



## **SAMPLE CHARTWORK QUESTIONS – YACHT MASTER OFFSHORE**

Unless otherwise specified, all chartwork questions relate to chart SAN 3002. Some questions may ask you to use deviation card No 1 for your ships compass:

<b>Deviation Card No 1</b>					
<b>Compass</b>	<b>Deviation</b>	<b>Magnetic</b>	<b>Compass</b>	<b>Deviation</b>	<b>Magnetic</b>
000°	8° E	008°	180°	8° W	172°
023°	6° E	029°	202°	6° W	196°
045°	4° E	049°	225°	4° W	221°
067°	2° E	069°	247°	2° W	245°
090°	0°	090°	270°	0°	270°
112°	2° W	110°	292°	2° E	294°
135°	4° W	131°	315°	4° E	319°
158°	6° W	152°	337°	6° E	343°
180°	8° W	172°	000°	8° E	008°

You will need to refer to the SAS Exercise and Navigation Tables (2008 edition) for some of these questions.

### **SOUTH AFRICAN TIDAL CALCULATIONS**

1. You wish to pick up a member of crew at the Mandela wharf in Durban harbour on Friday 2nd February 2007. The charted depth at this fictional wharf is 1.4m and your draft is 1.9m. Your depth sounder is 0.4m below your water line. What would the clearance under your keel be at 2000 hours?
2. Calculate the height of the tide in Durban harbour on Saturday 20 January 2007 at 1300 hours using the rule of twelfths. Compare this result with the hourly tide tables.

### **NEW ZEALAND TIDAL CALCULATIONS**

3. It is the 6th June 2008 and you are approaching Auckland after a long and difficult crossing of the Tasman Sea. You would like to moor in the marina at Tiritiri Matangi Island for the night. Your ETA at the marina is 1700, but there is a bar at the entrance to the marina with a charted depth 1.0m. Your yacht has a draft of 2.4m. What is the earliest local time you could enter the marina if you want a clearance of 0.5m?
4. It is 0730 on 26 June 2008 and you are moored in a marina at Matiatia Bay near Auckland NZ. You would like to leave as soon as possible but the charted depth at the entrance to your marina is only 1.0m. You have a draft of 1.8m and feel that a

clearance of 0,5m is necessary. What is the earliest time you could leave your marina?

5. It is a beautiful afternoon on 14 June 2008 but you have to get back to your marina at Murrays Bay near Auckland before the tide drops too low. The bar at the entrance to your marina has a charted depth of 1.0m. Your yacht has a draft of 2.1m. What is the latest time you can get back if you want 0.5m clearance under your keel?

*Please note that while Tiritiri Matangi Island, Matiatia Bay and Murrays Bay are very real "secondary ports", the marinas are fictional and created here simply to generate appropriate tidal calculations.*

### **ADMIRALTY TIDAL CALCULATIONS**

6. It is Sunday 16th April 2006. The sill at the entrance to your marina (a fictional marina) at Dover has a drying height of 1.6m. Your keel has a draft of 2.1m and you require a clearance of 0.5m. What is the latest time (UT) before the 1948 UT LW that you can enter the marina? Note that the transducer of your echo sounder is installed 0.5m below water level.
7. It is the morning of Saturday 26 August 2006. You wish to leave Carteret Marina before the mid afternoon low water. However the sill at the marina has a drying height of 5m. Your yacht has a draft of 1.5m. What is the latest time (UT) you can leave if you want a clearance of 0.5m?
8. It is 1030 UT on Saturday 4 February 2006 and you want to tie up at the South Pier at Folkstone to pick up supplies. The charted depth at the South Pier is drying 1,1m and your yacht has a draft of 1.9m. What is the earliest time (UT) you can tie up if you would like a safety margin of 0.5m?

### **PLOTTING AND SHAPING COURSE IN TIDAL STREAMS (FALSE BAY AND ENGLISH CHANNEL)**

9. You are anchored at  $34^{\circ}13.0'S$   $018^{\circ} 28.4E$ . You wish to shape a course to waypoint Z at  $34^{\circ}09.0'S$   $018^{\circ} 50.0E$ . You expect to depart at 0930 and sail at a speed through the water of 5.5 knots. Using your fictional tidal atlas for False Bay, you expect to encounter the following tidal streams:

0930 – 1030 set  $016^{\circ}T$  rate 1.8 k  
1030 – 1130 set  $347^{\circ}T$  rate 2.3 k  
1130 – 1230 set  $026^{\circ}T$  rate 1.3 k  
1230 – 1330 set  $174^{\circ}T$  rate 0.9 k

What is your compass CTS to steer and what is your ETA at waypoint Z? You have no deviation on your yacht's steering compass. Use chart 3002.

