

The background of the image is a dark gray or black topographic map. It features numerous thin, white contour lines that create a complex, wavy pattern across the entire frame. The lines vary in density and curvature, suggesting a rugged terrain. The overall effect is a textured, abstract background that resembles a map of a mountainous region.

B O L D R E X P E D I T I O N
E N I G M A T H



HOW TO USE THE EXPEDITION ENIGMATH SLIDE RULE BEZEL

Your new BOLDR EXPEDITION ENIGMATH is equipped with a slide rule bezel, offering a variety of analog calculations and measurements to play with. It may be daunting at first glance, but easy to master after a few tries.

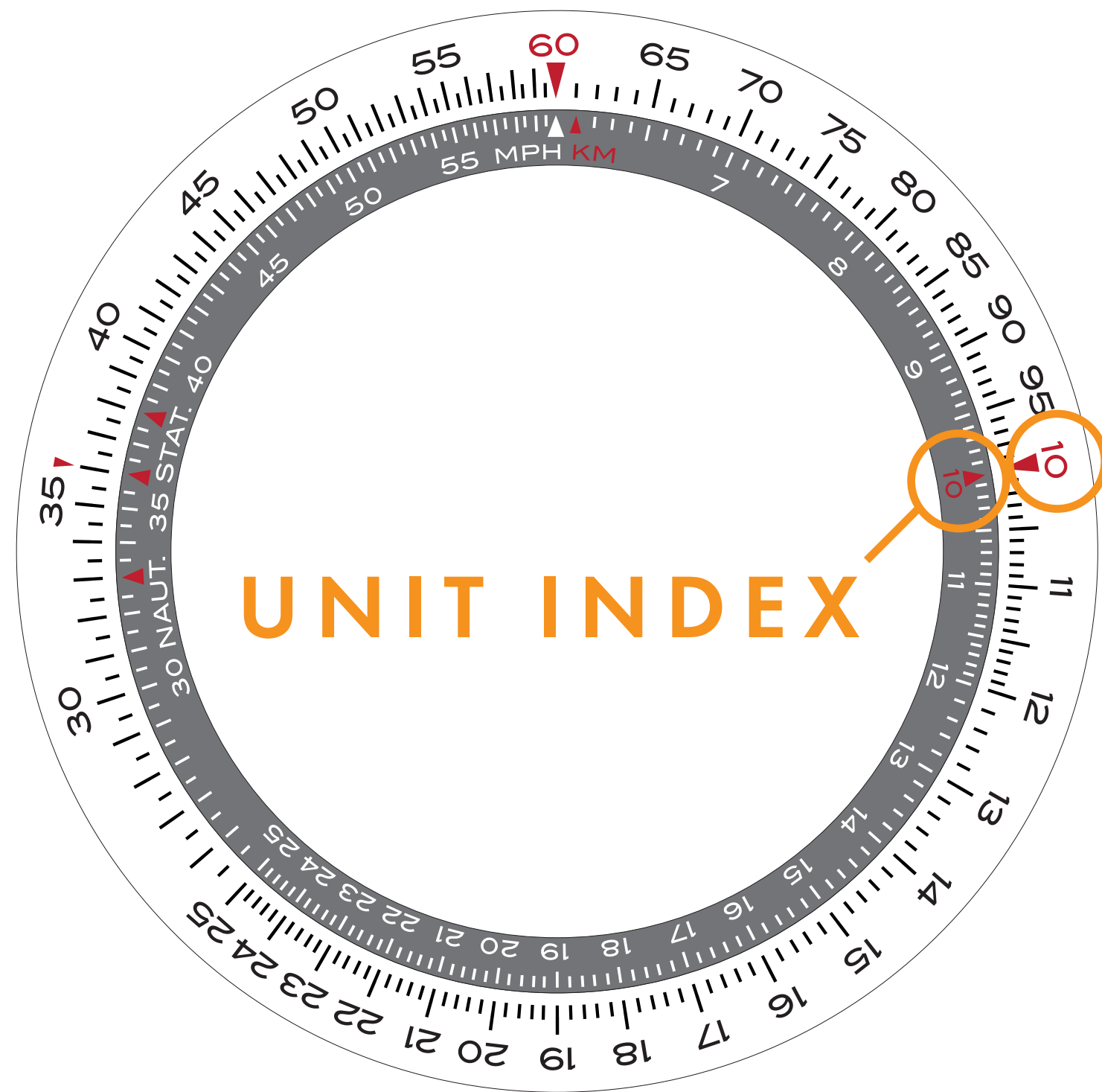
Brief notes before we dive in:

- The red '10' markers on the inner & outer bezels are known as **unit index** markers, our reference points to use the scales.
- Decimal points: If the result of 9×12 reads '10.8' on the scale, we simply adjust decimals to the expected value of above 100. Hence, we read 108.
- Rounding up to the nearest figure may be required. For instance, estimate '948' to be 9.5 on the scale before calculation, then adjust the necessary decimal points after.

1. MULTIPLICATION
2. DIVISION
3. CALCULATING SPEED (MPH)
4. CALCULATING SPEED (KPH)
5. CALCULATING TRAVEL TIME
6. CALCULATING TRAVEL DISTANCE
7. CONVERTING MILES TO KILOMETERS

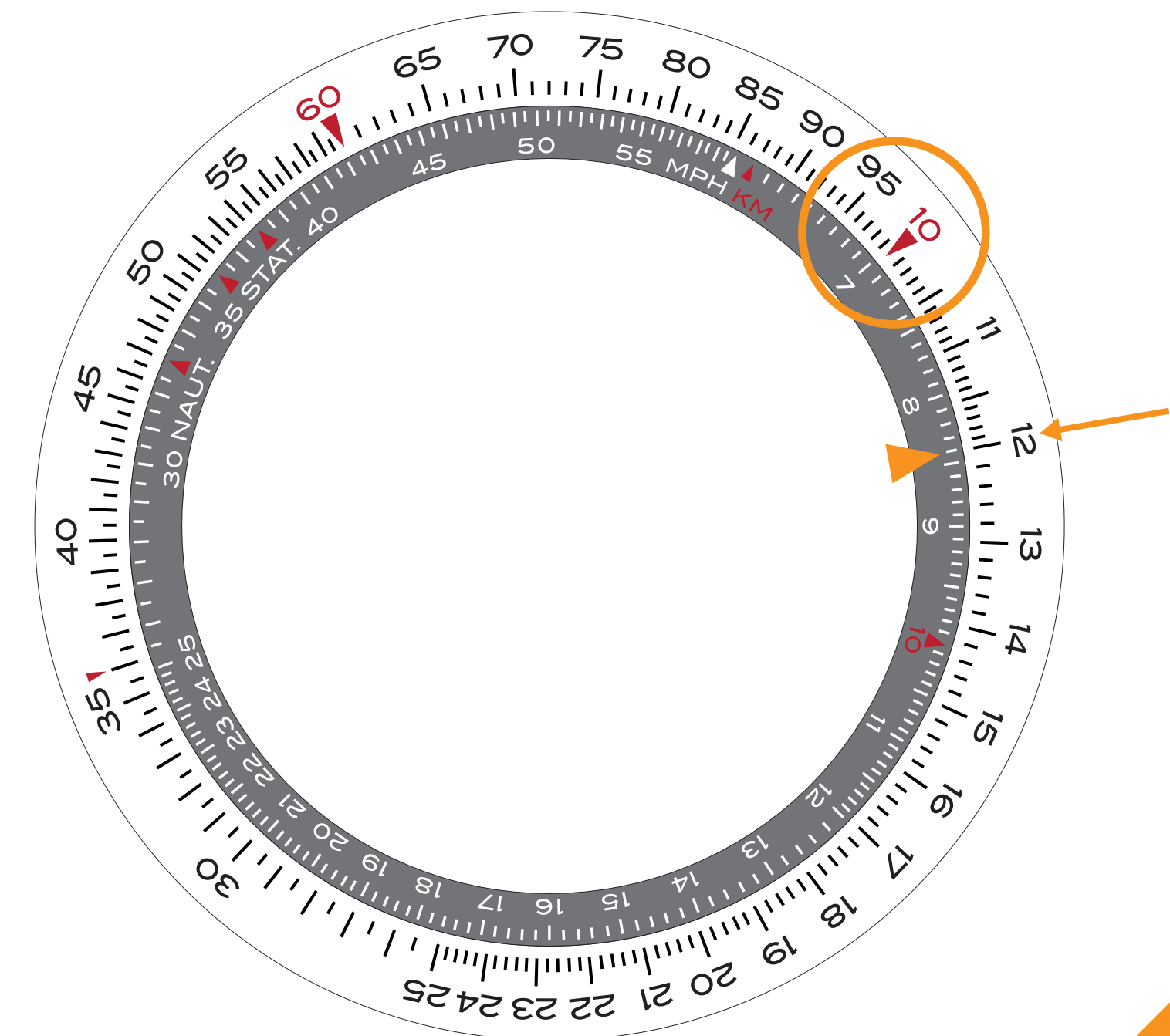
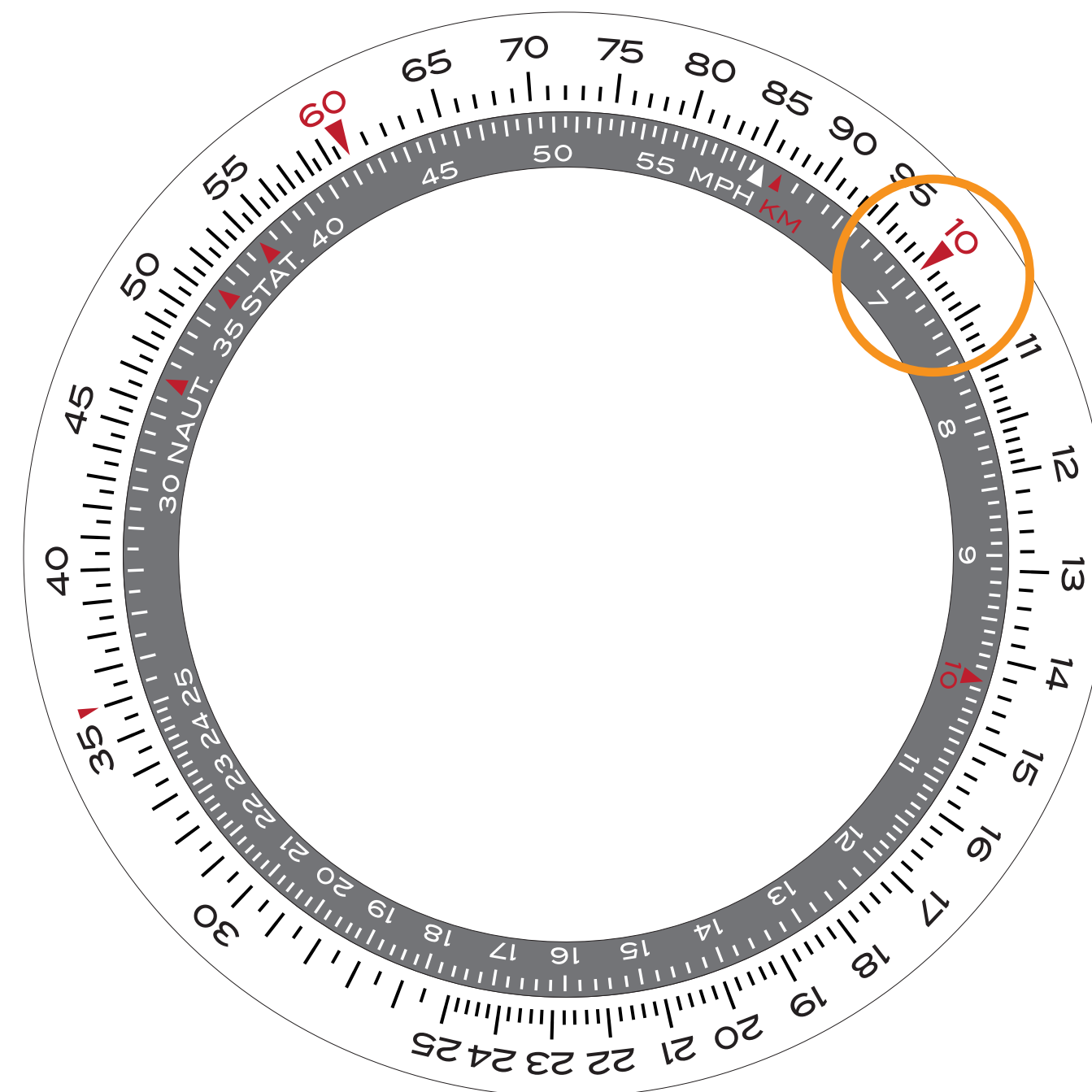
8. CONVERTING KILOMETERS TO MILES
9. CALCULATING FUEL (CONSUMPTION)
10. ASCENT/DESCENT (CLIMB RATE)
11. ASCENT/DESCENT (GROUND DISTANCE)
12. NAUTICAL AND STATUTE MILE CONVERSION

