R A D A R

RYA 1 Day Course

Skysail

Training

Radar Plotting Worked Examples

Keith Bater **Radar course notes**

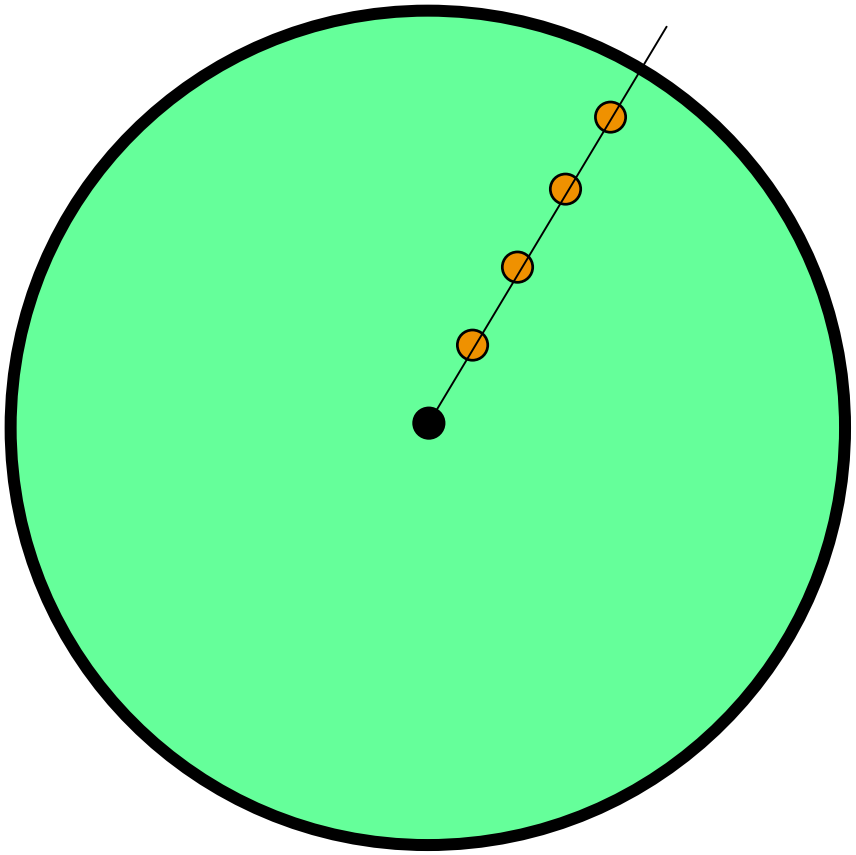
SKYSAIL TRAINING

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**