10. You are anchored at  $34^{\circ}19'S$   $018^{\circ} 29E$ . You wish to shape a course to waypoint Z at  $34^{\circ}20'S$   $018^{\circ} 48'E$ . You expect to depart at 1200 and sail at a speed through the water of 5 knots. Using your fictional tidal atlas for False Bay, you expect to encounter the following tidal streams:

1230 set 148°T rate 2.1 k  
1330 set 132°T rate 1.9 k  
1430 set 179°T rate 1.6 k  
1530 set 030°T rate 1.3k

What is your compass CTS to steer and what is your ETA at waypoint Z? You have no deviation on your yacht's steering compass. Use chart 3002.

11. You are planning to cross the channel on Wednesday 1 February 2006. You plan to leave your waypoint at 50° 40'N 000° 50'W at about 0830 UT heading for your waypoint at 49° 50'N 001° 40'W off Cherbourg. You anticipate sailing at a water speed of about 5 knots with about 5° leeway due to a Westerly wind. Shape your course for your waypoint off Cherbourg. What is your compass CTS and your ETA at your Cherbourg waypoint? Your yacht's steering compass has no deviation. Variation is 3°W. Use a photocopy of one of the pages of the tidal stream atlas for your chartwork.
12. You wish to cross the channel on Saturday 29 April 2006 from Alderney to Poole. Shape your course from waypoint A ( 49° 50'N and 002° 20'W) near Alderney to waypoint P (50° 40'N and 001° 50'W) off Poole, assuming that you leave waypoint A at 0830 UT sailing at about 5 knots through the water. You anticipate about 10° of leeway due to a Westerly wind. What is your compass CTS and your ETA at waypoint P? Variation is 3°W and your yacht's steering compass has no deviation. Use a photocopy of one of the pages of the tidal stream atlas for your chartwork.

#### **FIX BY MERIDIAN PASSAGE**

13. Disaster struck a few nights ago. After charging the batteries you left the battery switch on "both". That same night your wife left the fridge on. So your batteries are dead and your brand new engine has no crank start facility. It is the 2<sup>nd</sup> January 2007 and you guess you are about 16°S 30W. Fortunately you have a sextant and a nautical almanac. At about 1357 UT the lower limb of the sun reaches its maximum altitude of 81° 23.3'. You estimate your height above sea level to be 3m. Your index error is 1'.9 on the arc. Fix your position as best you can.
14. You were somewhere off the coast of Baja California when the hurricane struck. A lightning strike blew all your instruments and later your mast went. However it is now 12 August 2007 and the storm is over. Facing south with your sextant, the lower limb of the sun reaches its maximum altitude of 79° 57'.3 at about 2008 UT. You estimate your height above sea level to be 2.5m. Your index error is 1'.4 off the arc. You have a nautical almanac. Fix your position as best you can.
15. It is 17 July 2012. Your trustworthy chart plotter has failed and you have no hand held GPS. You have no nautical Almanac but in your sextant box you find an altitude correction table and the perpetual almanac that came with your sextant. Facing North, the lower limb of the sun reaches MP at an altitude of 47° 13'.8 at 0507 UT. The index error on your sextant is negligible and you estimate your height above sea level to be 3m. Fix your position as best you can.
16. It is 13 November 2010. Because of the war in Israel, the Pentagon have switched off the civil GPS signal across the Middle East. You have no nautical Almanac but luckily you find your old SAS Yachtmaster Exercise and Navigation Tables. Facing

South with your sextant, the lower limb of the sun reaches a maximum altitude of  $57^{\circ} 47'.8$  at 0747 UT. The index error on your sextant is negligible and you estimate your height above sea level to be 3m. Fix your position as best you can.

17. It is 11 August 2007. Facing north with your sextant, the lower limb of the sun reaches its maximum altitude of  $78^{\circ} 17'$  at about 0803 UT. You estimate your height above sea level to be 3m. Your index error is  $2'$  on the arc. You have a nautical almanac. Fix your position as best you can.
18. It is 23 February 2011. You have no nautical Almanac but you have a perpetual almanac in your sextant box. Facing North with your sextant, the lower limb of the sun reaches a maximum altitude of  $64^{\circ} 22'$  at 1421 UT. The index error on your sextant is negligible. You have no sextant altitude correction tables but you are able to measure the diameter of the sun with your sextant – it is about  $32'$ . Fix your position as best you can.
19. It is 1 January 2010. All you have on board is an old 2007 nautical almanac. Facing south with your sextant, the lower limb of the sun reaches its maximum altitude of  $58^{\circ} 10'$  at about 2207 UT. You estimate your height above sea level to be 3m. Your index error is  $3'$  on the arc. Fix your position as best you can.
20. It is 13 November 2010. You have no nautical Almanac but you do find a perpetual almanac in your sextant box. Facing South with your sextant, the lower limb of the sun reaches a maximum altitude of  $73^{\circ} 32'$  at 0541 UT. You have no altitude correction tables but you realise you can at least make a correction for lower limb by measuring the diameter of the sun with your sextant. The diameter turns out to be  $32'$  of arc. The index error on your sextant is negligible. Fix your position as best you can.