MULTIPLICATION



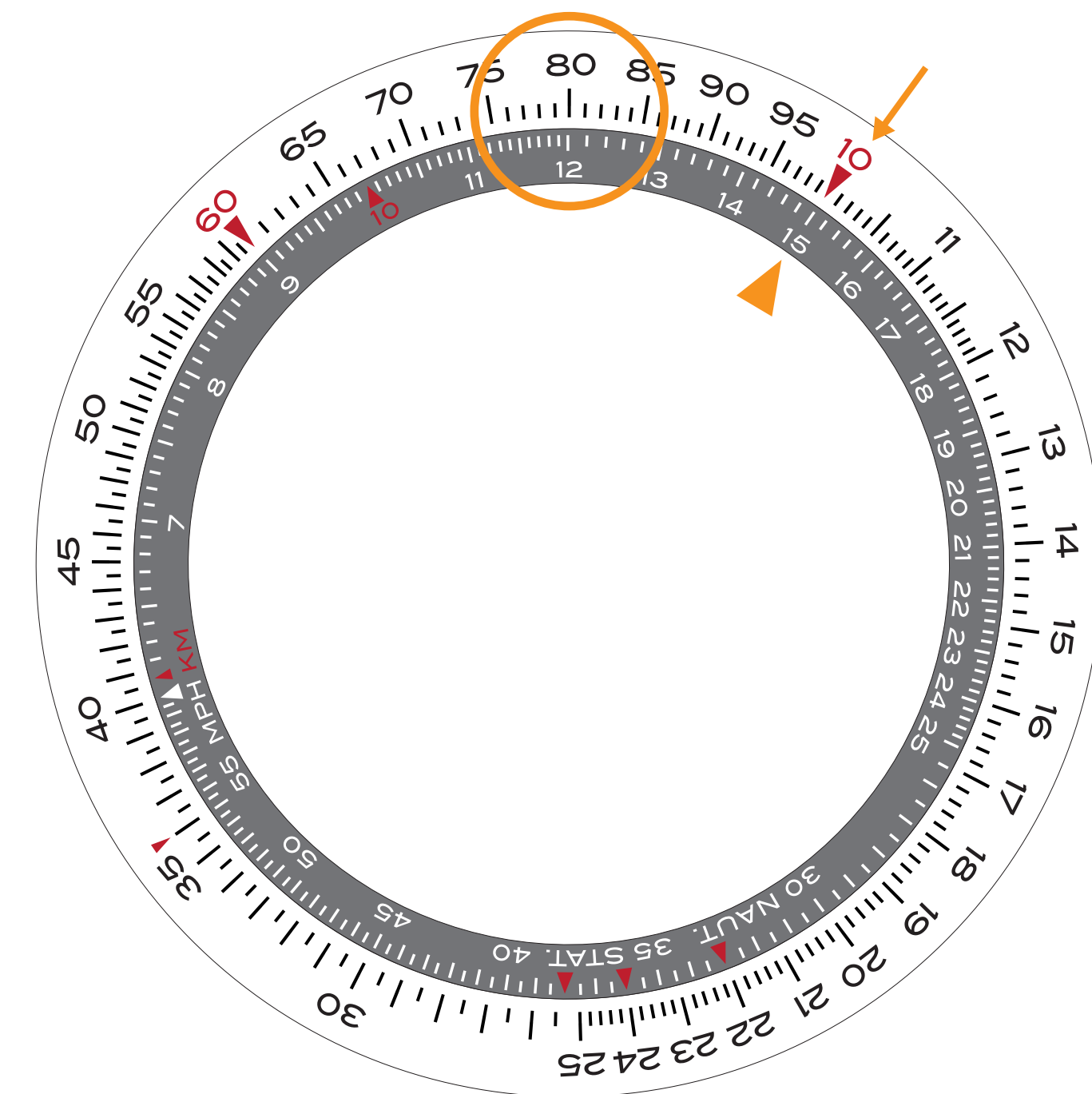
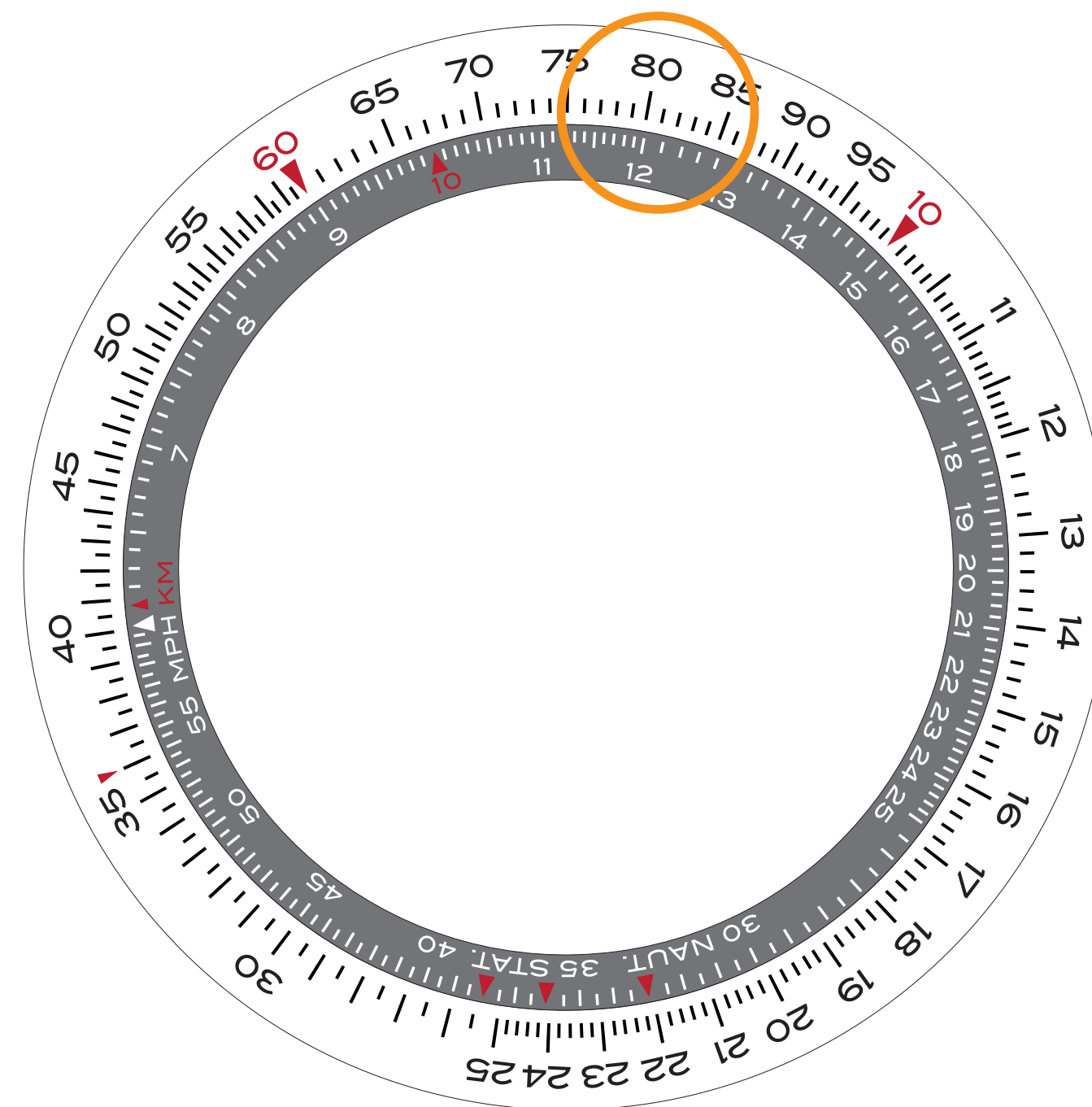
Consider an example of 7×12 . Set the **unit index** on the outer scale opposite '7' on the inner scale. The bezel is now aligned to all multiples of 7.

Read the answer opposite '12' on the outer bezel, which is '8.4' on the inner scale, 84 after adjustment.



DIVISION

Let's take a division example of 120 by 8. Place '12' (representing 120) on the inner scale opposite '80' (representing 8) on the outer scale. Read the number opposite the outer **unit index** to get the answer 15.

