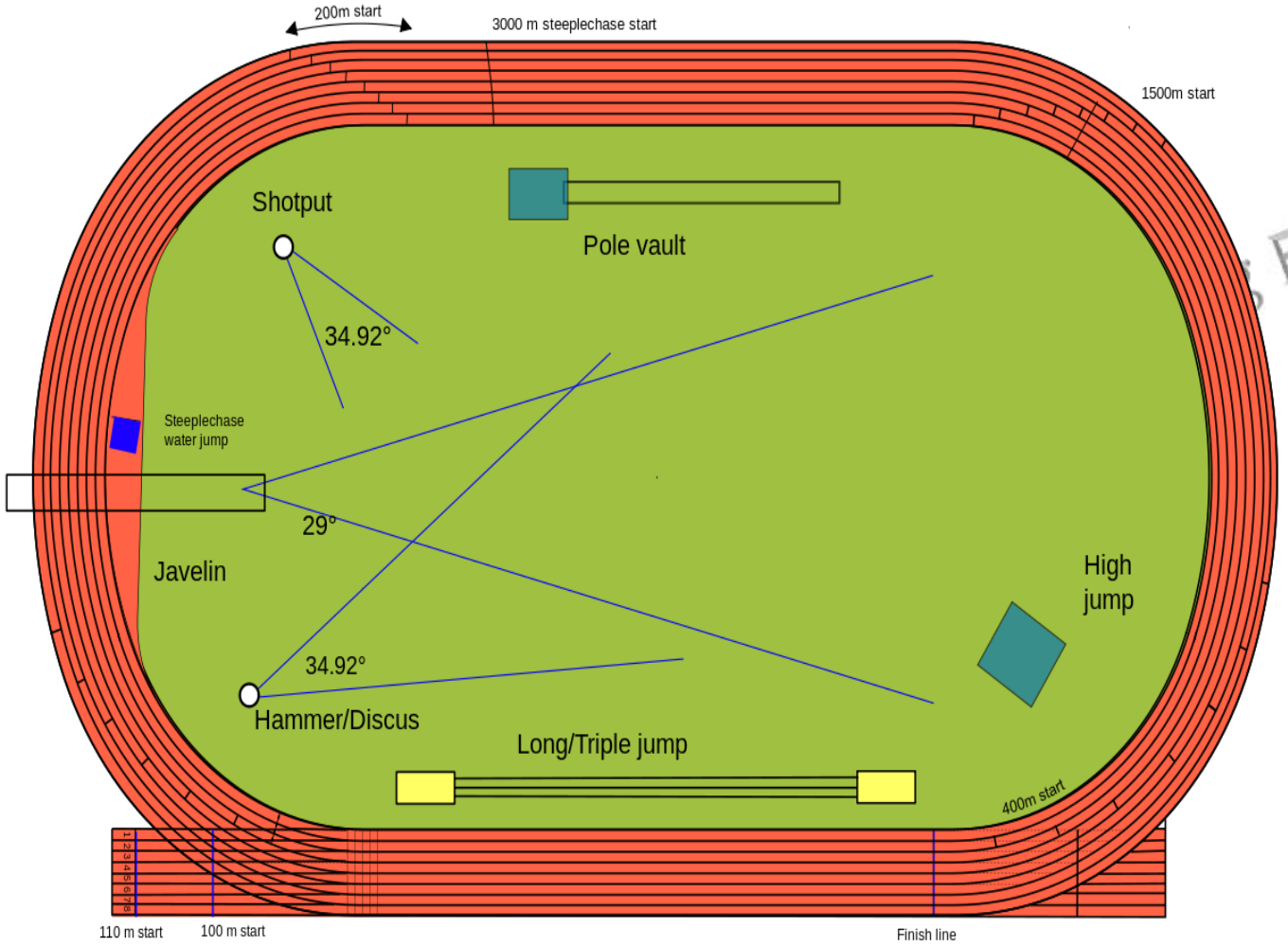
Fun Learning Education

Athletics

Track

Standard Track- 400m



Oval Shaped

North ⟷ South

Number of lane- 8 lane

Width of lane- 1.22m

1.21- 1.23m

Width of line- 5cm

Fun Learning
Education

400m Track Track

Total Track = 2 straight +2 curve

400m = 2 x 84.39m +2 curve

400m = 168.78 + 2 curve

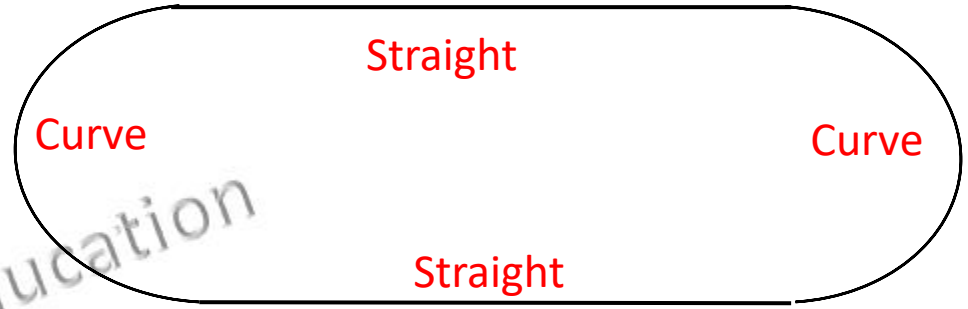
400m - 168.78 = 2 curve

231.22m = 2 curve

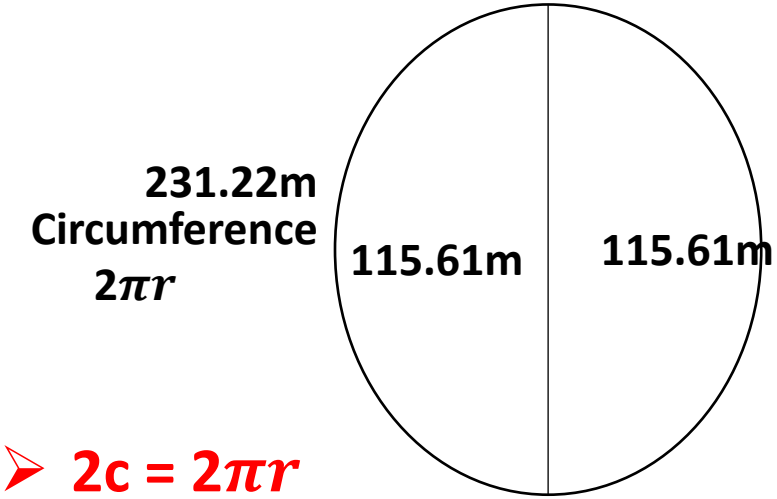
2 curve = 231.22m

$$\text{curve} = \frac{231.22\text{m}}{2} = 115.61\text{m}$$

400m Track



Straight - 84.39m



➢ **$2c = 2\pi r$**

