your vessel you should observe a celestial body on which bearing?
***123°***
See REF1080

You are on course 357°T and take a relative bearing of a lighthouse of 180°. What is the true bearing to the lighthouse?
***177°***
See REF1080

What is the geographic longitude of a body whose GHA is 215°15'?
***144°45'E***

In general, the most effective period for observing stars and planets occurs during the darker limit of _____.
***civil twilight***

When possible, a DR plot should always be started from where?
***A known position***

A position obtained by applying ONLY your vessel's course and speed to a known position is a _____.
***dead-reckoning position***
See REF1081

A chart position enclosed by a square is a(n) _____.
***estimated position***
See REF1081

You are on course 277°T and take a relative bearing of a lighthouse of 045°. What is the true bearing to the lighthouse?
***322°***
See REF1080

You are on course 180°T and take a relative bearing of a lighthouse of 225°. What is the true bearing of the lighthouse?
***045°***
See REF1080

When using horizontal sextant angles of three objects to fix your position, an indeterminate position will result in which situation?
*A circle will pass through your position and the three objects.*


You are on course 209°T. In order to check the longitude of your vessel, you should observe a celestial body on which bearing?
*270°*
See REF1080


You are on course 344°T and take a relative bearing of a lighthouse of 270°. What is the true bearing to the lighthouse?
*254°*
See REF1080


The line of position determined from a sight with an observed altitude (Ho) of 88°45.0' should be _____.
*plotted as an arc around the GP of the body*


A dead reckoning (DR) plot _____.
*ignores the effect of surface currents*
See REF1083


The direction in which a vessel is steered is the course. The path actually followed is the _____.
*course over the ground*
See REF1084


Your dead reckoning position should be plotted _____.
*at least every hour on the hour in the open waters of the sea*
See REF1081


A chart position enclosed by a semi-circle is a(n) _____.
*dead reckoning position*
See REF1081


The distance that a vessel travels from the time that the order to put engines full astern until the vessel is dead in the water is known as _____.
*head reach*
See REF899


A nautical mile is a distance of approximately how much greater than or less than a statute mile?
*1/7 greater*


What is the relative bearing of an object broad on the starboard quarter?
*135°*
See REF1080


When making landfall at night, the light from a powerful lighthouse may sometimes be seen before the lantern breaks the horizon. This light is called the _____.
*loom*


A line of position from a celestial observation is a segment of a _____.
*circle of equal altitude*


You are on course 180°T and take a relative bearing of a lighthouse of 225°. What is the true bearing of the lighthouse?
*045°*
See REF1080

When plotting a circle of equal altitude for a high altitude sight, the radius of the circle is determined by the formula _____.
**90° - Ho**


A dead reckoning (DR) plot _____.
**should be started each time the vessel's position is fixed**
See REF1083


The paths of intended travel between three or more points is the _____.
**track**


You plot a fix using three lines of position and find they intersect in a triangle. The actual position of the vessel _____.
**may be inside or outside of the triangle**
See REF1081


What describes an accurate position that is NOT based on any prior position?
**Fix**
See REF1081


A nautical mile is a distance of approximately how much greater than or less than a statute mile?
**1/7 greater**


You are on course 027°T and take a relative bearing to a lighthouse of 220°. What is the true bearing to the lighthouse?
**247°**
See REF1088


When making landfall at night, you can determine if a light is a major light or an offshore buoy by _____.
**checking the period and characteristics against the Light List**


You are on course 042°T. To check the course of your vessel you should observe a celestial body on which bearing?
**132°**
See REF1088


A position on the Earth has a longitude of 74°10'E. Its celestial counterpart would have a _____.
**GHA of 285°50'**
See REF1081


The line of position should be plotted as a circle around the GP of the body when the Ho exceeds what minimum value?
**87°**


Discounting slip, if your vessel is turning RPM for 10 knots and making good a speed of 10 knots, the current could be _____.
**slack**


The direction in which a vessel should be steered between two points is the _____.
**course**
See REF1084