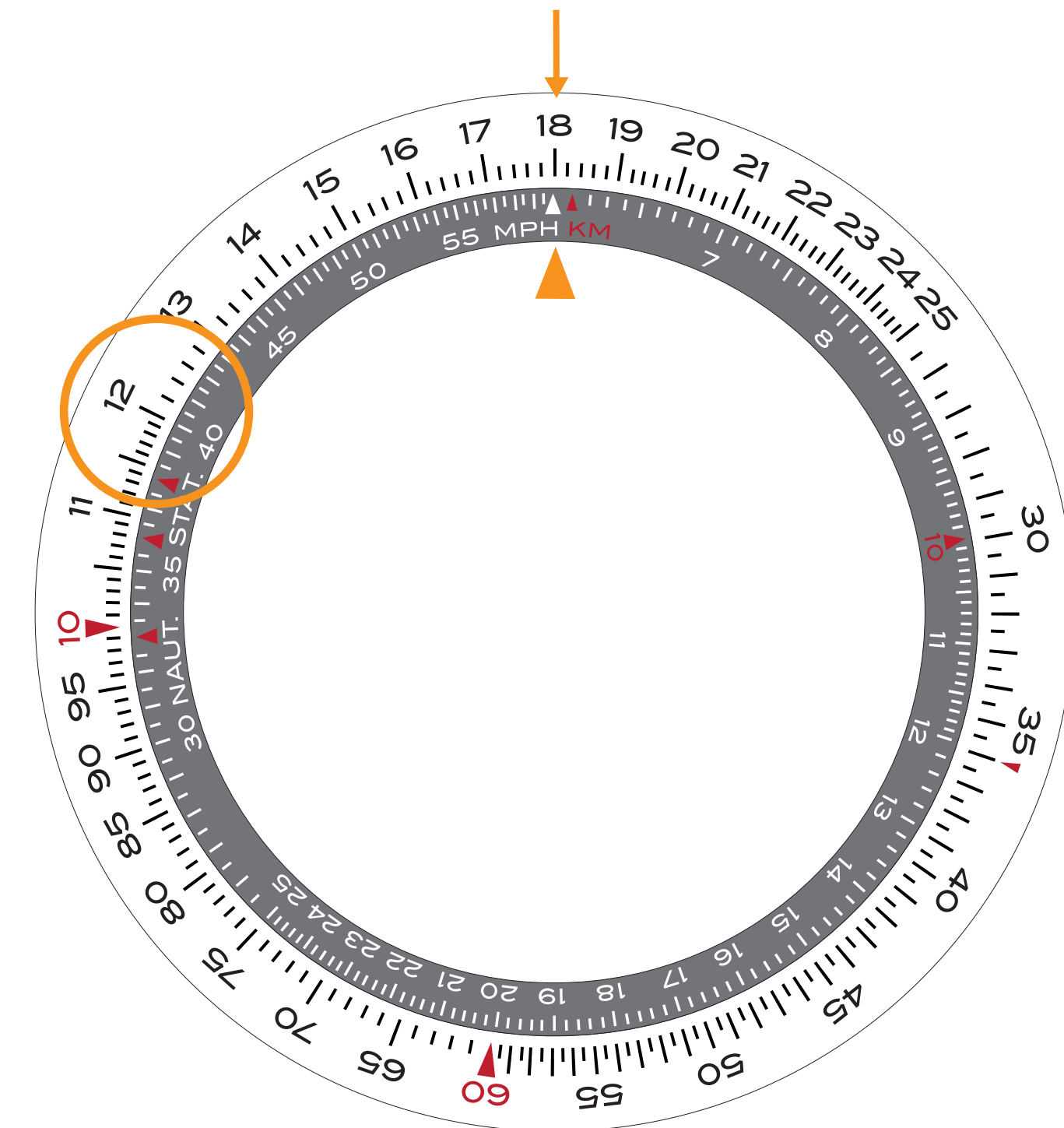
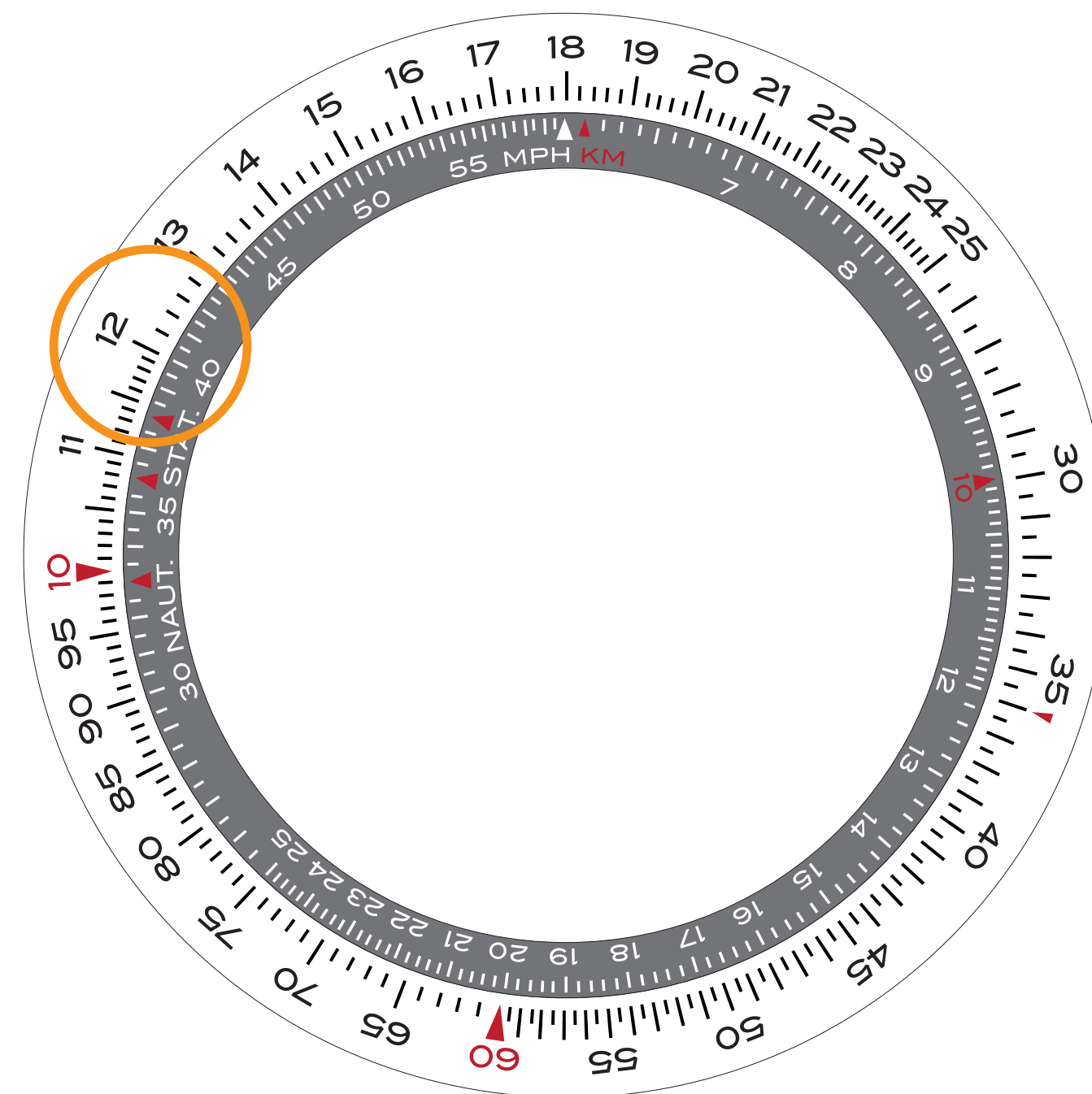


CALCULATING SPEED (MPH)

In order to calculate speed, we will require the values of time and distance.

Example: Given distance traveled = 120 miles over a time of 40 minutes, what is the ground speed?

Align '12' on the outer scale (representing 120) opposite '40' on the inner scale. Read the speed at the 12 am / pm marker, which shows 18. Adjust decimals to 180 miles per hour.

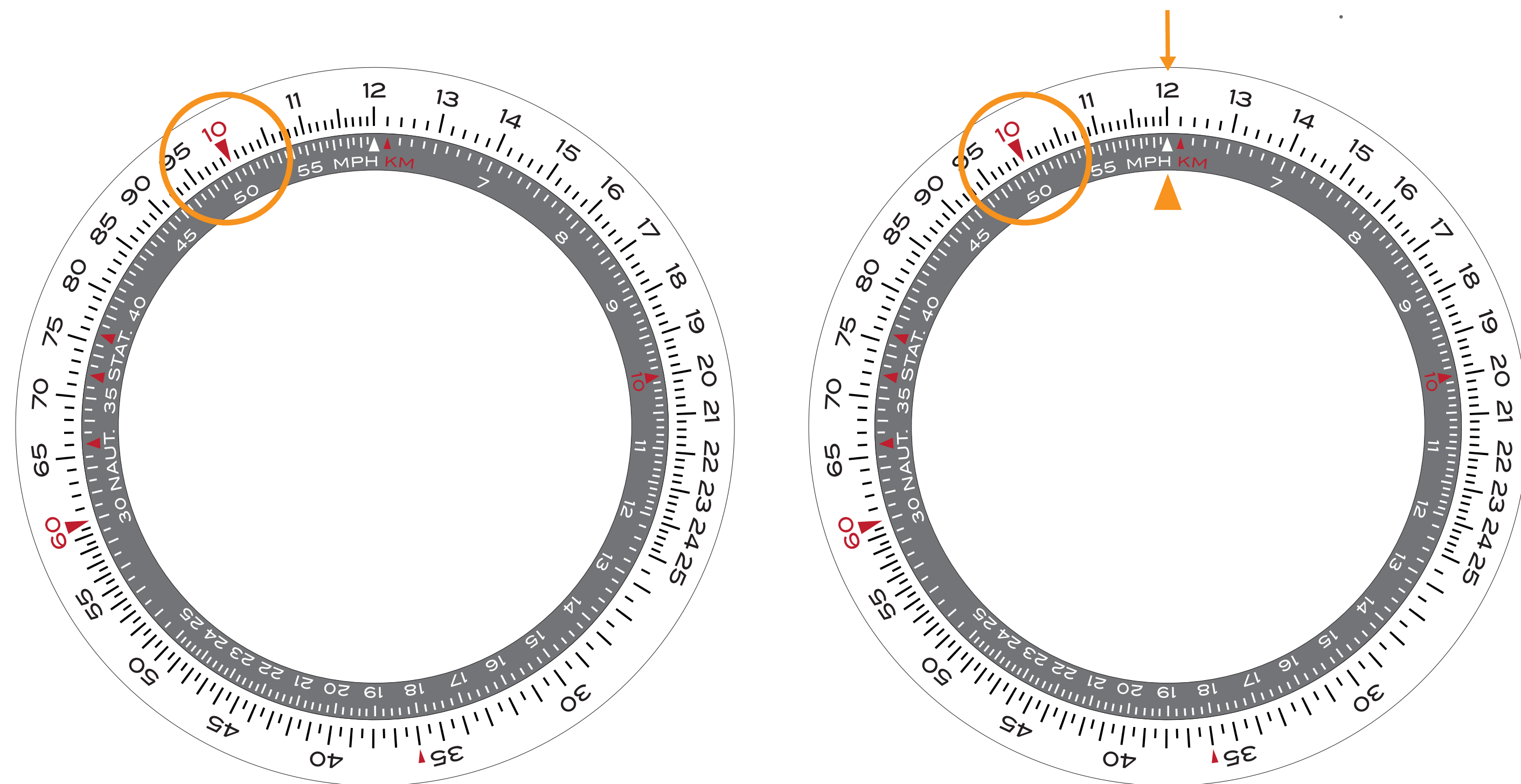


CALCULATING SPEED (KPH)

The same principle is used to calculate ground speed in kilometers per hour, given the values of time and distance.