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Radius

$2c = 2\pi r$

$231.22m = 2x \frac{22}{7} X\ r$

$231.22m = \frac{44}{7} r$

$\frac{231.22 \times 7}{44} = r$

Running radius(RR) = 36.785m or **36.80m**

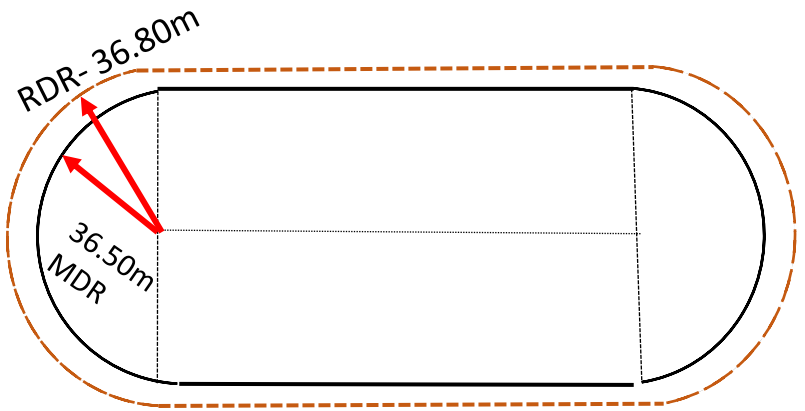
Marking radius(RR) = R.R – 30cm

= 36.785m -30cm

= 36.485m Or 36.50m

➢ $\pi = \frac{22}{7}$ **Or 3.14**

- **Raised Border- 30cm**
- **Non- Raised Border- 20cm**



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Minimum field required for 400m Standard track

Total Length of track = Straight + 2r + 2 (8x1.22)

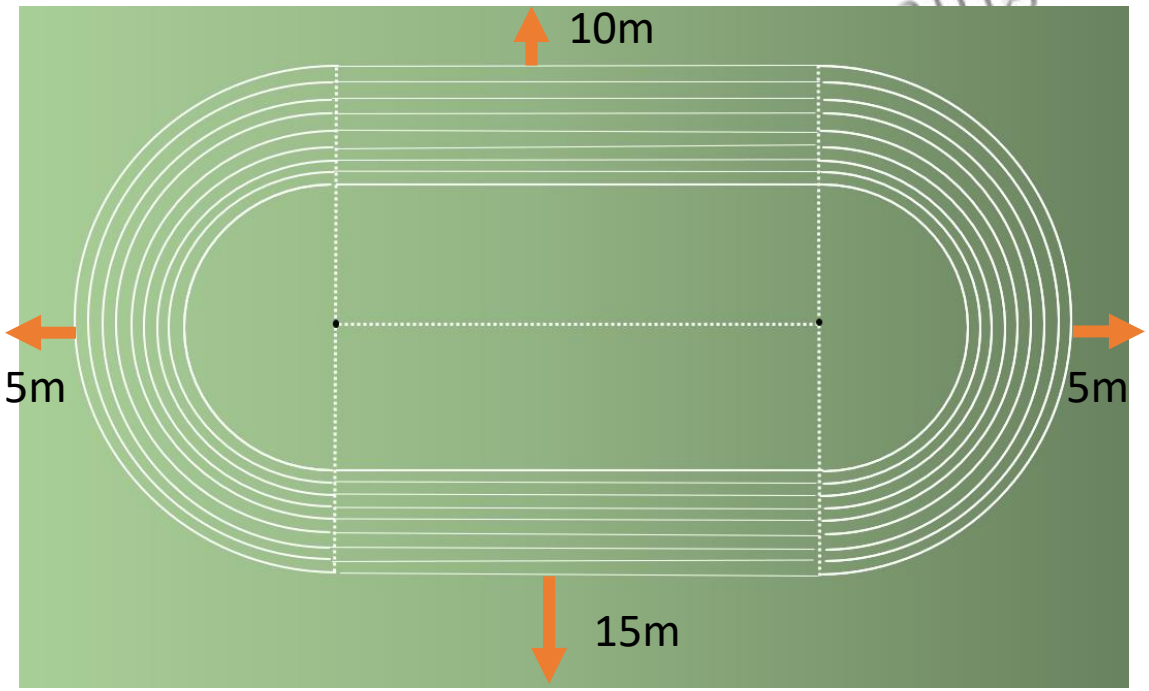
= 84.39m + 2 (36.50m) + 2 (9.76m)