You are plotting a running fix in an area where there is a determinable current. How should this current be treated in determining the position?
**The course and speed made good should be determined and used to advance the LOP.**
See REF1081

You determine your vessel's position by taking a range and bearing to a buoy. Your position will be plotted as a(n) _____.
**estimated position**
See REF1081

The upper vertex of a great circle track is in LONG 156°00'E. Sailing eastward, the great circle track will cross the equator in LONG _____.
**114°00'W**
See REF1087

A relative bearing is always measured from _____.
**the vessel's head**

If several navigational lights are visible at the same time, each one may be positively identified by checking all of the following EXCEPT what against the Light List?
**Intensity**

You are on course 146°T. To check the speed of your vessel you should observe a celestial body on which bearing?
**146°**

Given are the courses and speeds of 4 vessels. The navigator of which vessel would be required to know the actual time of meridian transit in order to take an accurate observation at LAN?
**C 192°T, Sp 23 knots**

The GP of a body for a high altitude sight is determined from the declination and the _____.
**Greenwich hour angle**
See REF1082

A current perpendicular to a vessel's track has the greatest effect on the vessel's course made good _____.
**at low vessel speeds**

The direction a vessel is pointed at any given time is the _____.
**heading**

Which statement about an estimated position is TRUE?
**It may be based on a single LOP or questionable data.**
See REF1081

A single line of position combined with a dead-reckoning position results in a(n) _____.
**estimated position**
See REF1081

The distance in longitude from the intersection of a great circle and the equator to the lower vertex is how many degrees of longitude?
**90°**

What is the relative bearing of an object dead astern?
**180°**
See REF1080

When using a buoy as an aid to navigation which of the following should be considered?
**The buoy may not be in the charted position.**

You are on course 201°T. To check the speed of your vessel you should observe a celestial body on which bearing?
**201°**

Given are the courses and speeds of 4 vessels. The navigator of which vessel would be required to know the actual time of meridian transit in order to take an accurate observation at LAN ?
*C 349°T, Sp 25 knots*

The center of a circle of equal altitude, plotted on the surface of the Earth, is the _____.
*geographical position of the body*

The type of current which will have the greatest effect on the course made good for your vessel is _____.
*one that flows at nearly right angles to your course steered*

The path that a vessel is expected to follow, represented on a chart by a line drawn from the point of departure to the point of arrival, is the _____.
*track line*

A position that is obtained by using two or more intersecting lines of position taken at nearly the same time, is a(n) _____.
*fix*
See REF1081

A position obtained by taking lines of position from one object at different times and advancing them to a common time is a(n) _____.
*running fix*
See REF1081

The longitude of the upper vertex of a great circle track is 169°E. What is the longitude of the lower vertex?
*011°W*

What is the relative bearing of an object sighted dead ahead?
*000°*
See REF1080

When using a buoy as an aid to navigation which of the following should be considered?
*The buoy may not be in the charted position.*

You are on course 061°T. To check the longitude of your vessel you should observe a celestial body on which bearing?
*090°*

Given are the courses and speeds of 4 vessels. The navigator of which vessel would be required to know the actual time of meridian transit in order to take an accurate observation at LAN?
*C 162°T, Sp 27 knots*

The GP of a body for a high altitude sight is determined from the declination and the _____.
*Greenwich hour angle*
See REF1082

You are heading in a northerly direction when you come across an easterly current. Your vessel will _____.
*be pushed to starboard*

The difference between the DR position and a fix, both of which have the same time, is caused by _____.
*current*

A vessel's position should be plotted using bearings of _____.
*fixed known objects on shore*
See REF1081

From LAT 07°12'N, LONG 80°00'W, to LAT 47°12'S, LONG 169°18'E, the initial great circle course angle is 137.25°. How would you name this course?
***N 137.25°W***

What is the relative bearing of an object broad on the starboard bow?
***045°***
See REF1080

When should a navigator rely on the position of floating aids to navigation?
***Only when fixed aids are not available***

A latitude line will be obtained by observing a body _____.
***at lower transit***