Example: Suppose distance traveled = 100 kilometers over 50 minutes, what is the ground speed?

Align '10' on the outer scale (representing 100 km) opposite '50' on the inner scale. Read the speed at the 12 am/pm marker, which shows 12. Adjust decimals to 120 kilometers per hour.

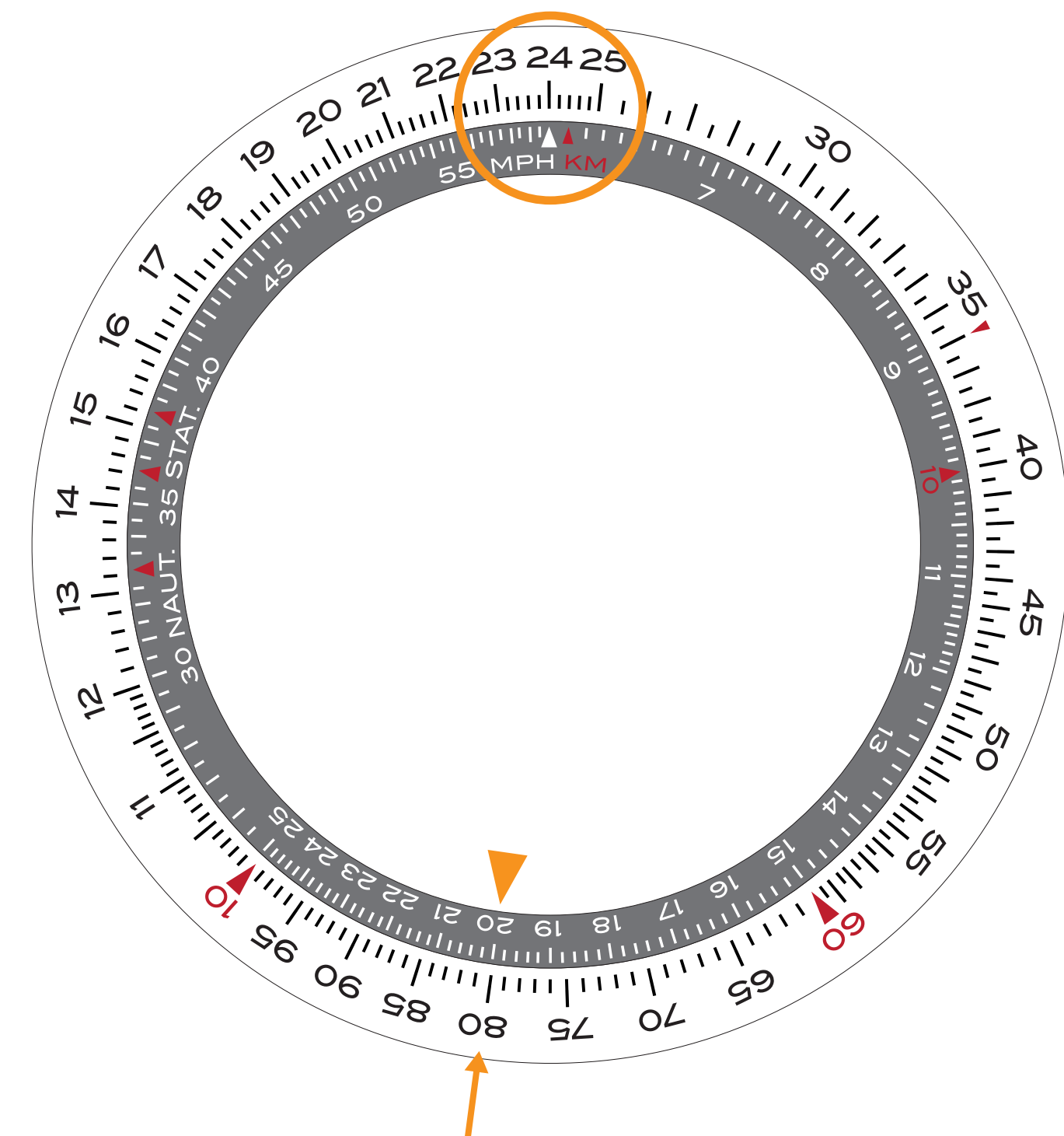
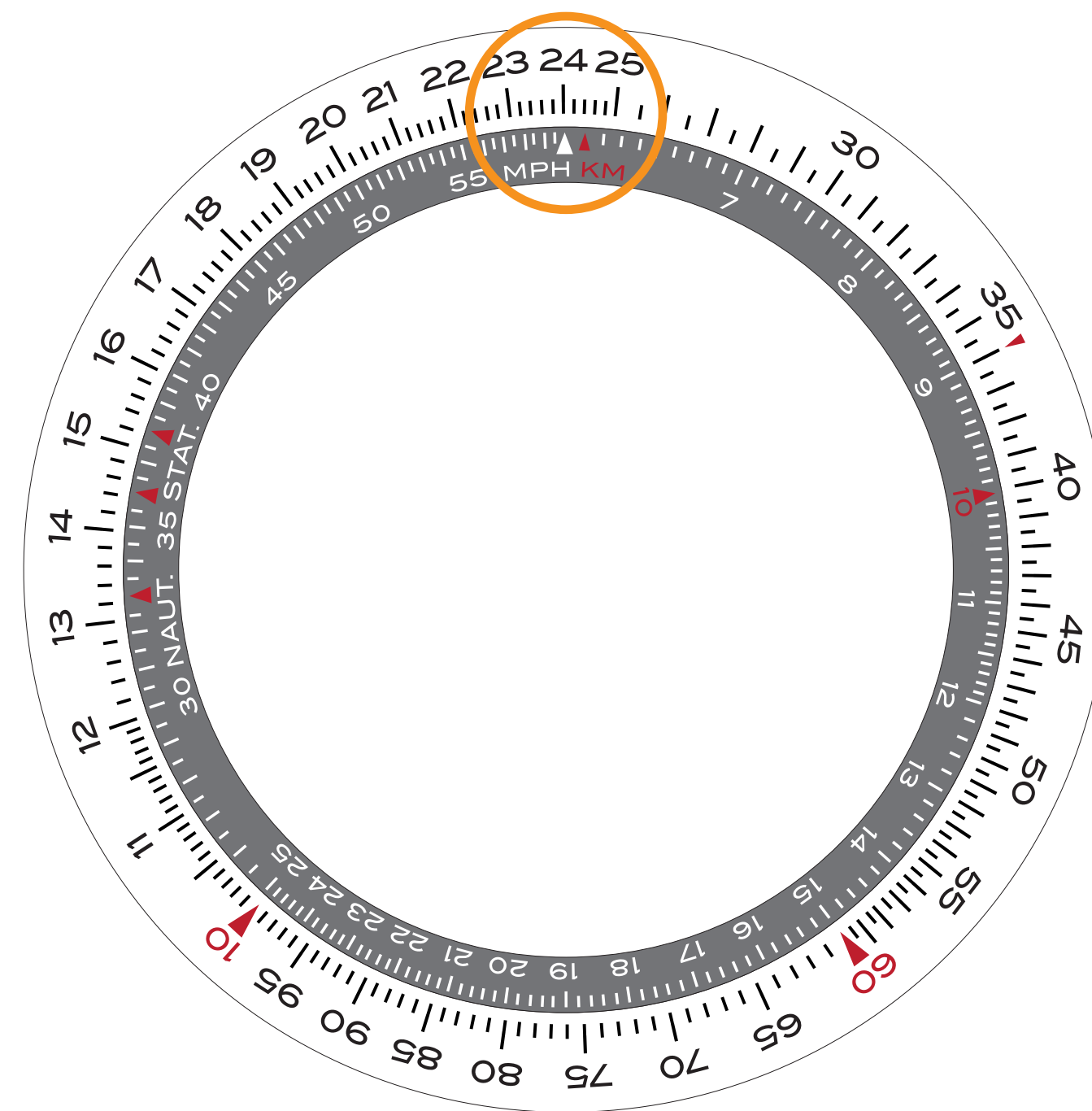


CALCULATING TRAVEL TIME

To calculate travel time, we will require values of distance and speed.

Example: Given distance traveled = 80 km at a speed of 240 kilometers per hour, what is the travel time?

Align '24' (representing 240 km/h) on the outer scale to the 12 am / pm marker. Locate '80' on the outer scale and read the corresponding inner scale value. The answer is '20', indicating 20 minutes.