= 176.91m

Total Width of track = 2r + 2 (8x1.22)

= 2 (36.50m) + 2 (9.76m)

= 92.52m



Length of field- **186.91m**

Width of field- **117.52m**

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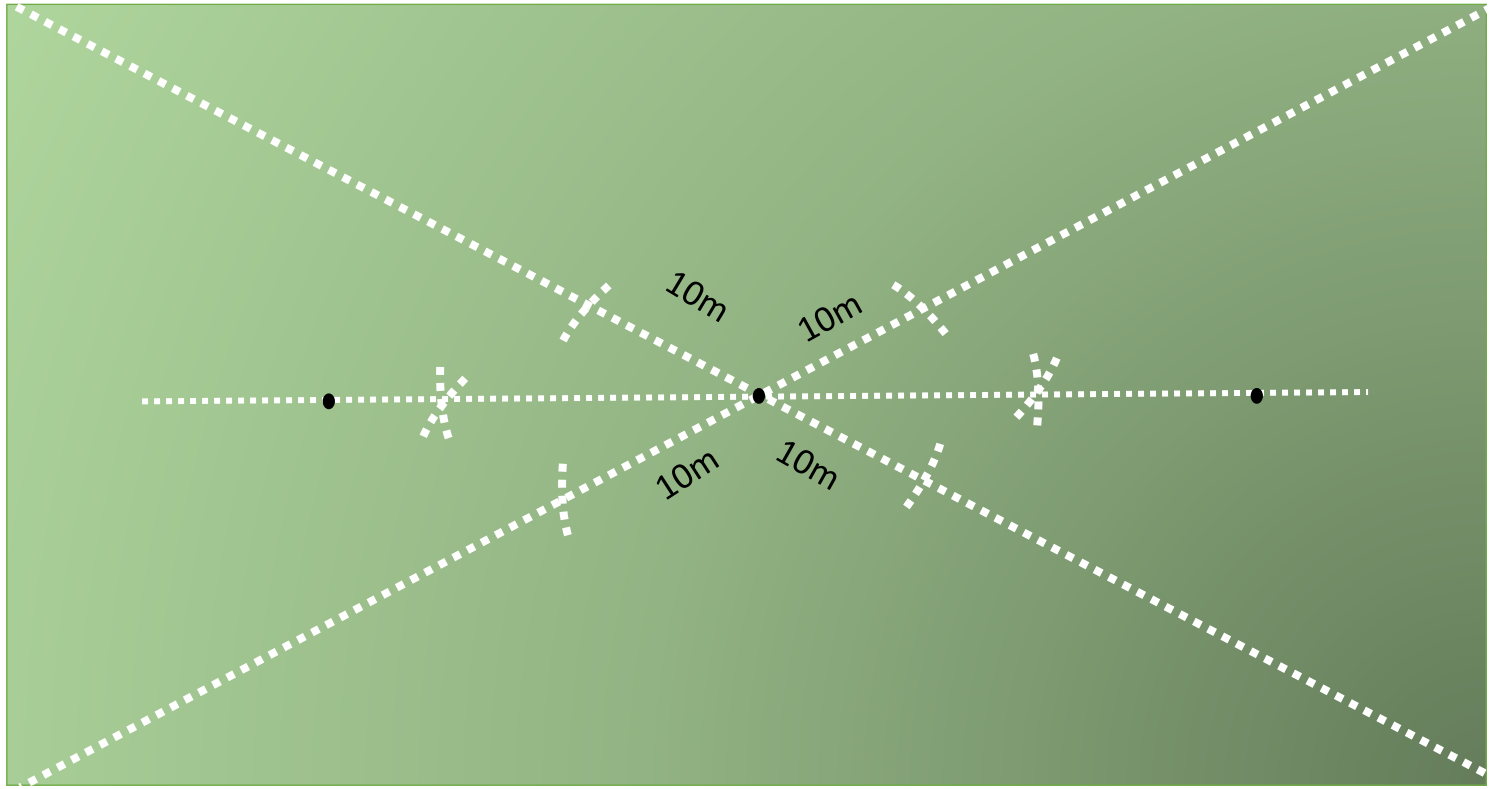
How to Mark a Track



