

Marine Communications and Traffic Services (MCTS) Aptitude Test

The MCTS Aptitude Test consists of five (5) subtests. Each subtest has 15 questions, is separately timed and is preceded by specific instructions on how to answer the questions. The subject of each of the subtests is listed below along with several sample questions for you to try. The correct answers to the sample questions are included in a separate document.

Subtest 1 - Arithmetic

Within the nautical world in general, and Marine Communication & Traffic Services (MCTS) in particular, arithmetic is a cornerstone skill with a place in almost all activities related to:

- Time
- Navigation
- Tides & currents
- Search & Rescue activities

The use of calculators is not permitted.

Sample questions:

1) A donut costs \$1.25. How many donuts can you buy for \$5.00?

- (1) 3
- (2) 4
- (3) 5
- (4) 6
- (5) none of the above

2) A medium sized pizza is regularly \$12.99 but the restaurant is having a 20 % off special. How much will the pizza cost? Round to the nearest penny.

- (1) \$9.75
- (2) \$10.39
- (3) \$10.99
- (4) \$2.60
- (5) none of the above

3) An employee was making \$14.00 per hour but was given a raise to \$14.91 per hour. What percentage of a raise did the employee receive?

- (1) 4.5 %
- (2) 5.0 %
- (3) 5.5 %
- (4) 6.0 %
- (5) 6.5 %

Subtest 2 - Checking - comparing lists for errors

Importance of Checking (verification)

In the day-to-day work performed by Marine Communications & Traffic Service Officers there is a continuous element of fact checking and verification of information. This activity is usually related to confirming that the information:

- In the Coast Guard’s database is accurate with what the company has published about their vessel or facilities in their registration papers.
- Provided by another government or private company or agency matches what is on file with the Government of Canada.

Comparison to ensure accuracy and consistency is a minor but very important part of the work performed by all federal government departments, and is the backbone of efficiency in any office.

This subtest asks you to compare information in a table for errors. The Information under the heading “Copy” should be exactly the same as under “Original”. You must count the errors made in the “Copy.”

For example:

| Original | | Copy | | | | | | | |
|-------------|--------|--------------|--------|--------------|--|--------------|--|----------------------|--|
| OBADE | HGC15 | OBADE | HGC15 | | | | | | |
| KINGT | BPA3X | KINGT | BPA8X | | | | | | |
| JUNXO | HLT614 | JUNXO | HLT614 | | | | | | |
| PERAD | SVC5T9 | PERAD | SVC9T5 | | | | | | |
| (1) 1 error | | (2) 2 errors | | (3) 3 errors | | (4) 4 errors | | (5) <u>No</u> errors | |

The correct answer would be “3 errors” because:

- BPA3X has one error because it shows in the “Copy” as BPA8X – the 3 was replaced with an 8.
- SVC5T9 has 2 errors because it shows in the “Copy” as SVC9T5 – the 9 and 5 are switched so each error is counted individually.

Sample questions

1.

| Sample 1 | Original | | Copy | |
|--|----------|--------|-------|--------|
| | CHIHU | KG2023 | CHIHU | KG2023 |
| GAUNG | HKJU | GAUNG | HKJU | |
| MALEN | BGCM5 | MALEN | BGGM5 | |
| XINGI | 2CCF8 | XINGI | 2CCF8 | |
| (1) 1 error (2) 2 errors (3) 3 errors (4) 4 errors (5) No errors | | | | |

2.

| Sample 2 | Original | | Copy | |
|--|----------|-------|--------|-------|
| | OOCLA | 3VGXQ | OOCLA | 3VGXQ |
| MAHLI | FRG587 | MAHLI | FRG587 | |
| ISKEN | MNON | ISKEN | MNON | |
| WASOU | 7RJ4L | WASOU | 7RJ4L | |
| (1) 1 error (2) 2 errors (3) 3 errors (4) 4 errors (5) No errors | | | | |

3.

| Sample 3 | Original | | Copy | |
|--|----------|-------|-------|-------|
| | PADIS | STAA6 | PADIS | STAA6 |
| NOVAS | 342CH | NOVAS | 342CH | |
| PERSI | AGYS | PRESI | AGYS | |
| YAZOU | NOT44 | YAZOU | NOT44 | |
| (1) 1 error (2) 2 errors (3) 3 errors (4) 4 errors (5) No errors | | | | |

Subtest 3 - Coding and Decoding information

Importance of Coding

MCTS is a complex working environment which uses many forms of electronic equipment, databases, and documentation in order to provide the services which are performed by MCTS Officers. To make this work easier and more efficient it is necessary to use acronyms and coded groups in order to express complex ideas without having to use lengthy sentences each time. An example of this would be a NAVTEX bulletin:

WND:SW15-20 WITH G40 VIS:2-6 RISK TSTM.