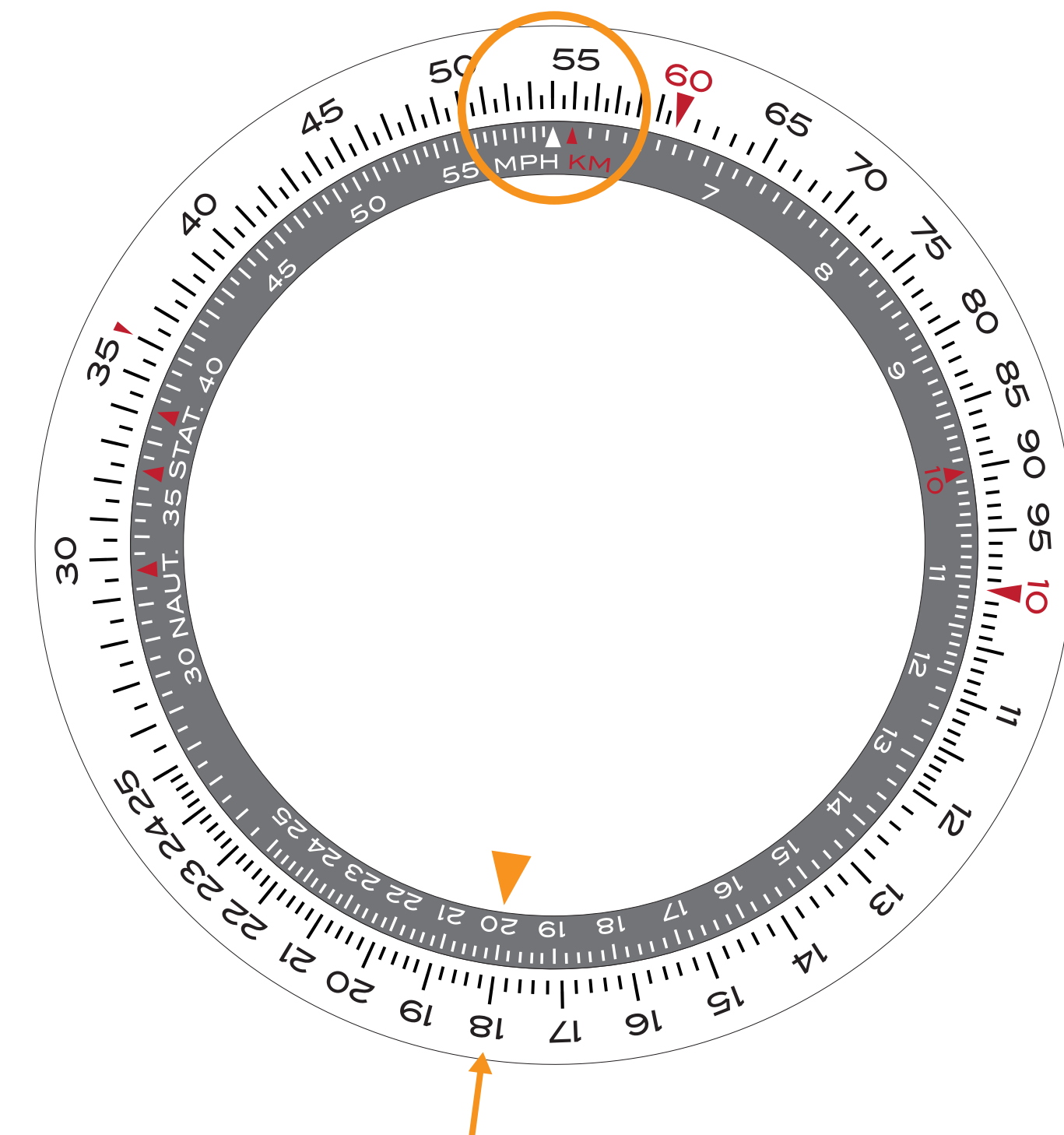
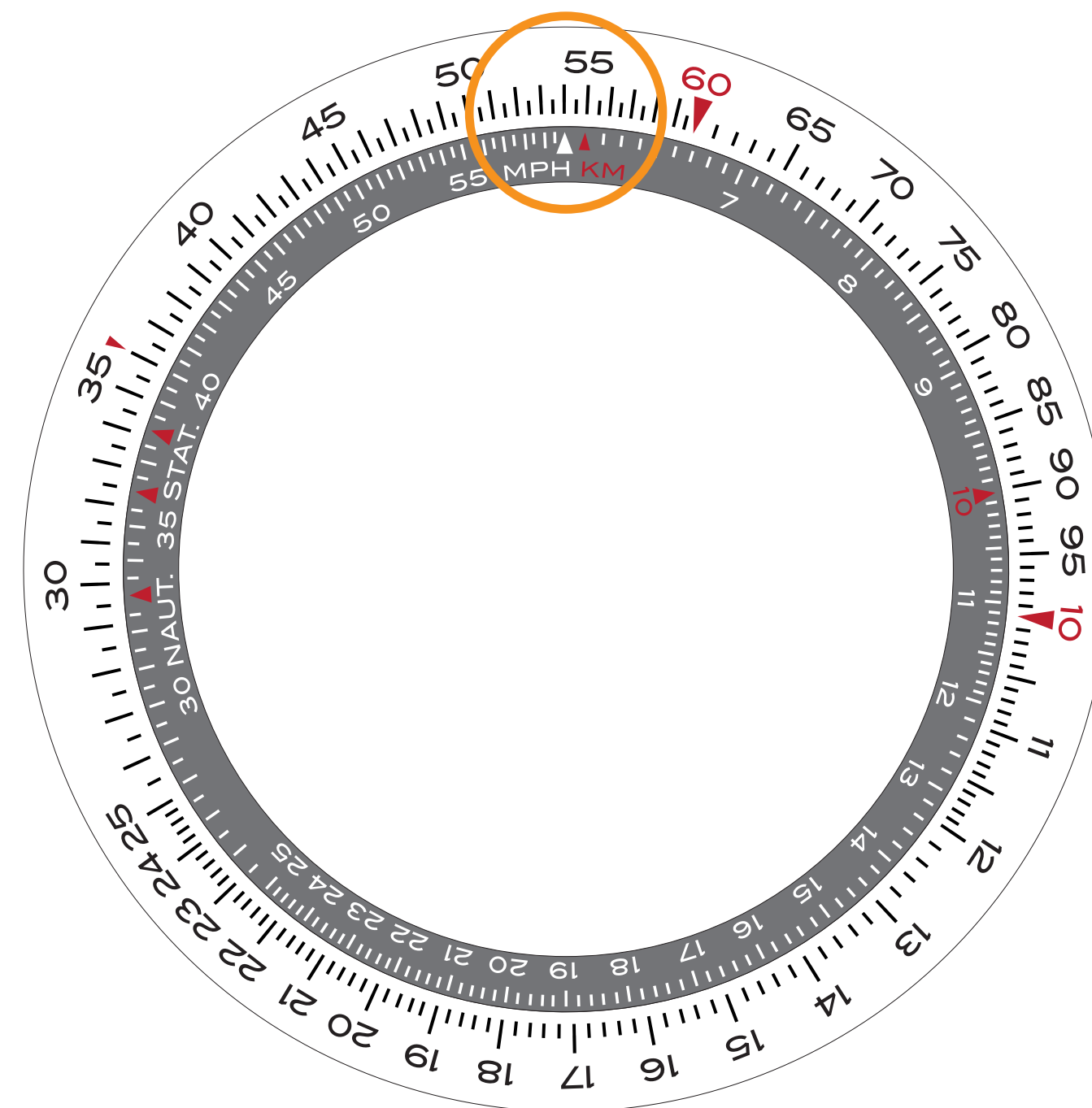
CALCULATING DISTANCE

To calculate distance, we will require values of time and speed.

Example: Given time traveled = 20 minutes at a speed of 540 miles per hour, what is the distance?

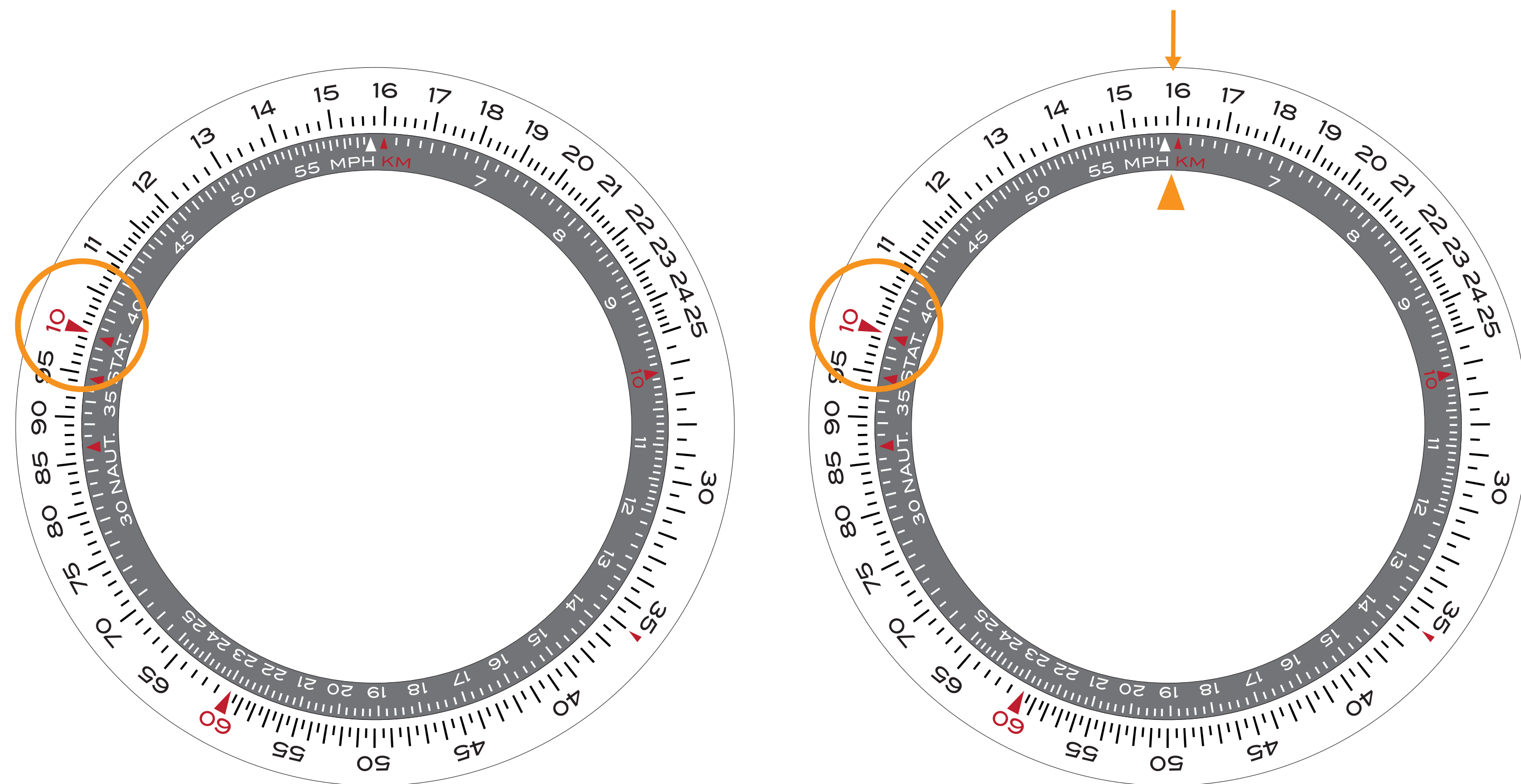
Align '54' (representing 540) on the outer scale to the 12 am / pm marker. Locate '20' on the inner scale and read the corresponding outer scale value. The answer is '18', indicating 180 miles.