Fun Learning
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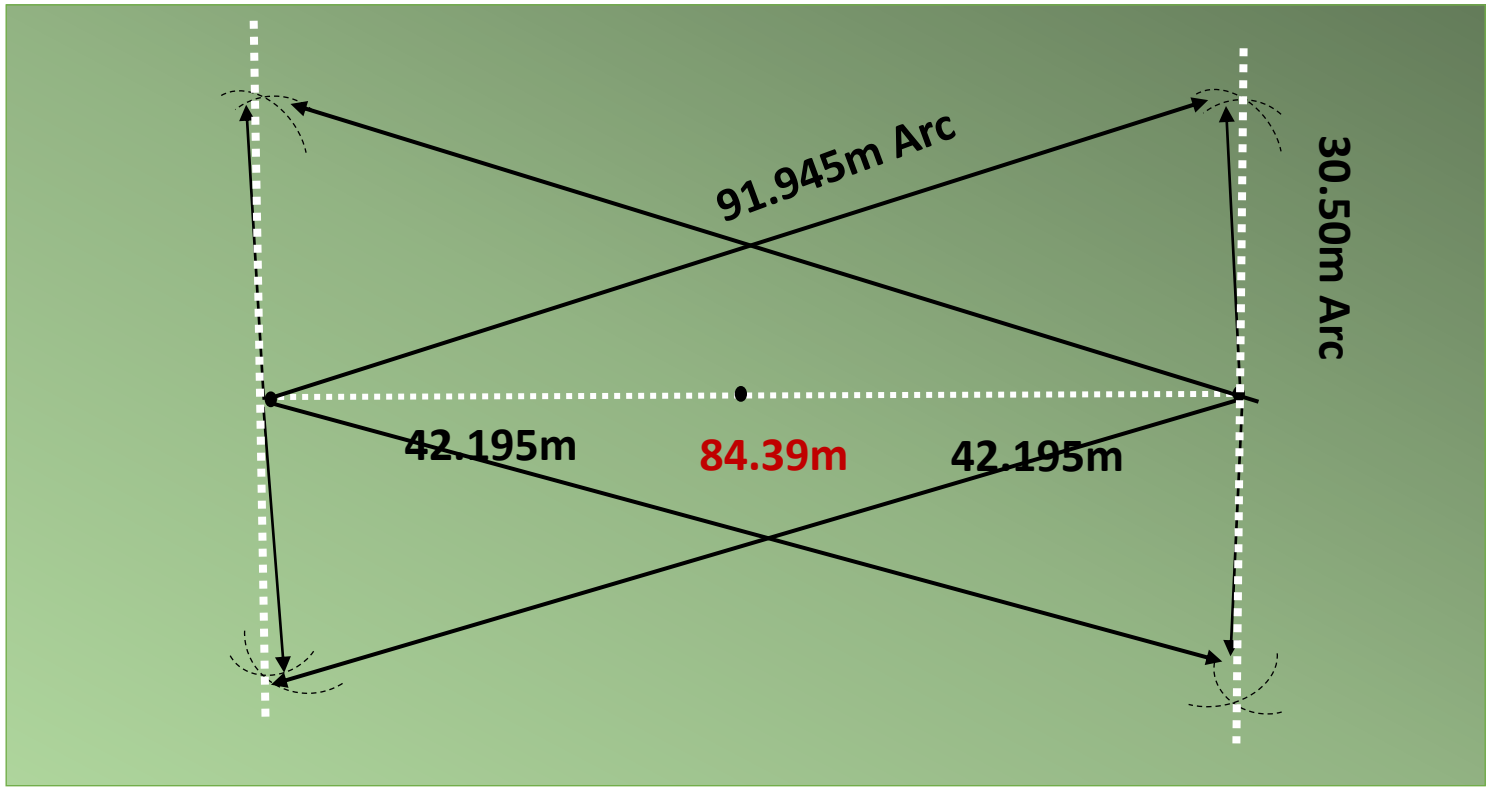
How to Mark a Track