In plain language this means:

Southwest winds 15 to 20 knots, with gusts to 40. Visibility 2 to 6 nautical miles with risk of thunderstorms.

As this is a daily part of MCTS work, it's important that you know how to "code" groups by taking a plain language situation and putting it into a coded sequence, and "decode" groups into a plain language statement.

In Subtest 3 you will have to translate ship information into code and ,conversely, decipher a given code into a description of the vessel. The table containing the codes is given below.

CODING TABLE

| TYPE OF SHIP | | SHIP CHARACTERISTICS | | SHIP DIRECTION | | | |
|----------------|----|------------------------|----|----------------|----|-----|----|
| General Cargo | 01 | Diesel-Electric Engine | 01 | NE | 01 | SSW | 05 |
| Container Ship | 02 | Gas Turbine Engine | 02 | NNE | 02 | SW | 06 |
| Bulk Carrier | 03 | Composite Construction | 03 | ENE | 03 | WSW | 07 |
| Ore Carrier | 04 | Aluminium Tank | 04 | E | 04 | W | 08 |
| Tanker | 05 | Nickel Steel Tank | 05 | | | | |
| RoRo Cargo | 06 | Raised Deck | 06 | ESE | 09 | WNW | 13 |
| Utility Vessel | 07 | Shelter Deck | 07 | SE | 10 | NW | 14 |
| Fishing Vessel | 08 | | | SSE | 11 | NNW | 15 |
| Passenger Ship | 09 | | | S | 12 | N | 16 |

*Please note that when you are putting the information about a ship into code, the code numbers must be in the same order as the information provided in the Coding Table which is not necessarily the order in which the information is presented in the question, i.e.: **type of ship, ship characteristics, ship direction.***

Use this table to answer the following questions:

For example:

The code 070415 denotes:

- (1) A utility vessel with a nickel steel tank heading in a NNW direction.
- (2) A fishing vessel with an aluminium tank heading in a NW direction.
- (3) A utility vessel with an aluminium tank heading in a NNW direction.
- (4) A tanker with a gas turbine engine heading in a NNE direction.
- (5) A general cargo vessel with a raised deck heading in a WSW direction.

The correct answer would be 3 because:

- 07 = Utility Vessel
- 04 = Aluminium Tank
- 15 = NNW (north-northwesterly direction)

Sample questions

1) The code 040113 denotes:

- (1) A gas turbine ore ship heading WNW.
- (2) A general cargo composite construction ship heading SSW.
- (3) An ore ship with a diesel-electric engine heading WNW.
- (4) An ore ship with aluminium tanks heading ENE.
- (5) A NW bound tanker with aluminum tanks.

2) A fishing vessel with a shelter deck heading SE should be coded:

- (1) 080610
- (2) 070711
- (3) 050215
- (4) 050306
- (5) 080710

3) The code 010602 denotes:

- (1) A NNE bound general cargo ship with a raised deck.
- (2) A container ship with a raised deck heading NNE.
- (3) A NE bound composite construction RoRo cargo ship.

- (4) A general cargo ship with a raised deck heading WSW.
- (5) A gas turbine ore carrier heading NNE.

Subtest 4 - Memory

Importance of a strong working memory

Reasoning, planning and problem solving rely on one's ability to store and manipulate information. All three (3) are key in the provision of distress and safety communications and the regulation of vessel traffic.

This subtest is completed in two (2) parts:

Part 1 - Read a short story, try to memorize as much of the text as you can. 15 minutes later given the same text with blank spaces you need to fill in from the choices given.

Sample text

At 10:30 pm the fishing vessel Aqua Hunter, at anchor in Marlow Bay, called the Coast Guard Radio station to report having seen what they thought was a red, twin star distress flare. The flare appeared to have come from water level and was to the northwest outside of the bay, most likely someplace around the east side of Byron Island. There were 3 people onboard the fishing vessel but only the lookout was awake and he did not want to wake up the skipper unless it was deemed necessary; the lookout was a deckhand and was unable to provide an ETA to the area where he thought the flare had originated. The Marine Communications and Traffic Services Officer at the radio station acknowledged the information and asked the fishing vessel to standby.

Part 2 – The same story but with blanks to be filled with what was deleted from the original text memorized.

At ___(1.)___ the fishing vessel _____(2.)_____, called the Coast Guard Radio station to report having seen what they thought was a _____(3.)_____ distress flare. The flare appeared to have come from water level and was to the northwest outside of the bay, most likely someplace around _____(4.)_____. There were 3 people onboard the fishing vessel but only the lookout was awake and he did not want to wake up the skipper unless it was deemed necessary; the lookout was a deckhand and was unable to provide an ETA to the area where he thought the flare had originated. The Marine Communications and Traffic Services Officer at the radio station acknowledged the information and asked the fishing vessel to standby.