Given are the courses and speeds of 4 vessels. The navigator of which vessel would be required to know the actual time of meridian transit in order to take an accurate observation at LAN?
***C 166°T, Sp 24 knots***

The GP of a body for a high altitude sight is determined from the Greenwich hour angle and the _____.
***declination***
See REF1082

At 0000 you fix your position and plot a new DR track line. At 0200 you again fix your position and it is 0.5 mile east of your DR. Which statement is TRUE?
***The drift is 0.25 knot.***

You plot a fix using three lines of position and find they intersect in a triangle. You should plot the position of the vessel _____.
***in the geometric center of the triangle***
See REF1081

Which position includes the effects of wind and current?
***Estimated position***
See REF1081

Lines of position may be _____.
***hyperbolas***
***arcs***
***straight lines***
***All of the above.***
See REF1081

The initial great circle course angle between LAT 23°0034°00'S, LONG 18°00'E is 063.8°. What is the true course?
***116.2°T***

What is the relative bearing of an object broad on the starboard beam?
***090°***
See REF1080

When navigating a vessel, you _____.
***should never rely on a floating aid to maintain its exact position***

While steering a course of 150°T, you wish to observe a body for a latitude check. What would the azimuth have to be?
***000°T***

The altitude at LAN may be observed by starting several minutes in advance and continuing until a maximum altitude occurs. This procedure should not be used _____.
**on a fast vessel on northerly or southerly headings**

What is the major problem with taking high altitude sun observations?
***It is difficult to establish the point where the sextant is vertical to the horizon.***

At 0000 you fix your position and plot a new DR track line. At 0200 you again fix your position and it is 0.5 mile west of your DR. Which statement is TRUE?
***The set is 270°, drift 0.25 knot.***

A position that is obtained by applying estimated current and wind to your vessel's course and speed is a(n) _____.
***estimated position***
See REF1081

A line connecting all possible positions of your vessel at any given time is a _____.
***line of position***
See REF1081

For navigational purposes, each great circle on the Earth has a length of _____.
***21,600 miles***

What is the relative bearing of an object broad on the starboard quarter?
***135°***
See REF1080

When you are steering on a pair of range lights and find the upper light is in line above the lower light, you should _____.
***continue on the present course***

While steering a course of 150°T, you wish to observe the Sun for a speed check. What would the azimuth have to be?
***150°T***

In order for a star to be used for a sight at lower transit, the star must _____.
***be circumpolar***

What is the major advantage of high altitude observations?
***The same body can be used for a fix from observations separated by several minutes.***

At 0000 you fix your position and change course to 090°T. At 0030 you again fix your position and it is 0.5 mile east of your DR. Which statement is TRUE?
***The current is easterly.***

Which position includes the effects of wind and current?
***Estimated position***
See REF1081

A line of position is _____.
***a line on some point of which the vessel may be presumed to be located***
See REF1081

What is the relative bearing of an object broad on the port quarter?
***225°***
See REF1080

When you are steering on a pair of range lights and find the upper light is in line above the lower light, you should _____.
*continue on the present course*

A star is observed at lower transit. The line of position derived from this sight is _____.
*a latitude line*

REF1080
True Bearing = Relative Bearing + True Heading. Relative Bearing = True Bearing - True Heading.

REF1081
Dead Reckoning (DR) - the process of estimating one's current position based upon a previously determined position, or fix, and advancing that position based upon known speed, elapsed time, and course; without sightings to land, etc. The speed reading was originally based on a Dutchman's Log, which uses a buoyant object tossed overboard near the bow of the vessel and assumed to be "Dead" in the water, or stationary, and the time it takes for the boat to move by it a certain, measured, distance on the deck is timed, then the speed of the vessel can be calculated. This does not take into account effects of wind and currents on the calculated position of the vessel. Estimated Position (EP) - a navigation point, less accurate than a fix, determined by course run, estimated speed, and estimated factors like drift caused by the wind and currents

REF1082
Greenwich hour angle. Angular distance west of the Greenwich celestial meridian; the arc of the celestial equator, or the angle at the celestial pole, between the upper branch of the Greenwich celestial meridian and the hour circle of a point on the celestial sphere, measured westward from the Greenwich celestial meridian through 360°; local hour angle at the Greenwich meridian.