Diagonal distance- 91.945m

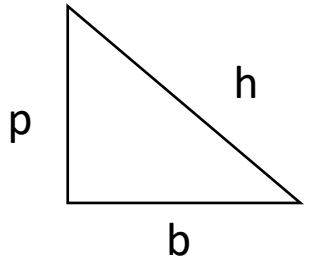


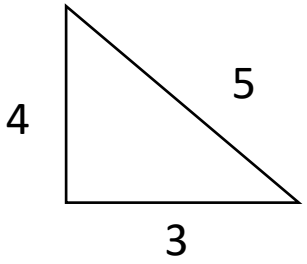
Fun Learning
Education

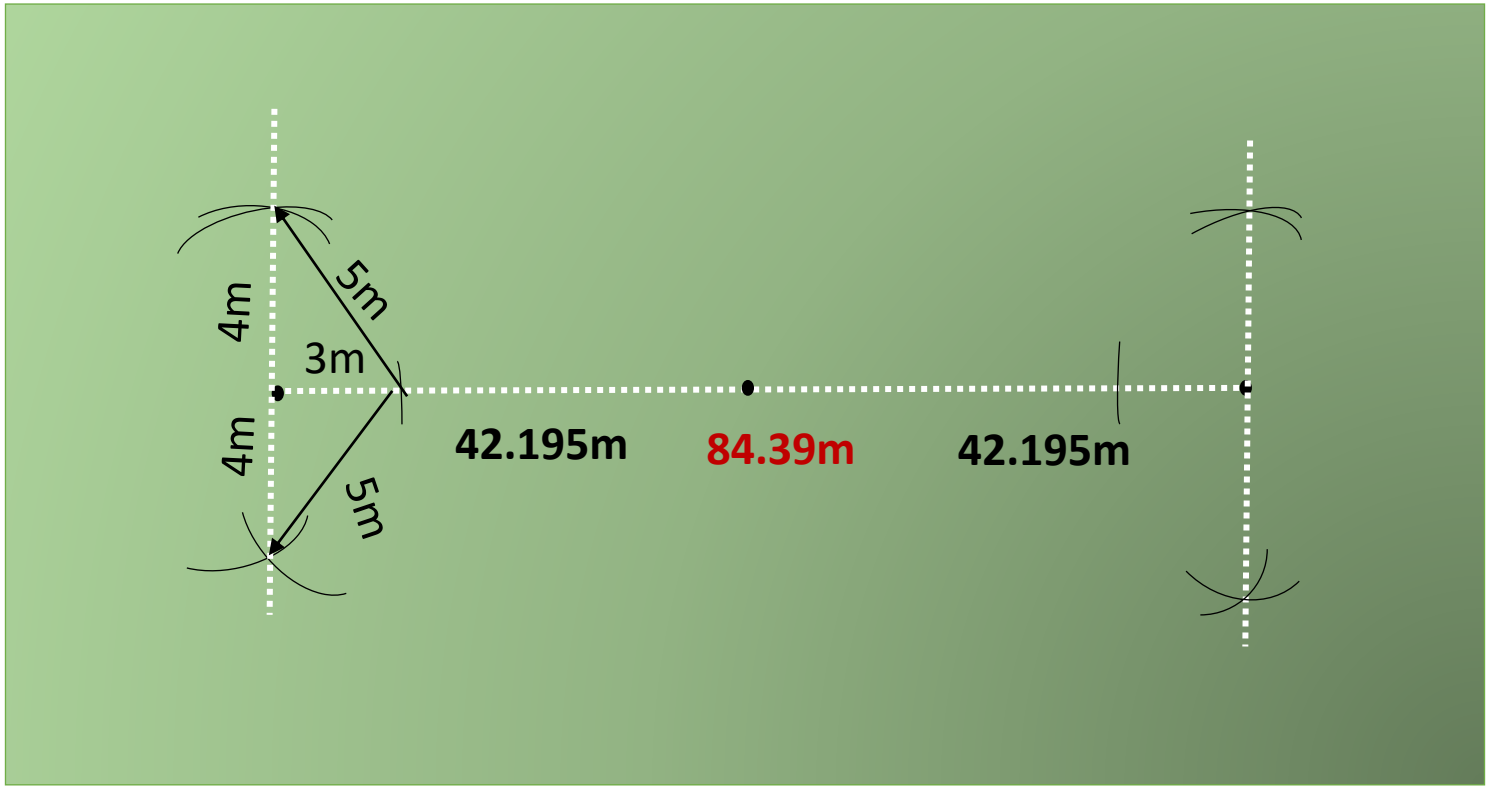
How to Mark a Track

Pythagoras Theorem

$h^2 = p^2 + b^2$







Fun Learning
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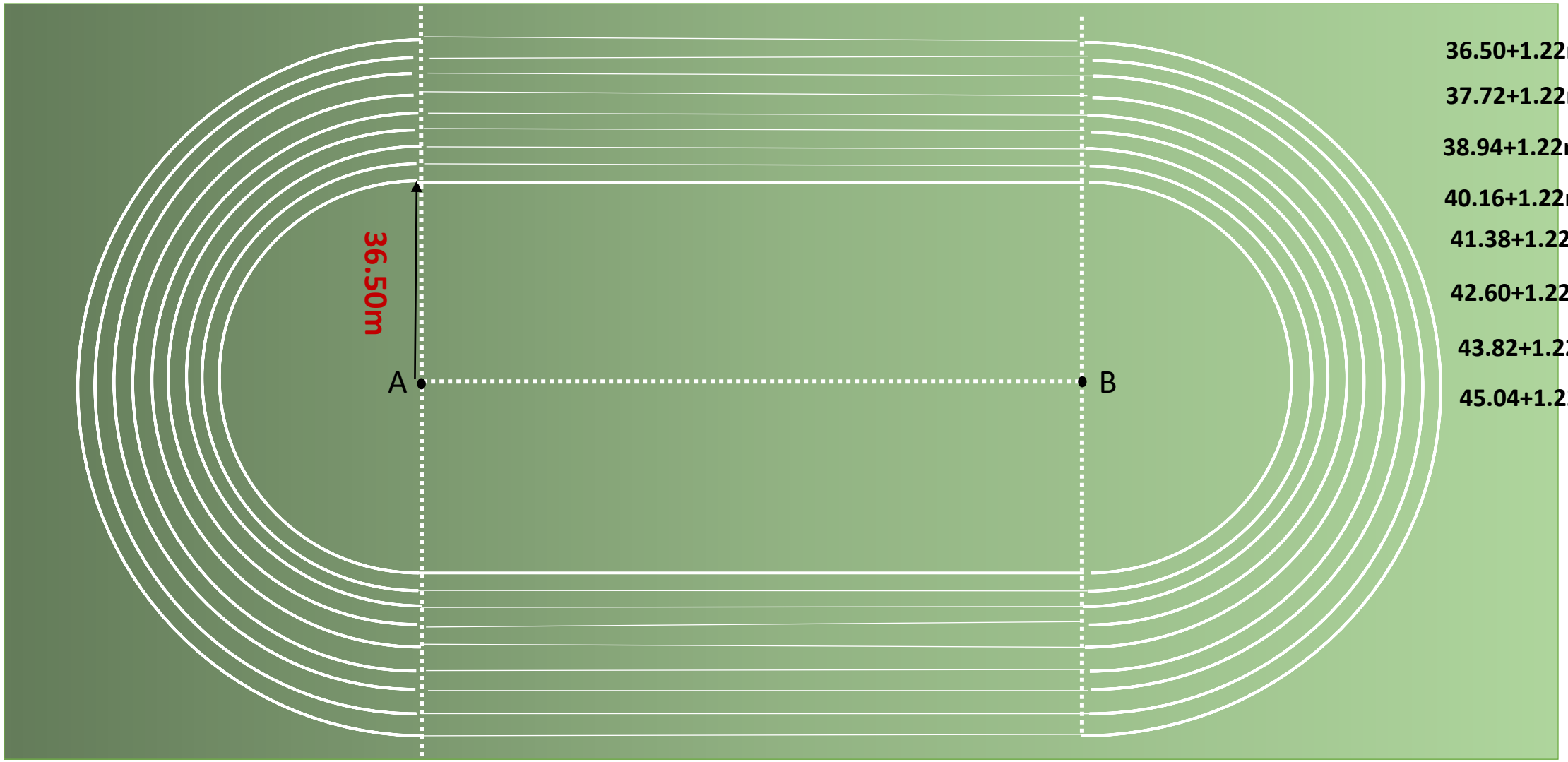
How to Mark a Track