1. (1) 11:30 pm
 (2) midnight
 (3) 10:30 am
 (4) 11:00 pm
 (5) 10:30 pm

2. (1) Hunter, at anchor in Marlow Inlet
 (2) Aqua Hunter, at anchor in Byron Bay
 (3) Shelby, transiting by Tanis Creek
 (4) Aqua Hunter, at anchor in Marlow Bay
 (5) Aqua, near Byron Island

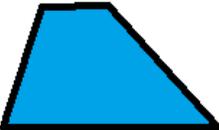
3. (1) yellow, parachute
 (2) red, handheld
 (3) red, twin star
 (4) green, slow burn
 (5) red, parachute

4. (1) the east side of Byron Island
 (2) the west side of Byron Island
 (3) the east side of Marlow Bay
 (4) the north side of Tanis Island
 (5) the west entrance to Shelby

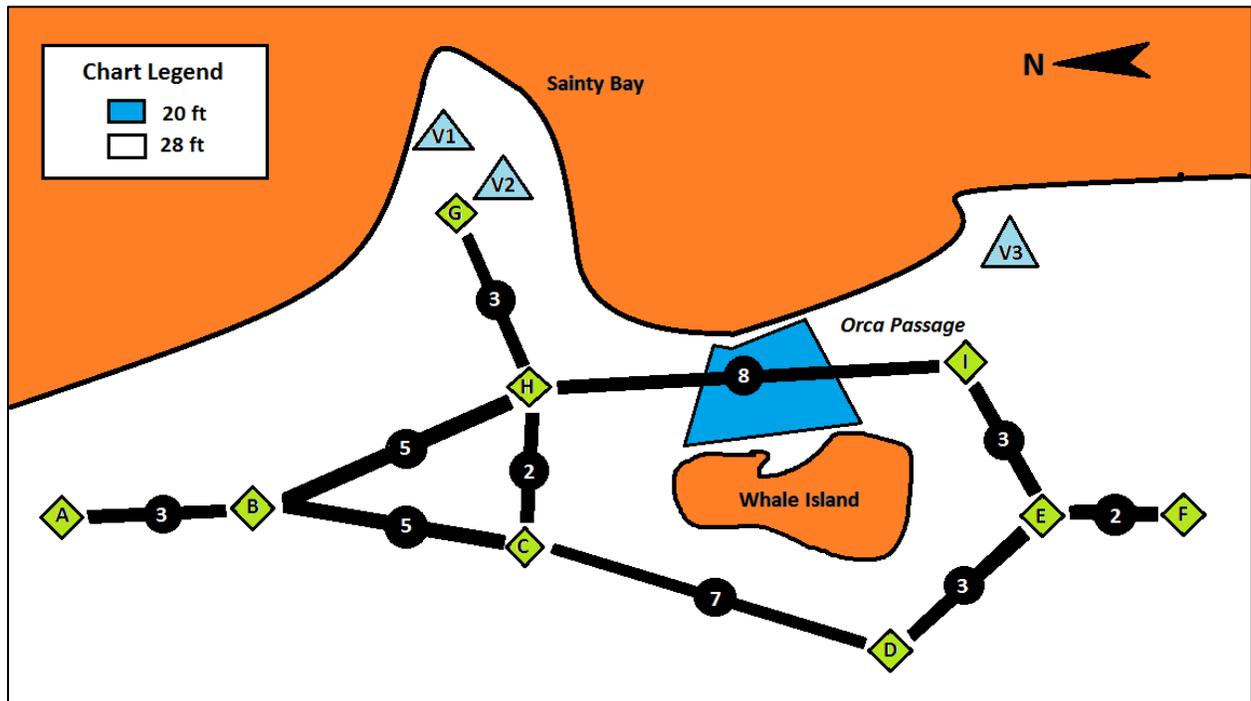
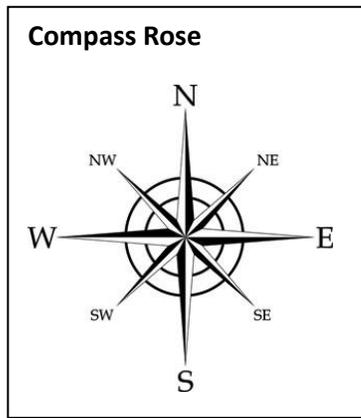
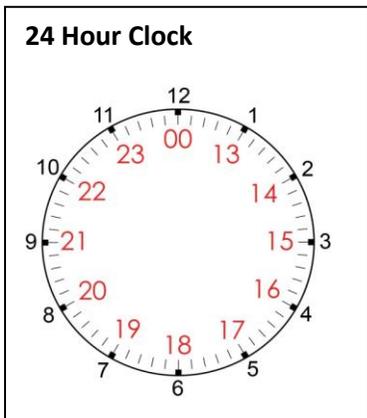
Subtest 5 - Spatial Reasoning

This subtest measures your ability to deal with situations similar to those encountered by Marine Communications and Traffic Services (MCTS) Officers.