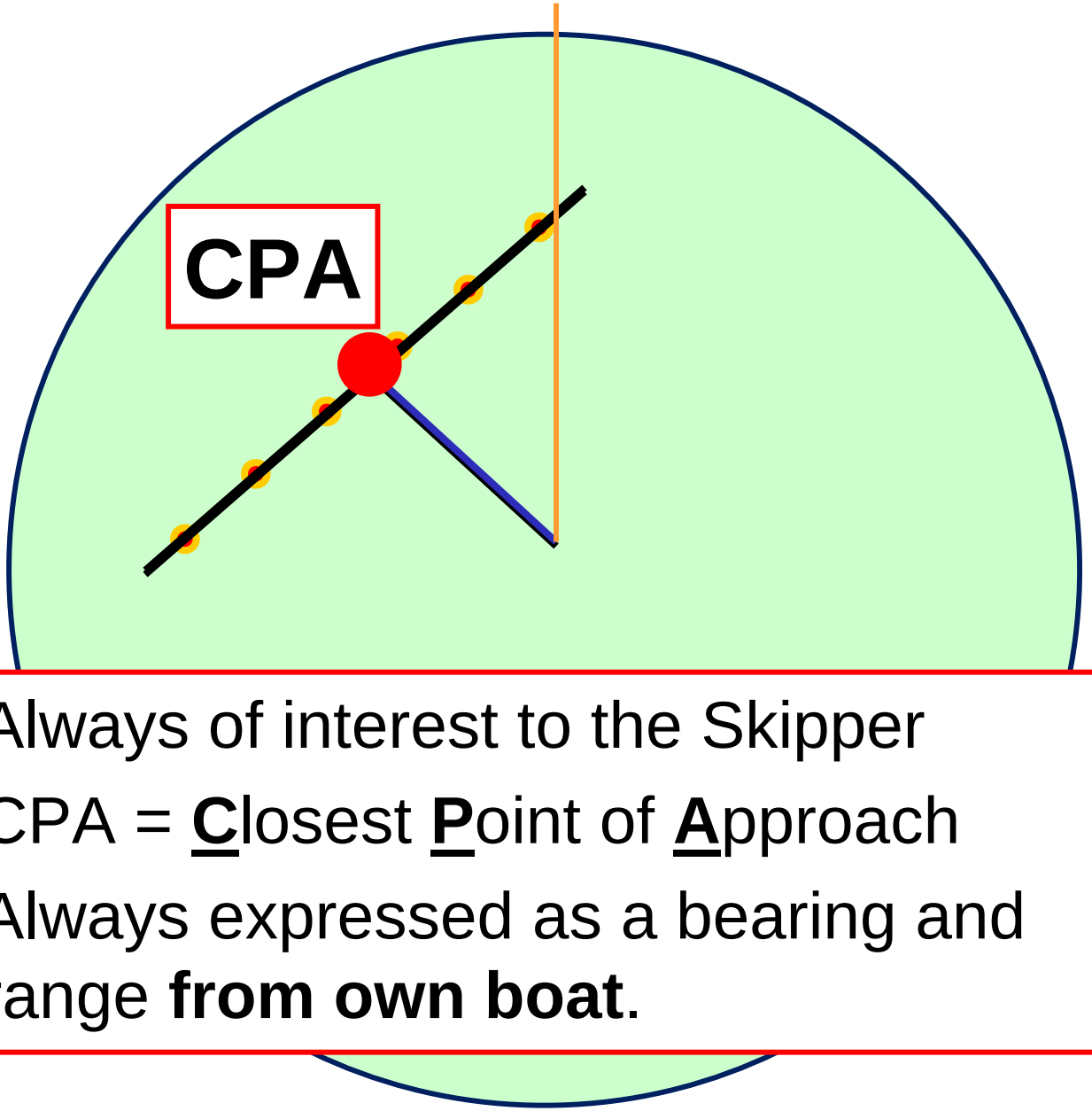
Collision Avoidance



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

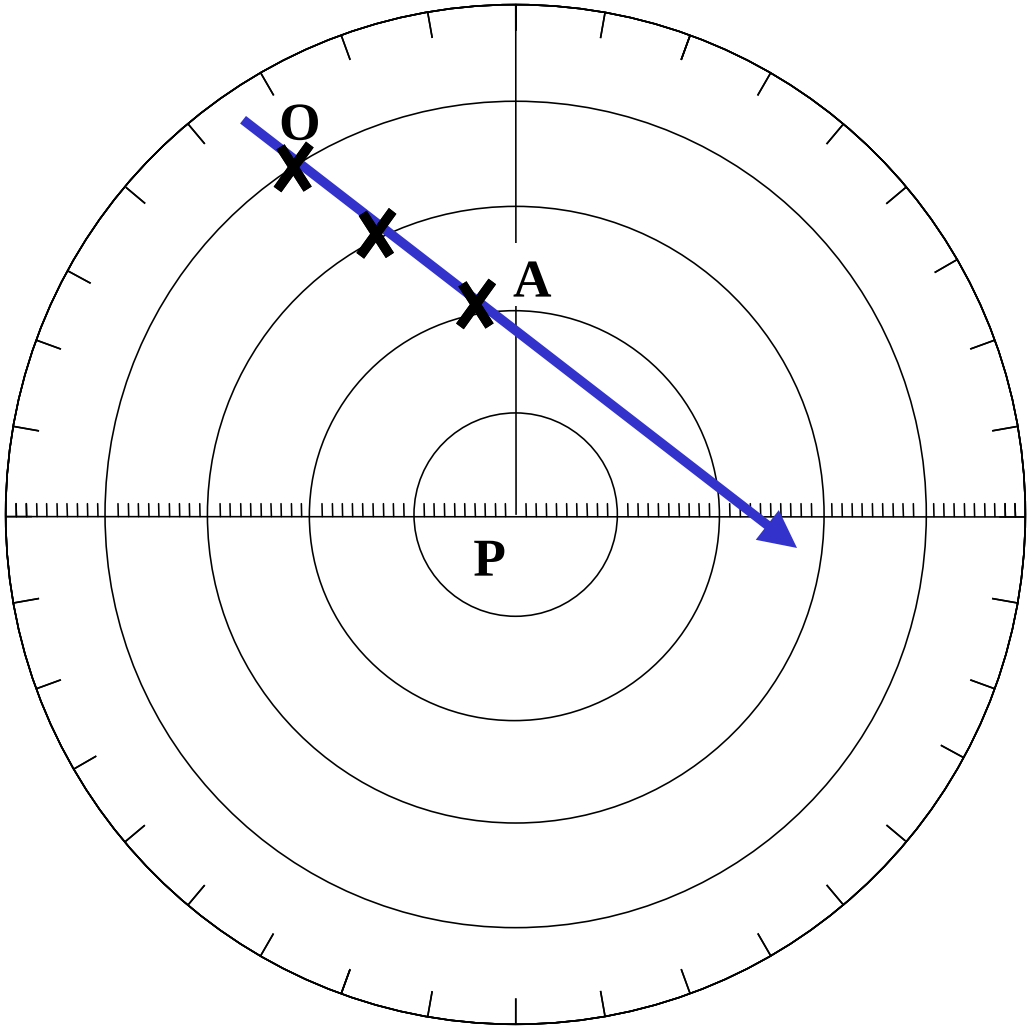
CBDR = Constant Bearing Decreasing Range

