Radar Plotting Worked Examples
SKYSAIL TRAINING

www.skysailtraining.co.uk

Laminated Skills Charts - waterproof A4

- Radar
  - with details of Radar controls
  - Collision rules to be used with Radar
  - Plotting sheet with full instructions
- VHF Procedures
- Day Skipper
- Chartwork
- Weather at Sea
- ColRegs - Lights Shapes and Sound Signals, steering and sailing rules
- Signals - Mayday, SOLAS, Flags, IPTS
- CEVNI Symbols, Signals and Lights
Collision Avoidance

A target whose range is decreasing and relative bearing is not changing is on a collision course

CBDR = Constant Bearing Decreasing Range
Closest Point of Approach - CPA

- Always of interest to the Skipper
- CPA = Closest Point of Approach
- Always expressed as a bearing and range from own boat.
Finding the Closest Point of Approach - CPA of a Target

1. Plot target position X at 6 minute intervals (= 0.1 hour)
2. First plot = O (Original)
3. Last plot = A (Actual)
4. Draw O - A the blue line past P the centre of the plot (your position)
Finding the Closest Point of Approach - CPA of a Target

1. Plot target position X at 6 minute intervals (= 0.1 hour)
2. First plot = O (Original)
3. Last plot = A (Actual)
4. Draw O - A the blue line past P the centre of the plot (your position)
5. Draw a line from P (in red) to meet the blue line at right angles.
6. This is the CPA
7. Find the Time to CPA = \((A-C / O-A) \times \text{Time for OA}\)
Finding the Time to Closest Point of Approach

Find the Time to CPA = \( \frac{A - C}{O - A} \times \) time from O to A

In this case time from O to A = 12 minutes = 0.2 hrs

So if OA = 3 miles

AC = 1.3 miles

Time to CPA = \( 0.2 \times \frac{1.3}{3} \)

\( = 0.087 \) hours

\( = 5.2 \) minutes
Finding the TRUE course and speed of the target

1. Plot target position X at 6 minute intervals (= 0.1 hour)
2. First plot = O (Original)
3. Last plot = A (Actual)

This gives the RELATIVE COURSE of the target

Our boat is travelling up the screen, so we need to take away our speed from the target.

Draw O – W: the distance we travel in 12 minutes

O - W = the WAY of our boat
Finding the TRUE course and speed of the target

We must adjust the target’s Relative course by allowing for our speed – up the screen.

Imagine the target dropped a buoy at O. The buoy then stays stationary.

When the target reaches A the buoy will be at W, where A – W is the distance travelled by our vessel. The TRUE COURSE of the target is W to A

The TRUE SPEED of the target is

\[
\frac{W - A}{\text{Time } O - A}
\]
<table>
<thead>
<tr>
<th>Question 1</th>
<th>Head Up, Range 5M, Heading 180°, speed 10 Kn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Range</td>
</tr>
<tr>
<td>1010</td>
<td>4.0 M</td>
</tr>
<tr>
<td>1016</td>
<td>3.0 M</td>
</tr>
<tr>
<td>1022</td>
<td>2.0 M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 2</th>
<th>Head Up, Range 5M, Heading 030°, speed 5 Kn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Range</td>
</tr>
<tr>
<td>1301</td>
<td>3.6 M</td>
</tr>
<tr>
<td>1307</td>
<td>2.3 M</td>
</tr>
<tr>
<td>1313</td>
<td>1.2 M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 3</th>
<th>Head Up, Range 10 M, Heading 355°, Speed 20 Kn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Range</td>
</tr>
<tr>
<td>2050</td>
<td>9.2 M</td>
</tr>
<tr>
<td>2056</td>
<td>6.8 M</td>
</tr>
<tr>
<td>2102</td>
<td>4.4 M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 4</th>
<th>Head Up, Range 10 M, Heading 355°, Speed 20 Kn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Range</td>
</tr>
<tr>
<td>1110</td>
<td>9.0 M</td>
</tr>
<tr>
<td>1116</td>
<td>8.0 M</td>
</tr>
<tr>
<td>1122</td>
<td>7.0 M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 5</th>
<th>North Up, Range 5M, Heading 110°, Speed 5 Kn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Range</td>
</tr>
<tr>
<td>1440</td>
<td>4.6 nm</td>
</tr>
<tr>
<td>1446</td>
<td>2.9 nm</td>
</tr>
<tr>
<td>1452</td>
<td>1.2 nm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 6</th>
<th>North Up, Range 5M, Heading 110°, Speed 5 Kn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Range</td>
</tr>
<tr>
<td>0212</td>
<td>5.0 nm</td>
</tr>
<tr>
<td>0218</td>
<td>3.9 nm</td>
</tr>
<tr>
<td>0224</td>
<td>2.7 nm</td>
</tr>
<tr>
<td>0230</td>
<td>1.8 nm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Question 7</th>
<th>North Up, Range 5M, Heading 110°, Speed 5 Kn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Range</td>
</tr>
<tr>
<td>0230</td>
<td>1.8 nm</td>
</tr>
<tr>
<td>0246</td>
<td>0.9 nm</td>
</tr>
<tr>
<td>0252</td>
<td>0.5 nm</td>
</tr>
<tr>
<td>0258</td>
<td>0.1 nm</td>
</tr>
</tbody>
</table>
Question 1

Mode: HU
Range: 5

Distance you travel in 12 minutes:
$= 10 \times \frac{1}{5} = 2$ miles

Target:
CPA: 0
Course: 250°
Speed: 7.0

Heading:
Speed: 10

Target:
Distance: 1 2 3 4 5 miles
**Question 2**

- **Mode**: HU
- **Range**: 5
- **Heading**: 030°
- **Speed**: 5

**Distance you travel in 12 minutes**

\[= 5 \times \frac{1}{5}\]

\[= 1 \text{ mile}\]
Question 3

Mode | HU
---|---
Range | 10

Speed | 20

Heading | 355°

Distance you travel in 12 minutes:

\[ \text{Distance} = 20 \times \frac{1}{5} \]

\[ = 4 \text{ miles} \]

TCPA 10 minutes

Target

CPA | 1.0
Course | 060°
Speed | 25.0
Distance you travel in 12 minutes

\[ = 20 \times \frac{1}{5} \]

\[ = 4 \text{ miles} \]
**Question 5**

Mode: NU  
Range: 5

**Heading** 110°  
**Speed** 5

**Target**  
CPA: 0.2M  
Course: 225°  
Speed: 15.0

Distance you travel in 12 minutes:

\[ \text{Distance} = 5 \times \frac{1}{5} = 1 \text{ miles} \]

Your heading 110°