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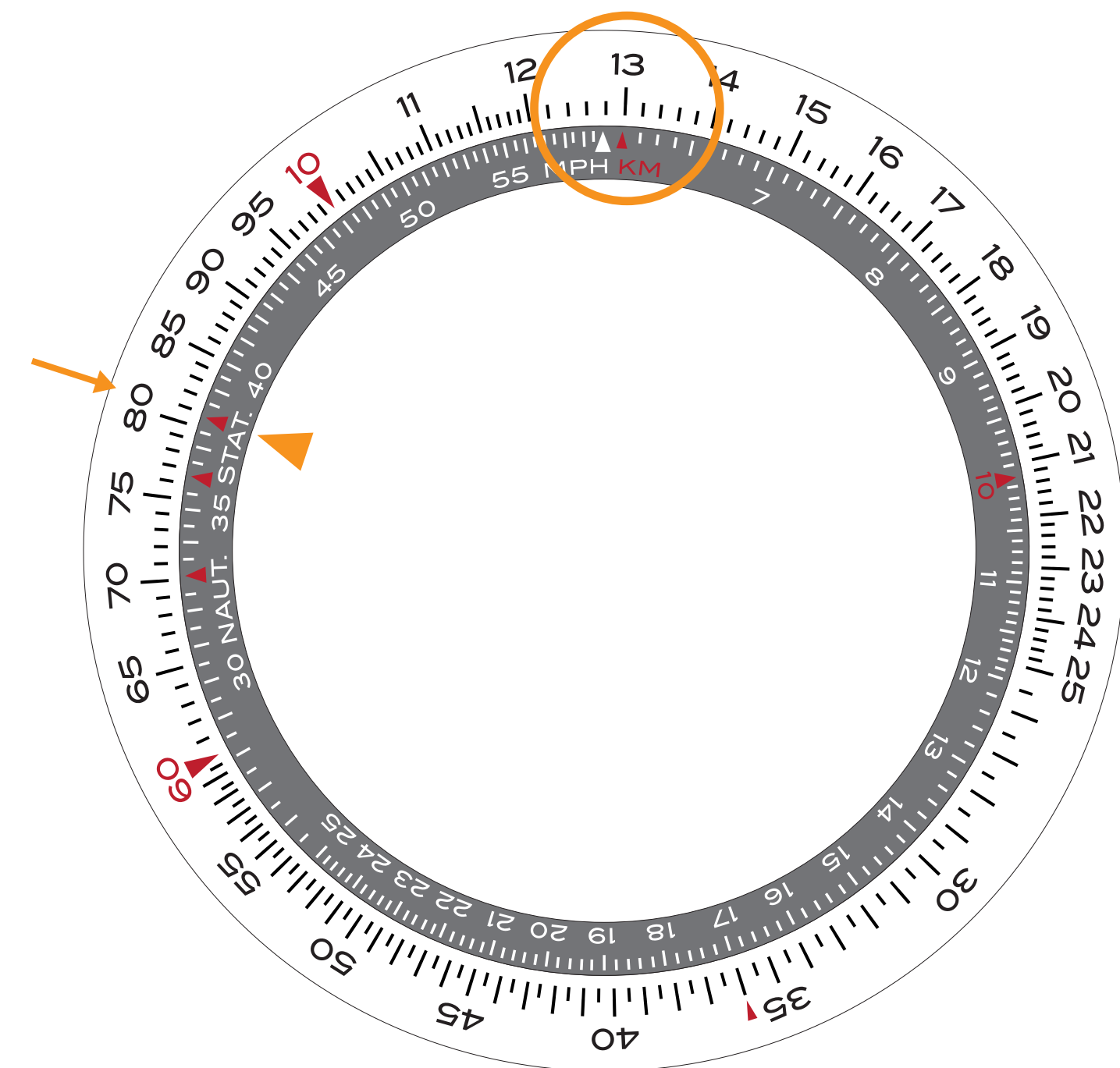
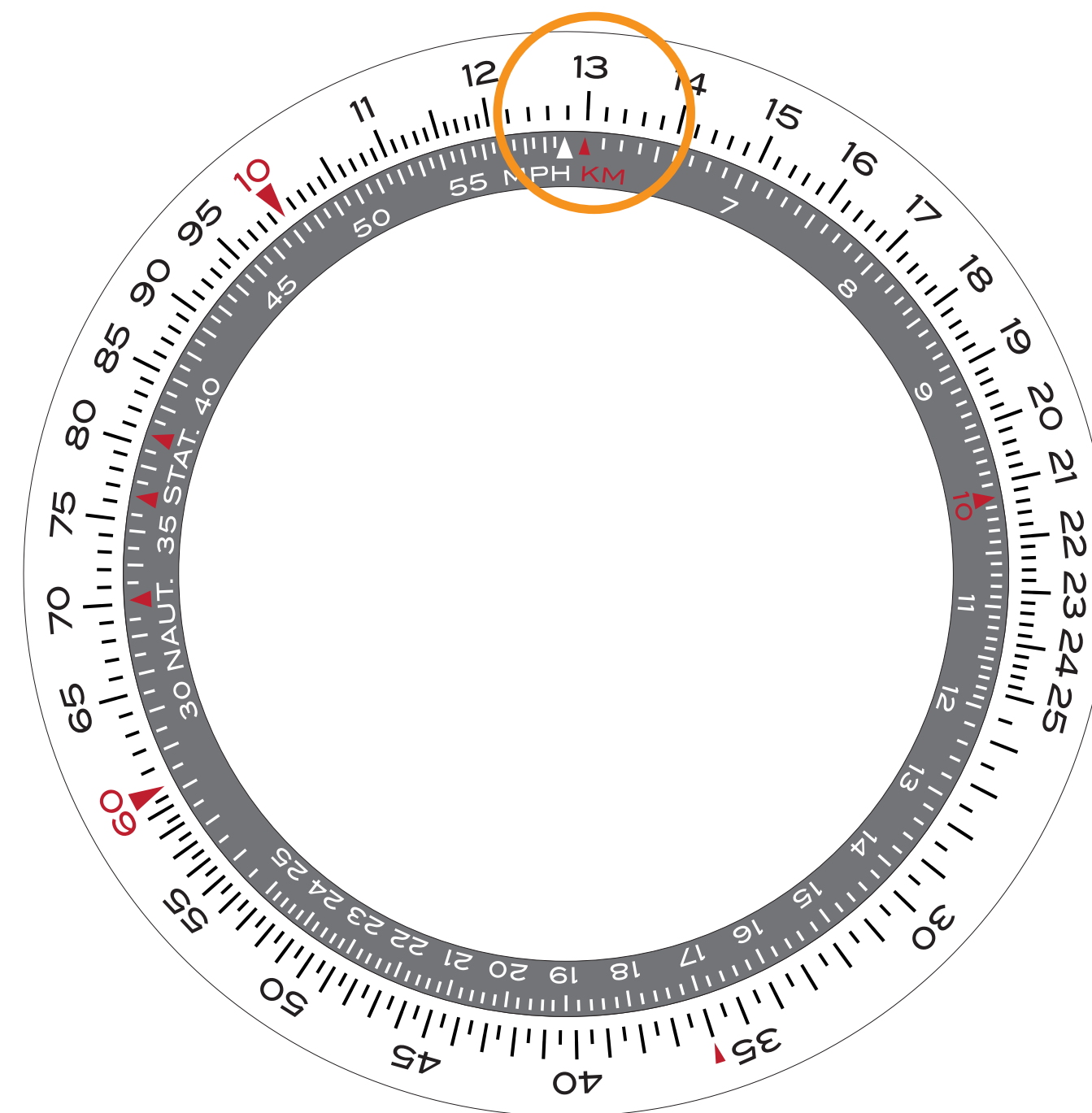
CONVERTING MILES TO KILOMETERS

Let's convert 100 miles to kilometers. Align '10' (representing 100) on the outer scale with the STAT marker on the inner scale. Read the **KM** value at the 12 am / pm mark. It shows '16', which we know to mean 160 kilometers.