Closest Point of Approach - CPA



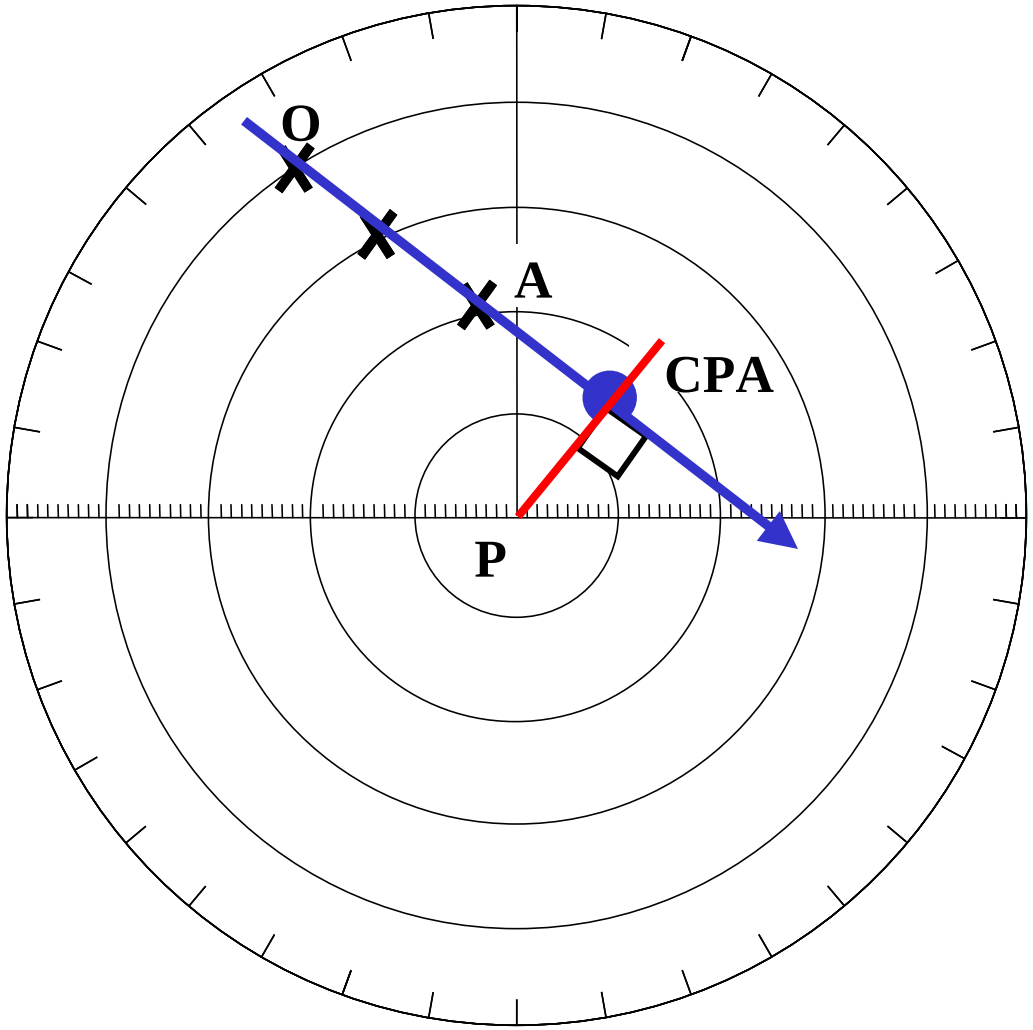
- Always of interest to the Skipper
- CPA = **C**losest **P**oint of **A**pproach
- Always expressed as a bearing and range **from own boat**.

Finding the Closest Point of Approach - CPA of a Target 1



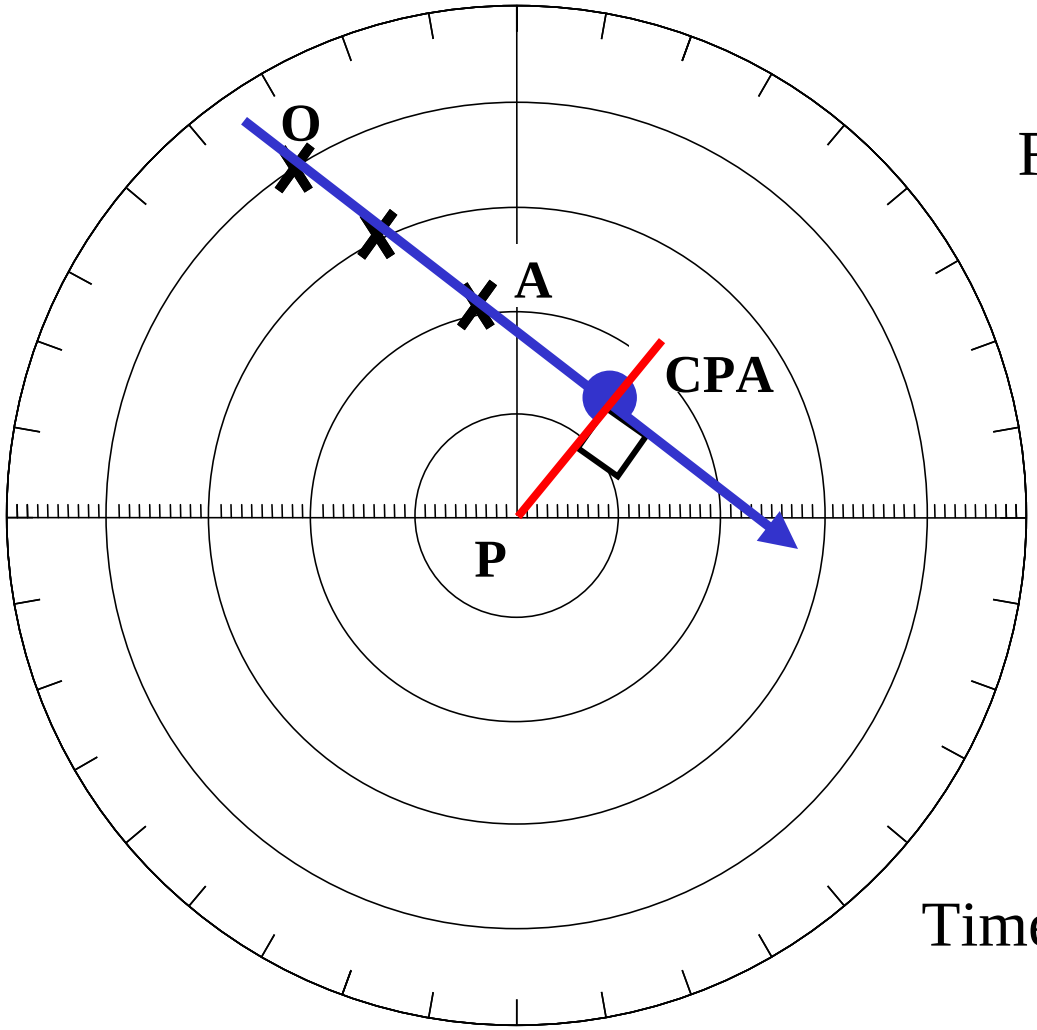
1. Plot target position X at 6 minute intervals (= 0.1 hour)
2. First plot = O (Original)
3. Last plot = A (Actual)
4. Draw O - A the blue line past P the centre of the plot (your position)