Marking radius(RR)
36.485m Or 36.50m



36.50+1.22m= 37.72m

37.72+1.22m= 38.94m

38.94+1.22m= 40.16m

40.16+1.22m= 41.38m

41.38+1.22m= 42.60m

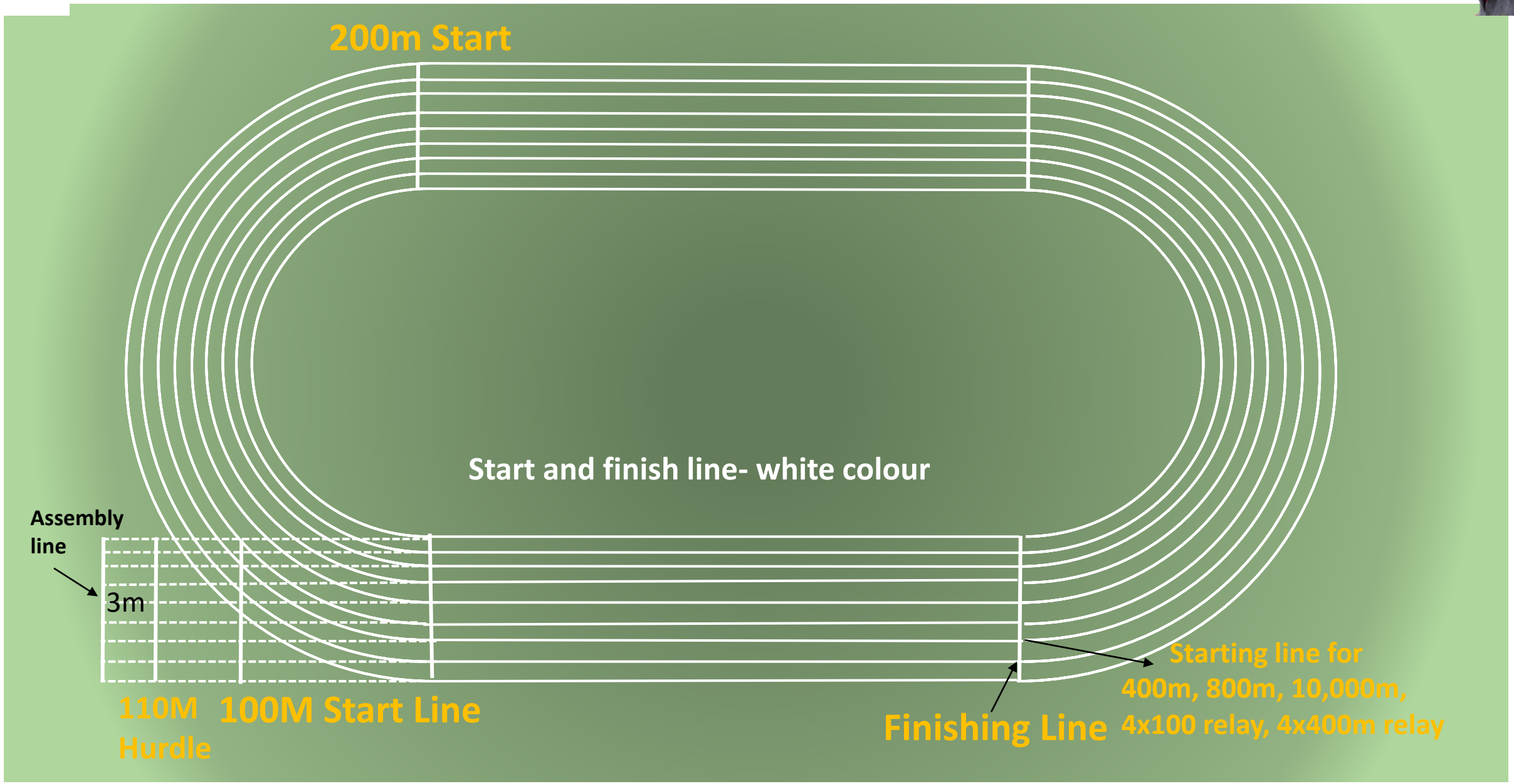
42.60+1.22m= 43.82m

43.82+1.22m=45.04

45.04+1.22m= 46.26

Fun Learning
Education

100m, 200m, 400m Start



Fun Learning Education

Stagger

Half Stagger- 200m Race Start

Full Stagger- 400m Race Start

Full Stagger- $[W(n-1)-10cm]2\pi$

- *W= width of lane*
- *N= number of lane*

Half Stagger- $[W(n-1)-10cm]\pi$

1st lane- $No\ Stagger$

2nd lane- $[1.22(2-1)-10cm]22/7$