CONVERTING KILOMETERS TO MILES

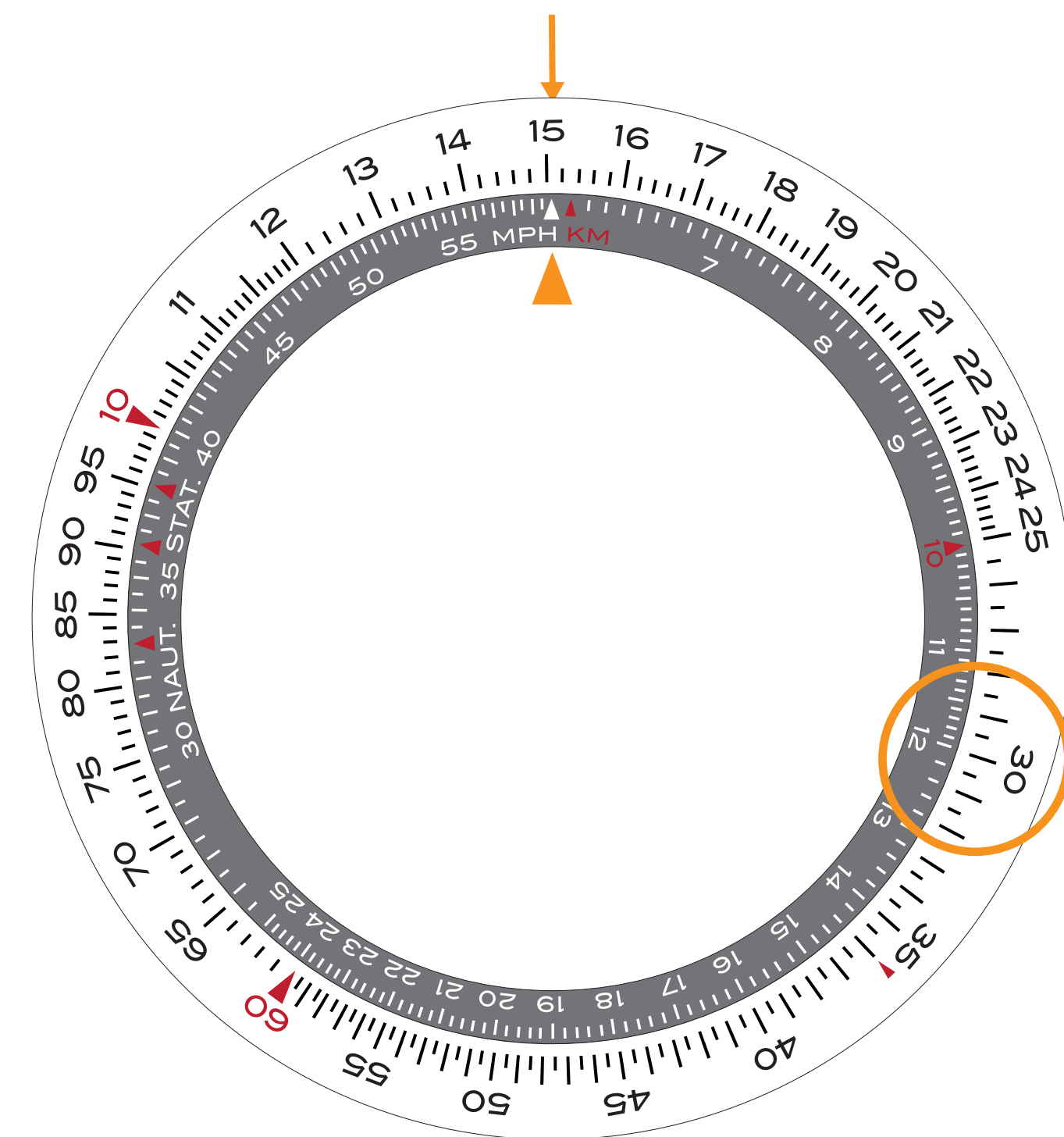
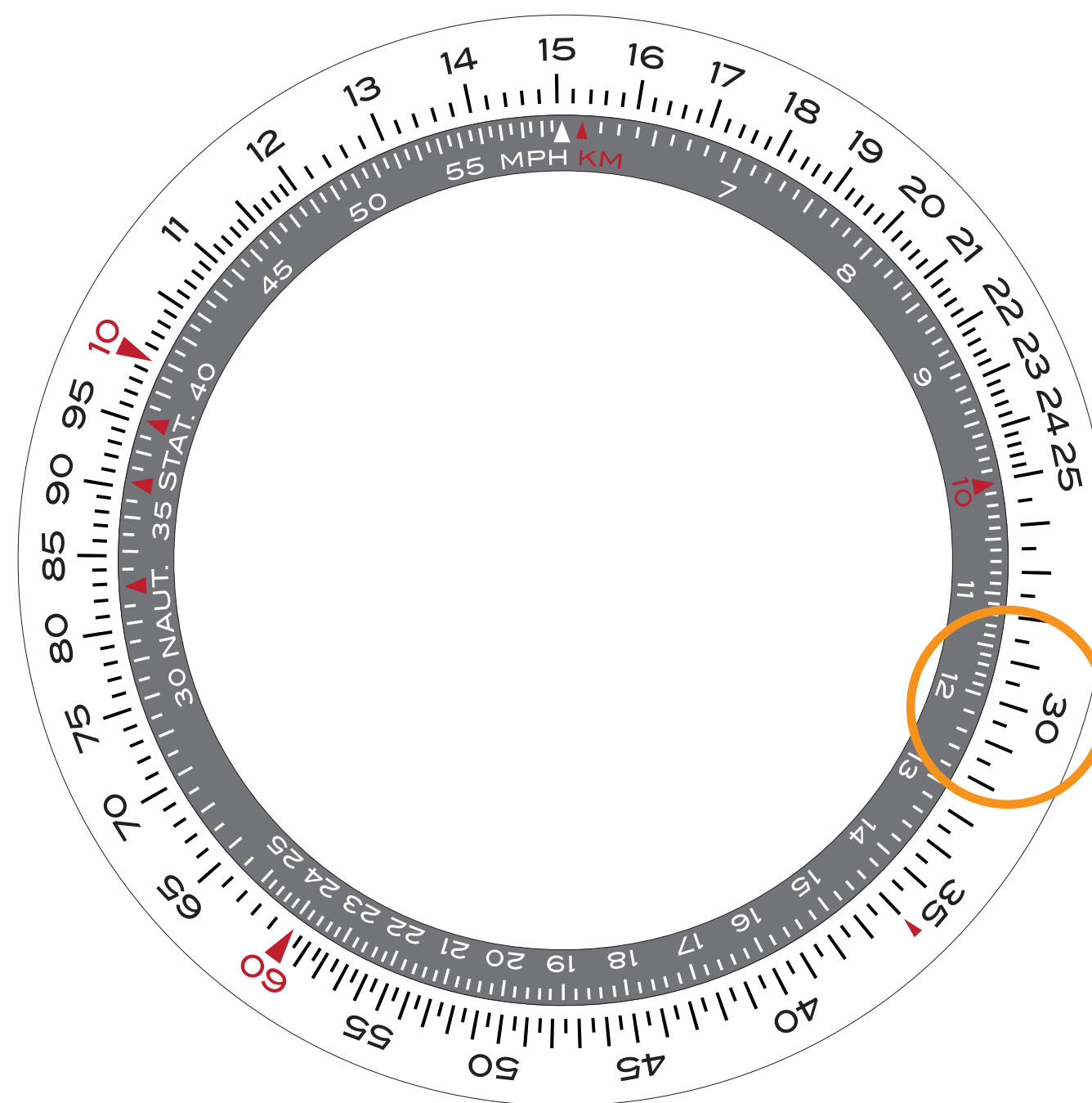
Let's convert 130 kilometers to miles. Align '13' (representing 130) on the outer scale with the KM marker on the inner scale. Read the value at the STAT indicator, approx 80.7 miles.



FUEL (CONSUMPTION)

What is our fuel consumption, given the usage of 30 gallons over 120 minutes?
(Note that the answer is read 'per hour').

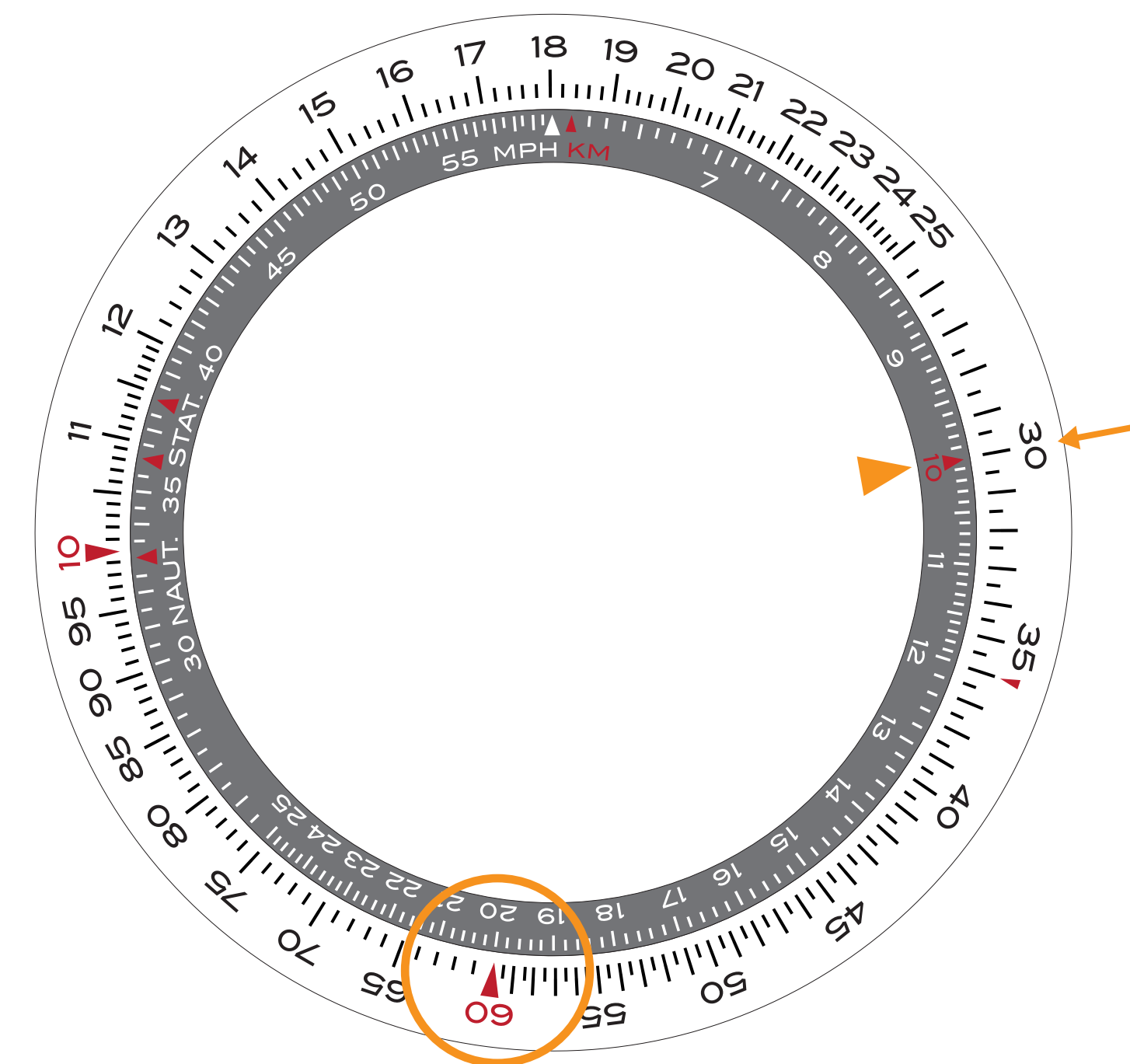
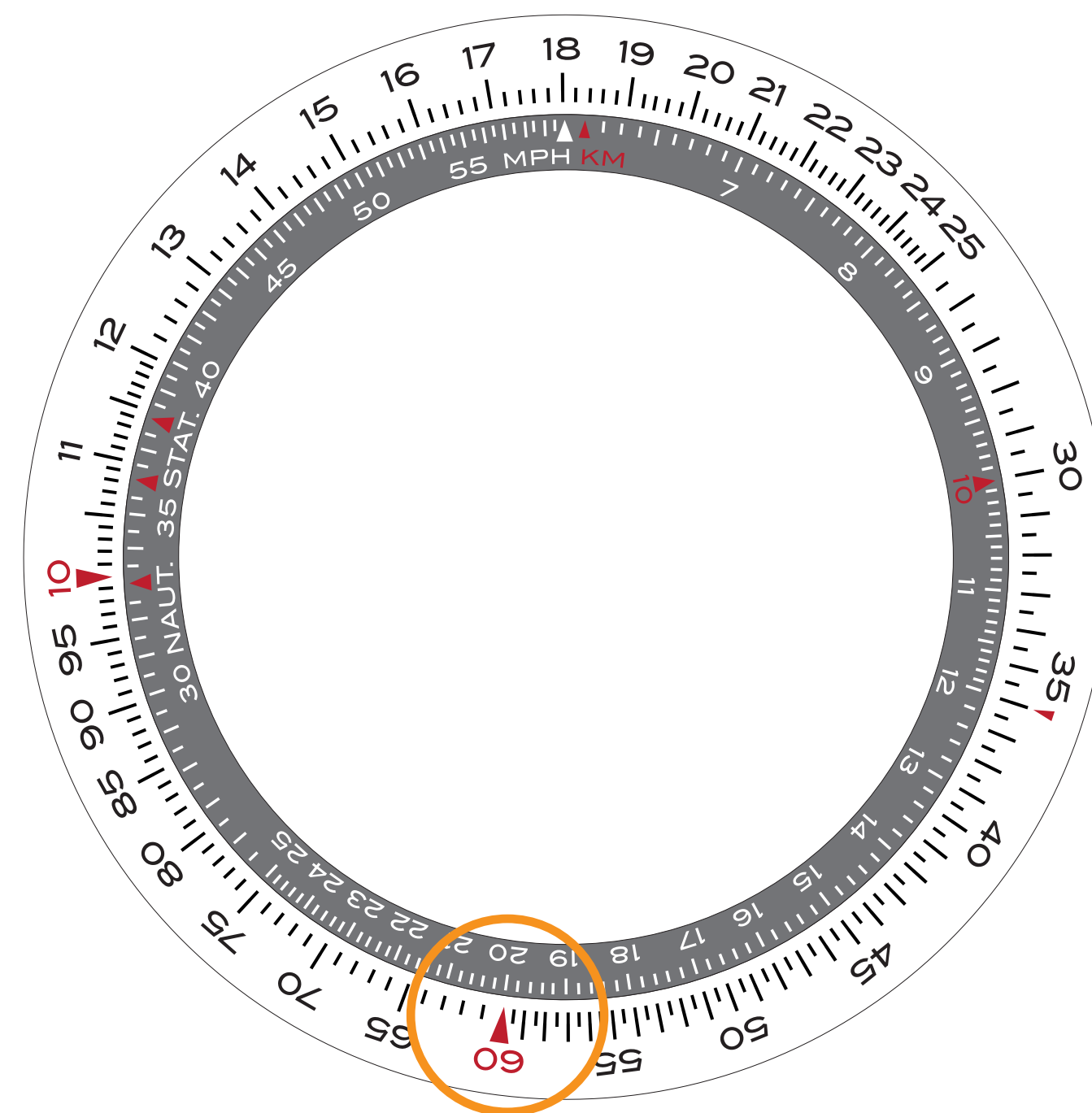
Align '30' on the outer scale with '12' on the inner scale (representing 120 minutes).
Read the result '15' at the 12 am / pm marker, indicating consumption of 15 gallons per hour.