Finding the Closest Point of Approach - CPA of a Target 2



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) *x* Time for OA

Finding the Time to Closest Point of Approach



Find the Time to CPA =

$$\frac{\text{A - C}}{\text{O - A}} \; x \text{ time from O to A}$$

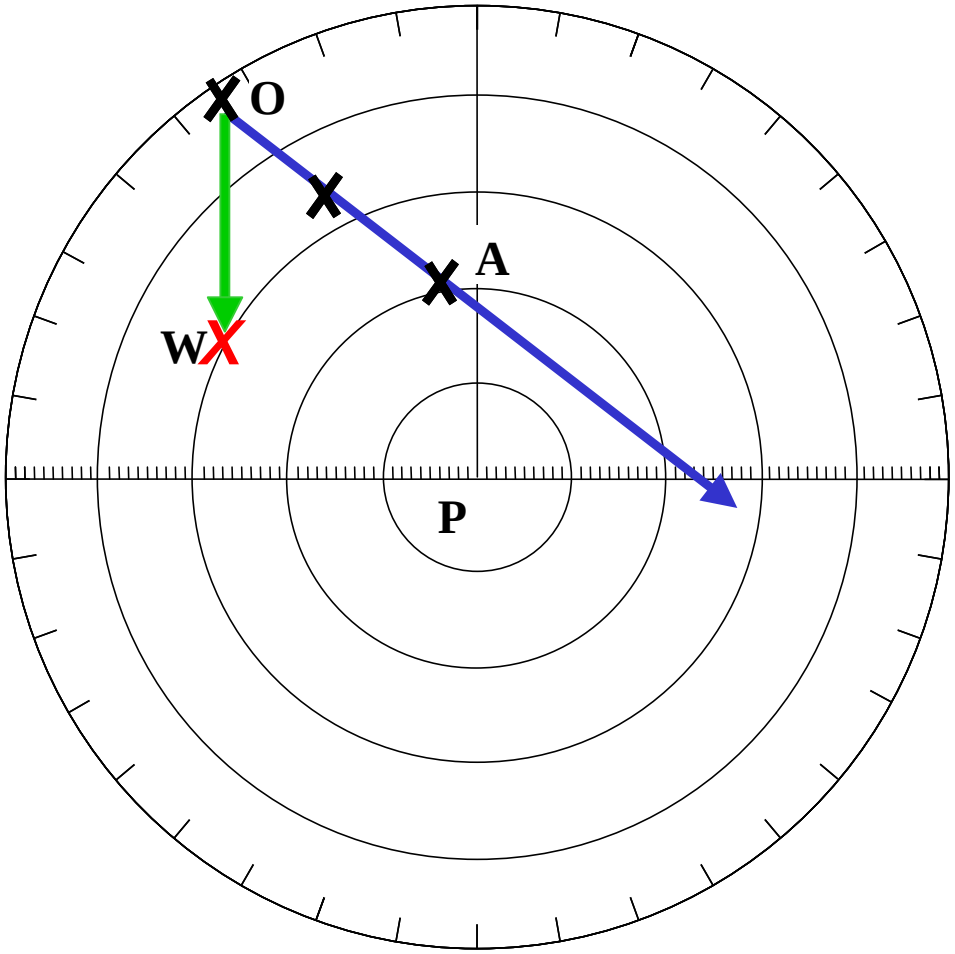
In this case time from O to A = 12 minutes = 0.2 hrs

So if OA = 3 miles

AC = 1.3 miles

Time to CPA = 0.2 x (1.3/3)
= .087 hours
= 5.2 minutes

Finding the TRUE course and speed of the target 1



1.Plot target position X at 6 minute intervals (= 0.1 hour)

2.First plot =O (Original)

3.Last plot = A (Actual)

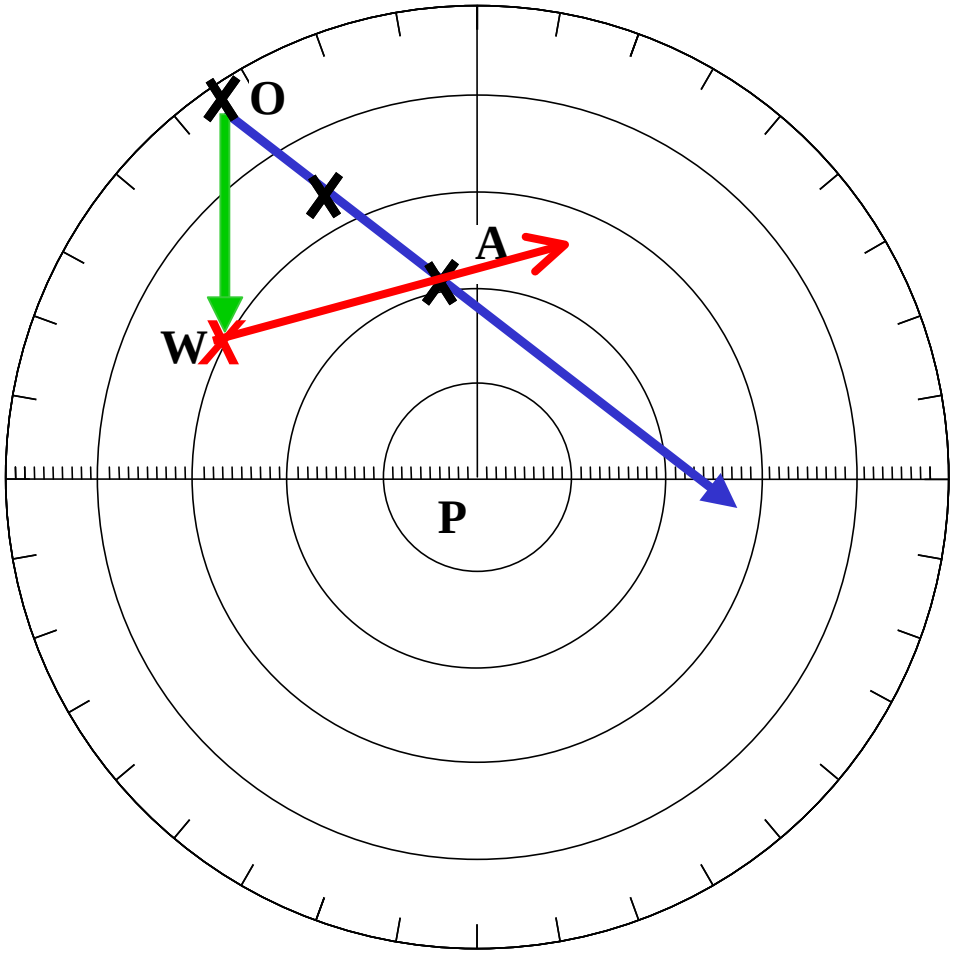
This gives the RELATIVE COURSE of the target