$[1.22-10cm]\frac{22}{7}$

$[1.12\ X\ \frac{22}{7}\ ]$ **= 3.52m**

3rd lane- **= 7.35m**

4th lane- **= 11.19m**

5th lane- **= 15.02m**

6th lane- **= 18.86m**

7th lane- **= 22.69m**

8th lane- **= 26.53m**

Full Stagger-

2nd lane- **= 7.04m**

3rd lane- **= 14.71m**

4th lane- **= 22.38m**

5th lane- **= 30.05m**

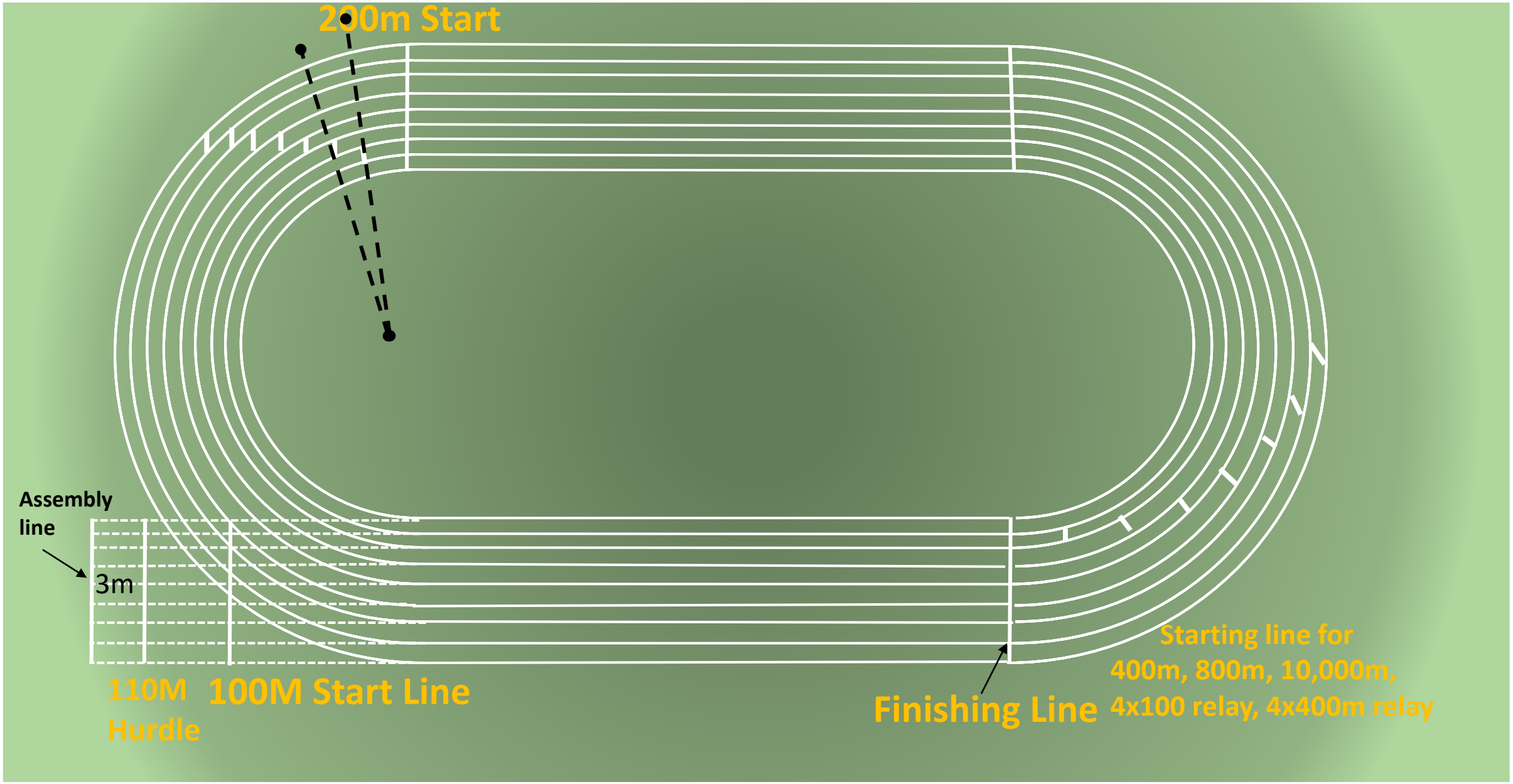
6th lane- **= 37.72m**

7th lane- **= 45.39m**

8th lane- **= 53.06m**

Fun Learning
Education

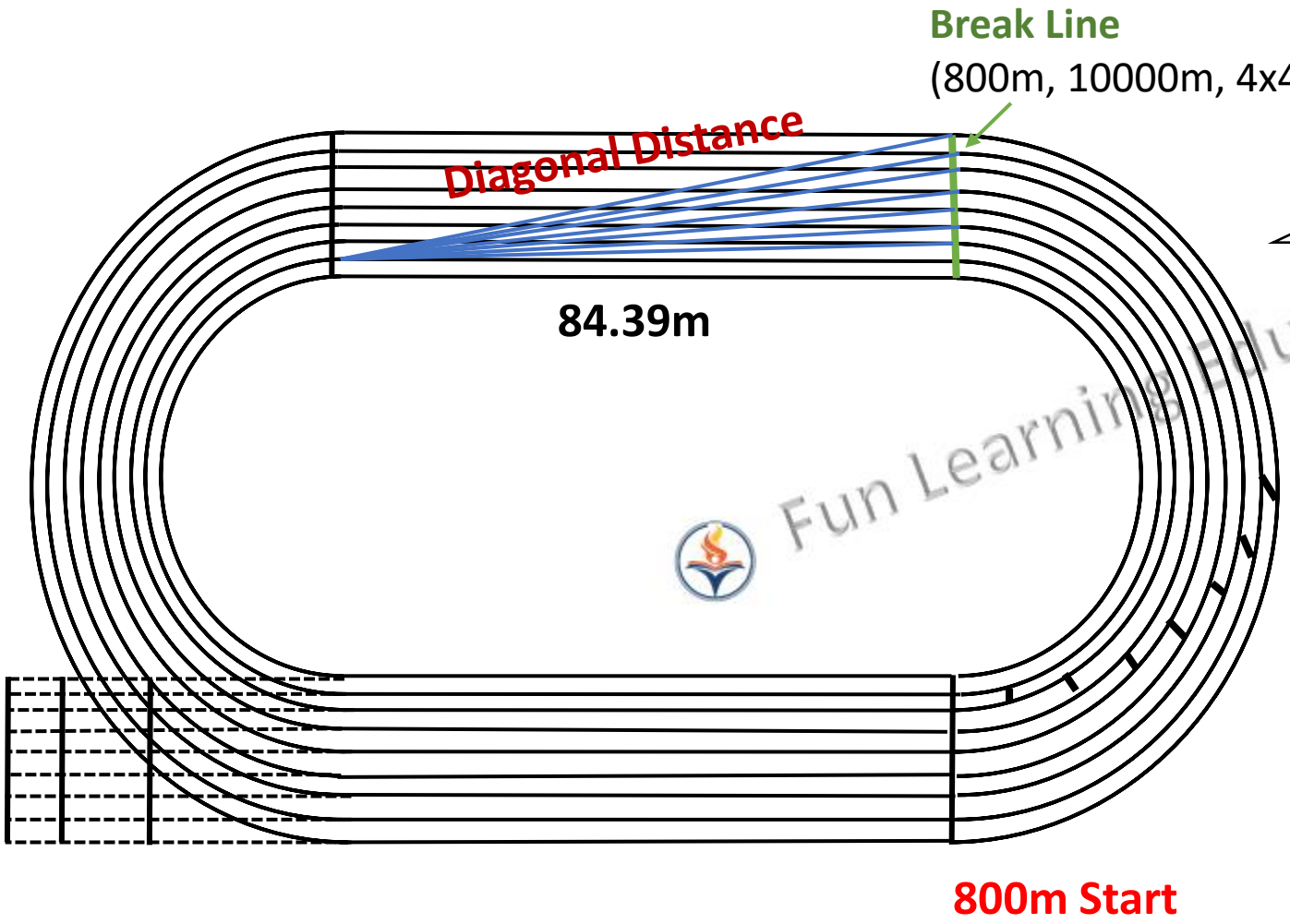
200m, 400m Stagger

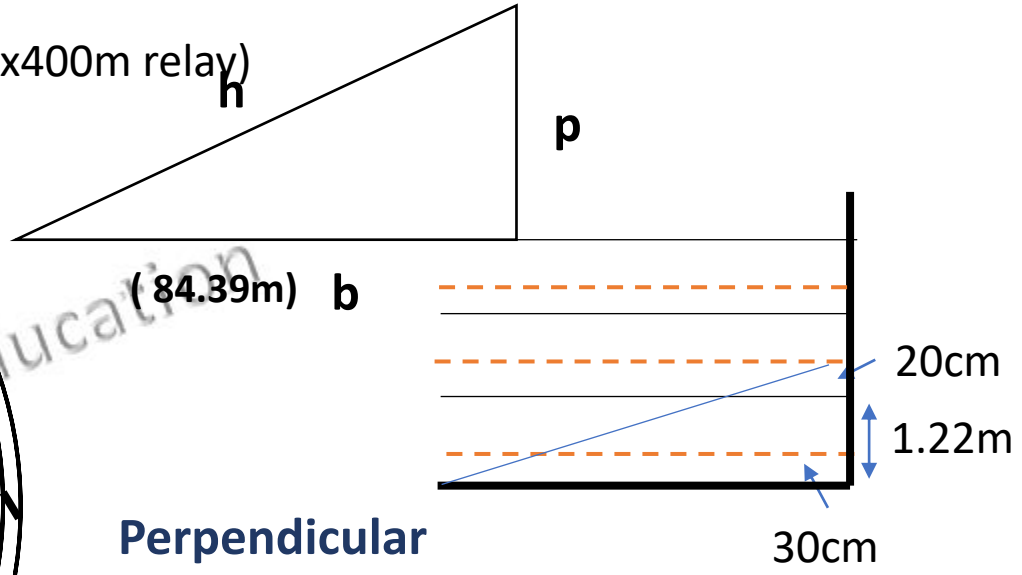