AIRCRAFT ASCENT/ DESCENT (CLIMB RATE)

Let's take an example of ascent, or the climb rate of an aircraft,

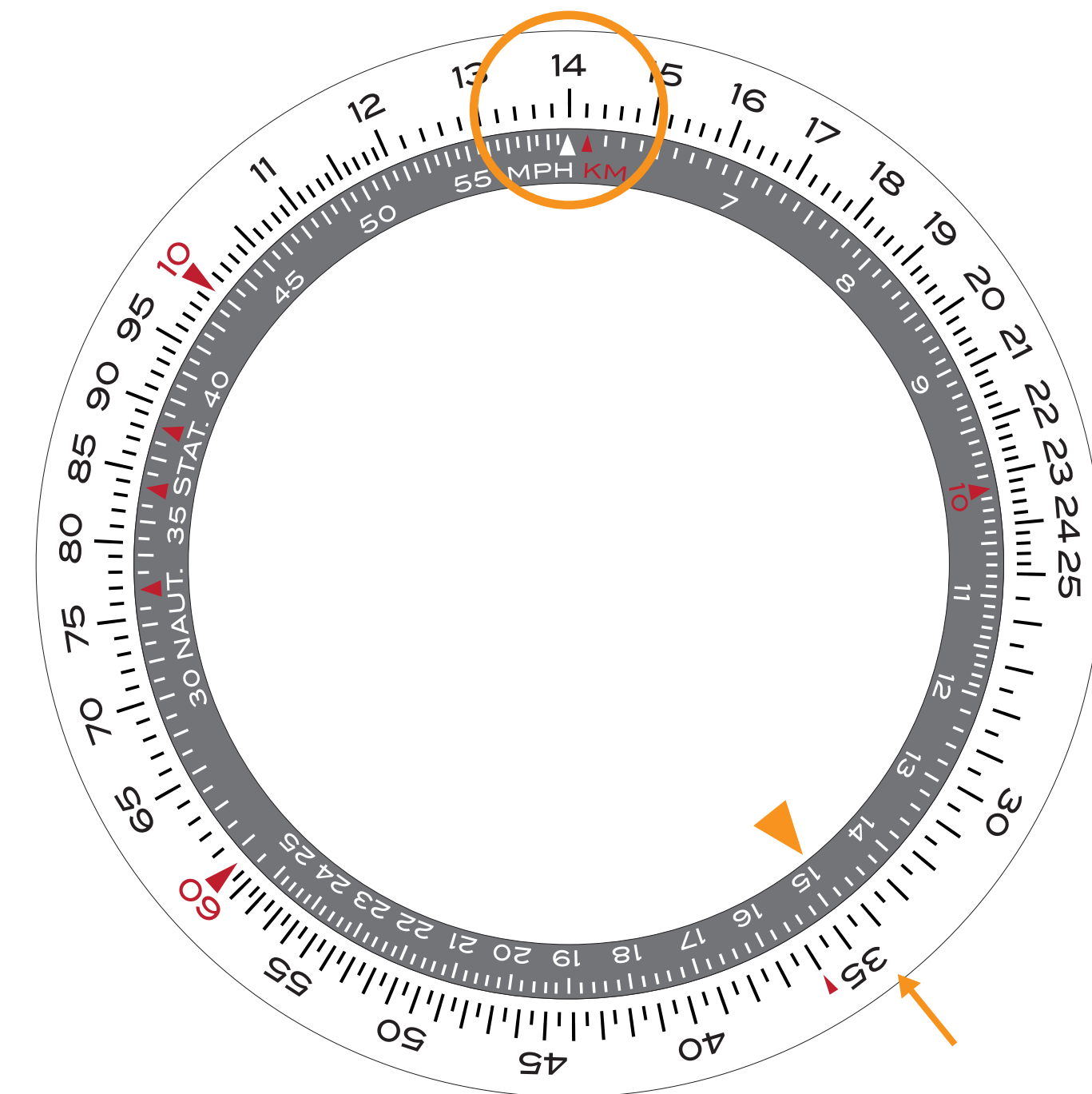
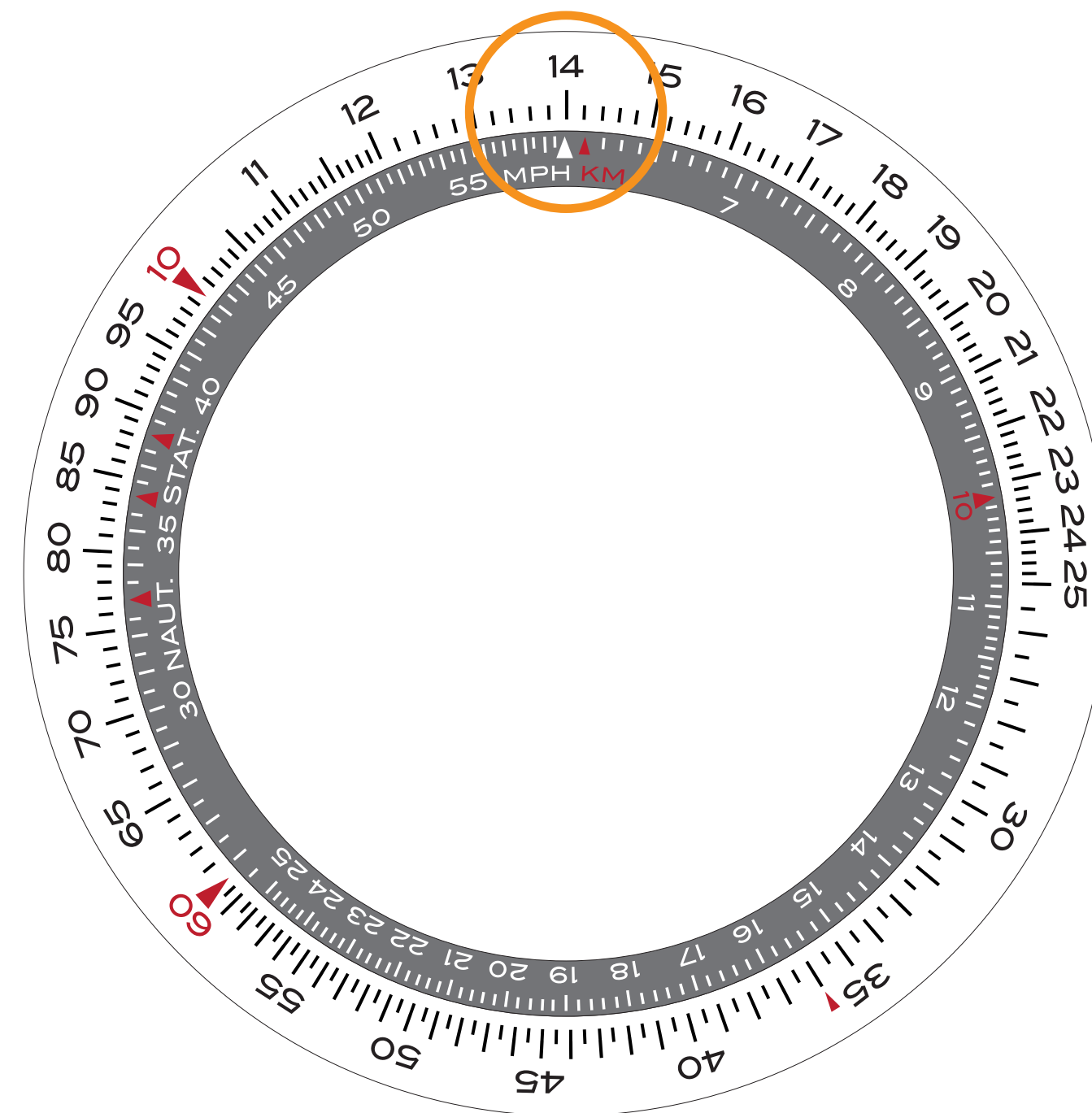
Using given values of 6000 feet over 20 minutes, align '60' (representing 6000 feet) on the outer scale with 20 on the inner scale. Read the value opposite the inner scale unit index '10' which is '30'. This indicates an ascent rate of 300 feet per minute.



AIRCRAFT ASCENT/ DESCENT (GROUND DISTANCE)

During an aircraft's descent, how much ground distance is covered over 14.8 minutes at an average speed of 120 mph, aided by a tail wind of 20 mph?
Total average speed is $120 + 20 = 140$ mph.

Aligning 14 on the outer bezel (representing 140 mph) opposite MPH at the 12 am / pm marker, read 14,8 on the inner scale to get a distance of 34,5 miles on the outer scale.



NAUTICAL AND STATUTE MILE CONVERSION

Let's convert 60 statute miles to nautical miles. Set '60' on the outer bezel opposite the 'STAT' indicator on the inner scale. Now read the outer scale value opposite the 'NAUT' indicator, which shows '52', our answer in nautical miles.