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 2



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

$$\frac{W - A}{\text{Time } O - A}$$

Question 1 Head Up, Range 5M, Heading 180º, speed 10 Kn

Time	Range	Bearing
1010	4.0 M	320°
1016	3.0 M	320°
1022	2.0 M	320°

Is there a likelihood of collision?	Yes
What is the other vessel's true course?	250º
What is the other vessel's speed?	7.0 Kn

Question 2 Head Up, Range 5M, Heading 030º, speed 5 Kn

Time	Range	Bearing
1301	3.6 M	320°
1307	2.3 M	312°
1313	1.2 M	292°

Is there a likelihood of collision?	No
What is the other vessel's true course?	168º
What is the other vessel's speed?	9.0 Kn

Question 3 Head Up, Range 10 M, Heading 355º, Speed 20 Kn

Time	Range	Bearing
2050	9.2 M	282°
2056	6.8 M	283°
2102	4.4 M	270°

Is there a likelihood of collision?	No
What is the CPA?	1.0 M
What is the TCPA?	10 mins
What is the other vessel's true course?	060º

Question 4 Head Up, Range 10 M, Heading 355º, Speed 20 Kn

Time	Range	Bearing
1110	9.0M	008°
1116	8.0 M	009°
1122	7.0 M	009°

What is the CPA?	0.4M
What is the other vessel's speed?	10 Kn
Is there a likelihood of collision?	??
What light will you see?	White

Question 5 North Up, Range 5M, Heading 110º, Speed 5 Kn

Time	Range	Bearing
1440	4.6 nm	064°
1446	2.9 nm	066°
1452	1.2 nm	077°

Is there a likelihood of collision?	??
What is the CPA?	0.8 M
What is the other vessel's true course?	225º
What is the other vessel's speed?	15.0 Kn

Question 6 North Up, Range 5M, Heading 110º, Speed 5 Kn

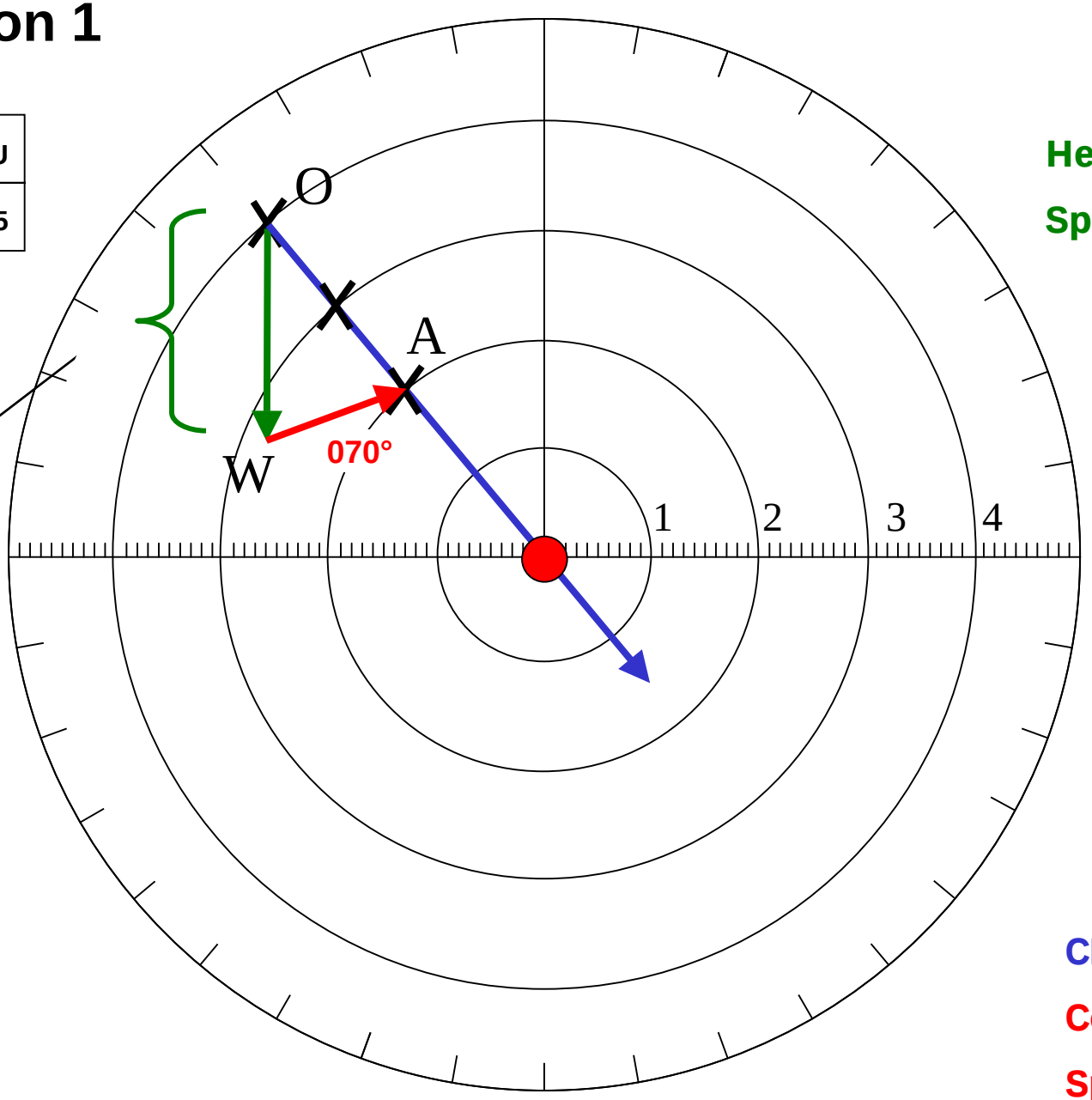
Time	Range	Bearing
0212	5.0 nm	002°
0218	3.9 nm	359°
0224	2.7 nm	354°
0230	1.8 nm	334°