The following symbols chart represents the elements that make up the simulated radar depictions used in the MCTS specific portion of this test.

| Element | Description |
|---|--|
|  | <p>Shorelines – Identified by a continuous line.</p> <p>Land – Represented by an orange-brown or tan coloured area.</p> <p>Anchorage Sites – Identified by a name on the radar chart (e.g. Sainty Bay).</p> |
|  | <p>Waterways – “Highways” on the water, they are identified by thick black lines traced on the chart display. They represent routes which ships are required to follow between points shown on the nautical chart. Way-points (see “Way-points” below) mark the end of each waterway.</p> |
|  | <p>Way-points – Identify the beginning and/or end of a waterway, or intersections where ships may change direction in order to follow their assigned routes. Ships must enter or leave the waterways from these way-points when departing or arriving at their anchorages.</p> <p><i>When answering questions, do not refer to any event that might occur beyond the end points.</i></p> |
|  | <p>Depth – Identifies the depth of any portion of the waterway that is indicated by a coloured box shown in the “Chart Legend”. If the legend indicates a depth of 25 feet for a certain portion of the waterway then any ship with a draught (draft) of 25 feet or less can safely navigate in that area. Conversely, any ship with a draught (draft) of more than 25 feet would run aground in that area.</p> |

| | |
|--|---|
|  | <p>Distances – Identifies the distance across the waterway between two way-points. The distance is in nautical miles.</p> |
| <p>N</p>  | <p>Compass – Indicates the direction of north on the simulated radar display; a compass is located on every nautical chart.</p> <p><i>Depending on the radar display, north is not always the top of the graphic so always be sure to check which way it's pointing before making any decisions about direction.</i></p> |



Vessel Information Table

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---------------|-------------------|----------|---------|--------------|-------------|---------|-----|
| Ship Code | Maximum Draft | Manoeuv. Charact. | Position | Destin. | Depart. Time | Route | Speed | ETA |
| V1 | 22 ft | ½ hr | G | F | 0930 | G-H-C-D-E-F | 3 Nm/hr | |
| V2 | 18 ft | ½ hr | G | F | 1000 | | 4 Nm/hr | |
| V3 | 26 ft | 1 hr | I | A | | | 2 Nm/hr | |
| <i>**Due to temporary conditions the waterway between Point B and Point H will be closed from 1100 hrs until further notice.</i> | | | | | | | | |

The table provides an example of the type of radio communication information available for the regulation of vessel traffic. This information is described below:

Ship Code: The ship code number is enclosed in a triangle which shows the position of the ship.

Maximum Draft: The draft of a vessel corresponds to the part of the ship below the waterline. A ship can only navigate in waterways with a depth equal to or greater than its maximum draft.

Manoeuvring Characteristics: Refers to the time required by the ship to anchor or to leave anchor.

Position of the Ship: The location of the ship in the table by the letter corresponding to the nearest waterway point.

Destination: Indicates the targeted destination of a ship is indicated by reference to a waterway point, if known.

Departure Time: Refers to the time at which the ship will leave its anchorage, when applicable.

Route: Refers to the route assigned to each ship, when applicable. Ships are obliged to follow their assigned routes.

Speed: Refers to the speed at which the ship will navigate, expressed in nautical miles per hour (Nm/hr).

Estimated Time of Arrival: Indicates the time at which the ship should reach its targeted destination.

All times are based on the International 24-hour clock.

Instructions

Use the symbols chart, simulated radar chart, and the vessel information table above to answer the following questions.

1. Given a departure time of 0930 hrs., what is the ETA for vessel #1 to Point F?
 - (1) 1500 hrs.
 - (2) 1520 hrs.
 - (3) 1530 hrs.
 - (4) 1540 hrs.
 - (5) 1545 hrs.

2. Vessel #3 departs at 0830 hrs., what is its ETA and routing for Point A?
 - (1) 1230 hrs. following route I-H-B-A
 - (2) 1630 hrs. following route I-E-D-C-B-A
 - (3) 1730 hrs. following route I-H-B-A
 - (4) 1830 hrs. following route I-H-C-B-A
 - (5) 2000 hrs. following route I-E-D-C-B-A

3. If vessel #1 departs on schedule, and vessel #3 departs at 1200, what will be the geographical relationship of vessel #3 to vessel #1 at 1300?
 - (1) South
 - (2) Southeast
 - (3) East
 - (4) North
 - (5) Northwest

4. Given a maximum draft of 19 ft. for vessel #3, what would be its ETA for Point A if it departed at 0800 hrs.?
 - (1) 1700 hrs.
 - (2) 1730 hrs.
 - (3) 1800 hrs.
 - (4) 1930 hrs.
 - (5) 2030 hrs.