REF1083
Dead Reckoning (DR) is a navigational process that uses only know information, such as the boats heading and speed through the water. A DR plot does not consider any unknown factors, such as current; it only considers what is known. The term "current" when used in navigation is a collection of all the unknown factors that affect a vessels position; such as water movement, leeway caused by wind and any steering errors that may occur. While these factors can be measured, they cannot be predicted with any consist accuracy.

REF1084
Course Over Ground is the actual direction of progress of a vessel, between two points, with respect to the surface of the earth. The vessel's Heading may differ from the Course over ground due to the effects of wind, Tide and currents.

REF1085
unstabilized display. A radarscope display in which the orientation of the relative motion presentation is set to the ship's heading and changes with it.

REF1086
rhumb line. A line on the surface of the earth making the same oblique angle with all meridians; a loodrome or loodromic curve spirals toward the poles in a constant true direction. Parallels and meridians, which also maintain constant true directions, may be considered special cases of the rhumb line. A rhumb line is a straight line on a Mercator projection. Sometimes shortened to RHUMB. rhumb-line course. The direction of the rhumb line from the point of departure to the destination, expressed as the angular distance from a reference direction, usually north. Also called MERCATOR COURSE. rhumb-line distance. Distance point to point along a rhumb line, usually expressed in nautical miles. rhumb-line sailing. Any method of solving the various problems involving course, distance, difference of latitude, difference of longitude, and departure as they are related to a rhumb line.

REF1087
The great circle track is the shortest distance between two places on the earth's surface. The great circle track appears as a straight line on Gnomonic (great circle) charts. The vertices of a great circle are the two points nearest to the poles which have a course on the great circle track due EAST / WEST.

REF1088
The following questions are to be answered by plotting on chart 12221 TR, Chesapeake Bay, and using the supporting publications. Each question is completely independent of any other question on this exam. The following information is applicable to all questions. (The abbreviation "psc" stands for "per standard magnetic compass".) VARIATION IS 9° W DEVIATION TABLE

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HDG.MAG.     DEVIATION
000°            2.0°E
030°            3.0°E
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| | |
|---|---|
| 060° | 4.0°E |
| 090° | 2.0°E |
| 120° | 1.0°E |
| 150° | 1.0°W |
| 180° | 2.0°W |
| 210° | 3.5°W |
| 240° | 3.0°W |
| 270° | 1.5°W |
| 300° | 0.0° |
| 330° | 1.5°E |

REF899

Head Reach is defined as a distance along the direction of the course at the moment when the "full astern" command was given. The distance is measured from the moment when the "full astern" command is given until the vessel is stopped dead in the water.

REF972

[[A source for these charts can be found at this link if anyone is interested.|http://www.landfallnavigation.com/ngamisc.html]] A gnomonic map projection displays all great circles as straight lines. Thus the shortest route between two locations in reality corresponds to that on the map. This is achieved by projecting, with respect to the center of the Earth (hence perpendicular to the surface), the Earth's surface onto a tangent plane. The least distortion occurs at the tangent point. Less than half of the sphere can be projected onto a finite map. As a corollary, a rectilinear photographic lens cannot encompass more than 180 degrees for the same reason. Since meridians (loci of constant longitude) and the equator are great circles, they are always shown as straight lines. If the tangent point is one of the poles then the meridians are radial and equally spaced. The equator is at infinity in all directions. Other parallels (loci of constant latitude) are depicted as concentric circles. If the tangent point is not on a pole or the equator, then the meridians are radially outward straight lines from a Pole, but not equally spaced. The equator is a straight line that is perpendicular to only one meridian (which again demonstrates that the projection is not conformal). If the tangent point is on the equator then the meridians are parallel but not equally spaced. The equator is a straight line perpendicular to the meridians. Other parallels are depicted as hyperbolae.