Is there a likelihood of collision?	No
What is the CPA?	0.9 M
What is the other vessel's true course?	210º
What is the other vessel's speed?	15.0 Kn
What is the CPA if we turn 45° to Port?	1.2 M

Question 1

Mode	HU
Range	5

Heading	180°
Speed	10



Distance you travel in 12 minutes

= 10 x 1/5

= 2 miles

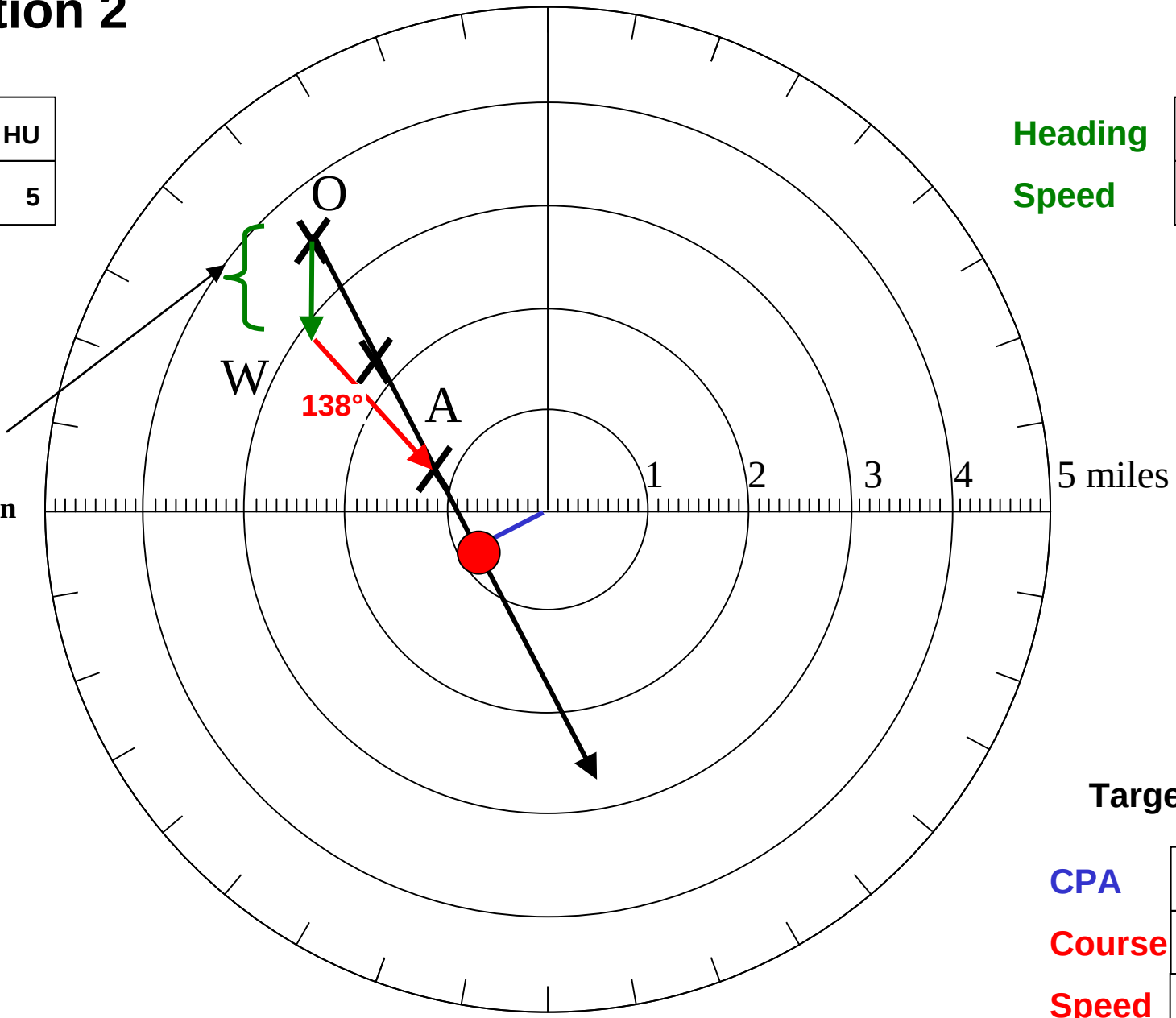
Target

CPA	0
Course	250°
Speed	7.0

Question 2

Mode	HU
Range	5

Heading	030°
Speed	5



Distance you travel in 12 minutes

= 5 x 1/5

= 1 mile

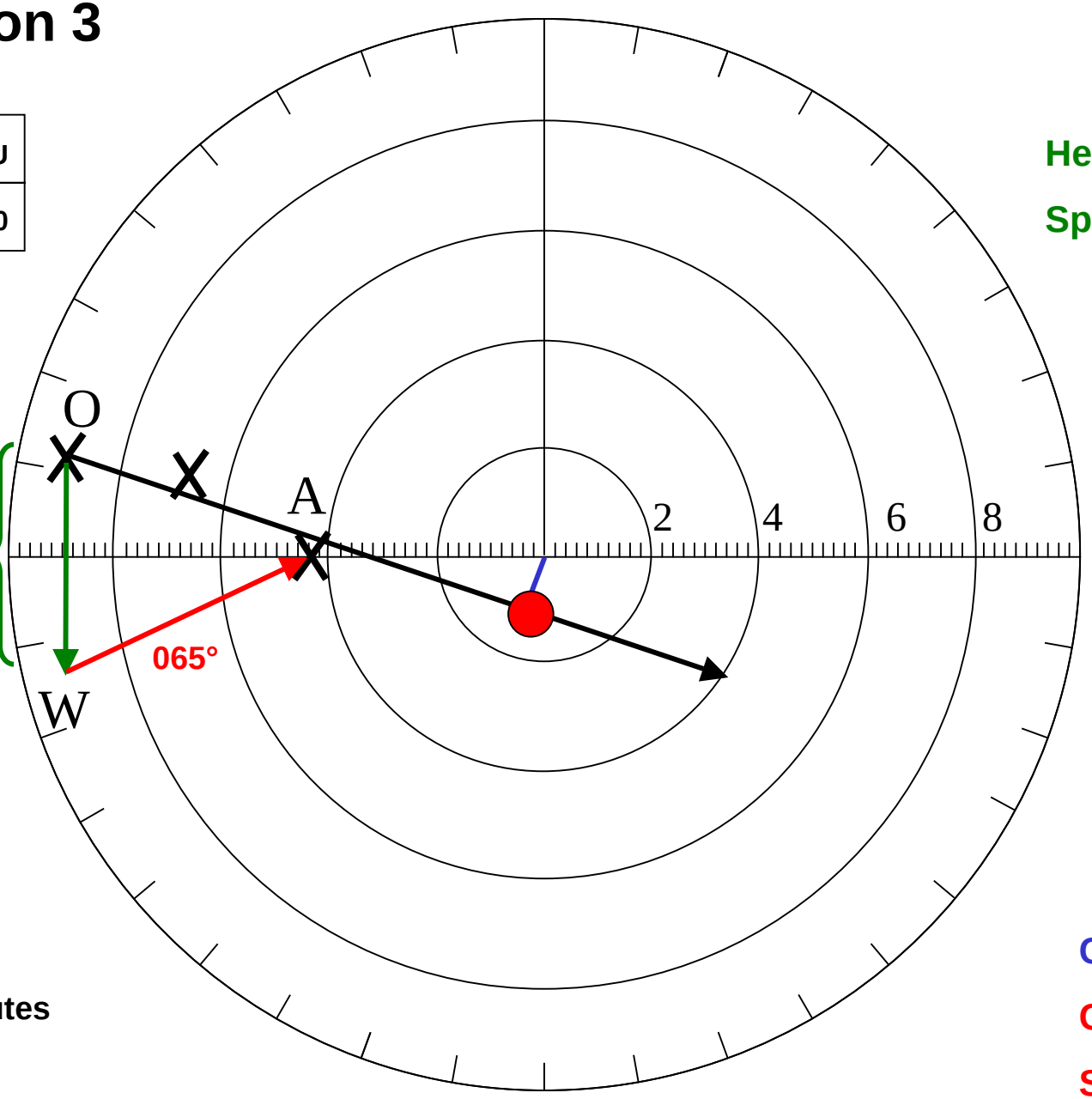
Target

CPA	0.7
Course	168°
Speed	9.0

Question 3

Mode	HU
Range	10

Heading	355°
Speed	20



Distance you travel in 12 minutes

= 20 x 1/5

= 4 miles

TCPA 10 minutes

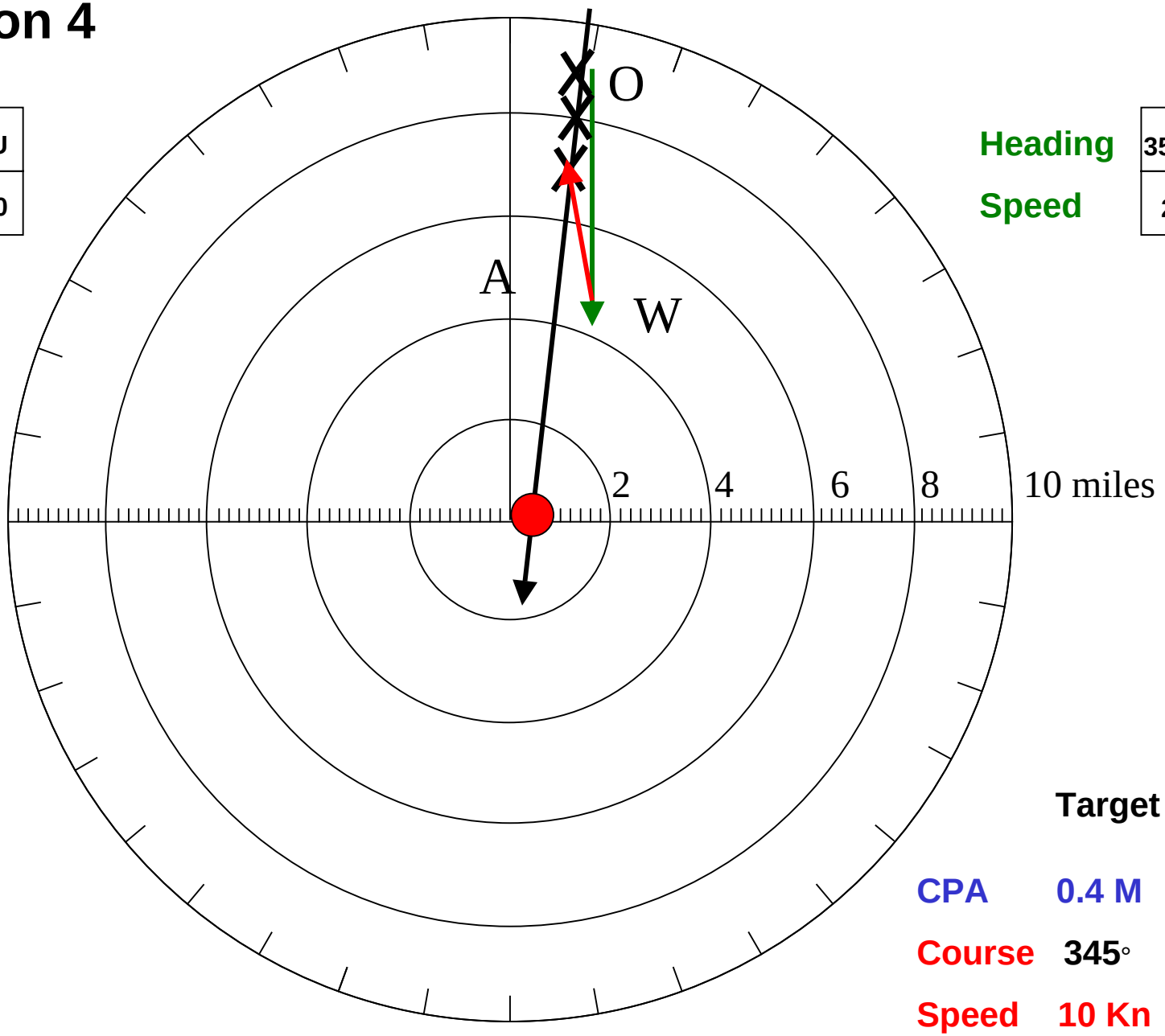
Target

CPA	1.0
Course	060°
Speed	25.0

Question 4

Mode	HU
Range	10

Heading	355°
Speed	20



Distance you travel in 12 minutes

= 20 x 1/5

= 4 miles

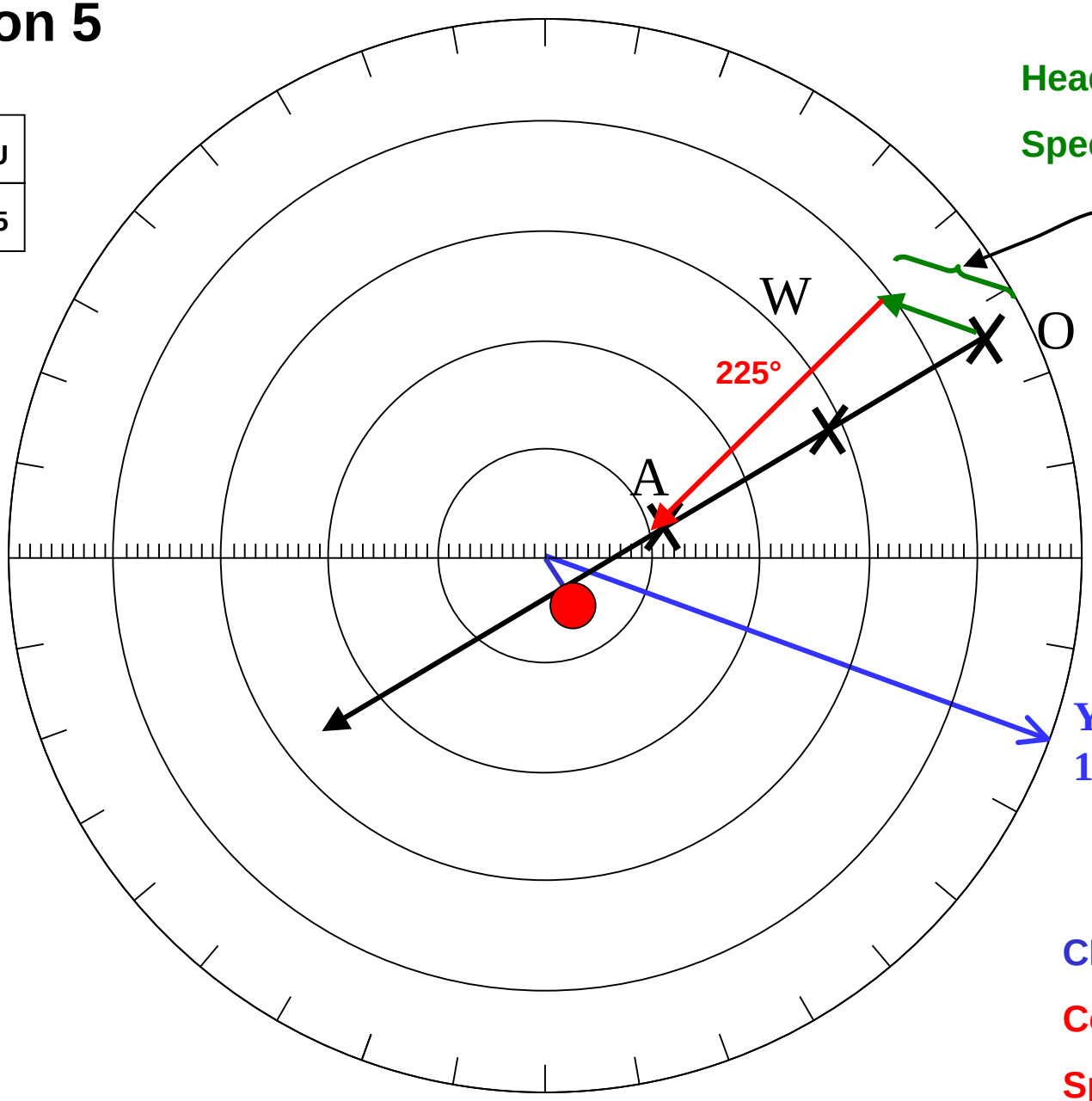
Target

CPA	0.4 M
Course	345°
Speed	10 Kn

Question 5

Mode	NU
Range	5

Heading	110°
Speed	5



Distance you travel in 12 minutes

= 5 x 1/5

= 1 miles

Your heading 110°

Target

CPA	0.2M
Course	225°
Speed	15.0