Fun Learning Education

800m Race

800m Stagger- Half stagger + DED (Diagonal Excess Distance)





Perpendicular

L2 = (1.22- 0.30m) +0.20m
= 0.92+0.20m
= 1.12m

L3 = 1.12 + 1.22m
= 2.34m

L4 = 3.56m
L5 = 4.78m
L6 = 6m
L7= 7.22m
L8 = 8.44m

Fun Learning Education

Pythagoras Theorem

2nd Lane $h^2 = p^2 + b^2$

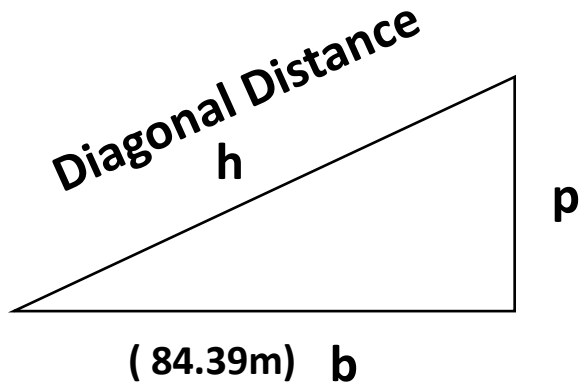
$$h = \sqrt{p^2 + b^2}$$

$$h = \sqrt{(1.12)^2 + (84.39)^2}$$

$$h = \sqrt{1.48 + 7121.67}$$

$$h = \sqrt{7123.15}$$

L2 h = 84.398m



Perpendicular

L2 = (1.22- 0.30m) +0.20m
= 0.92+0.20m
= 1.12m

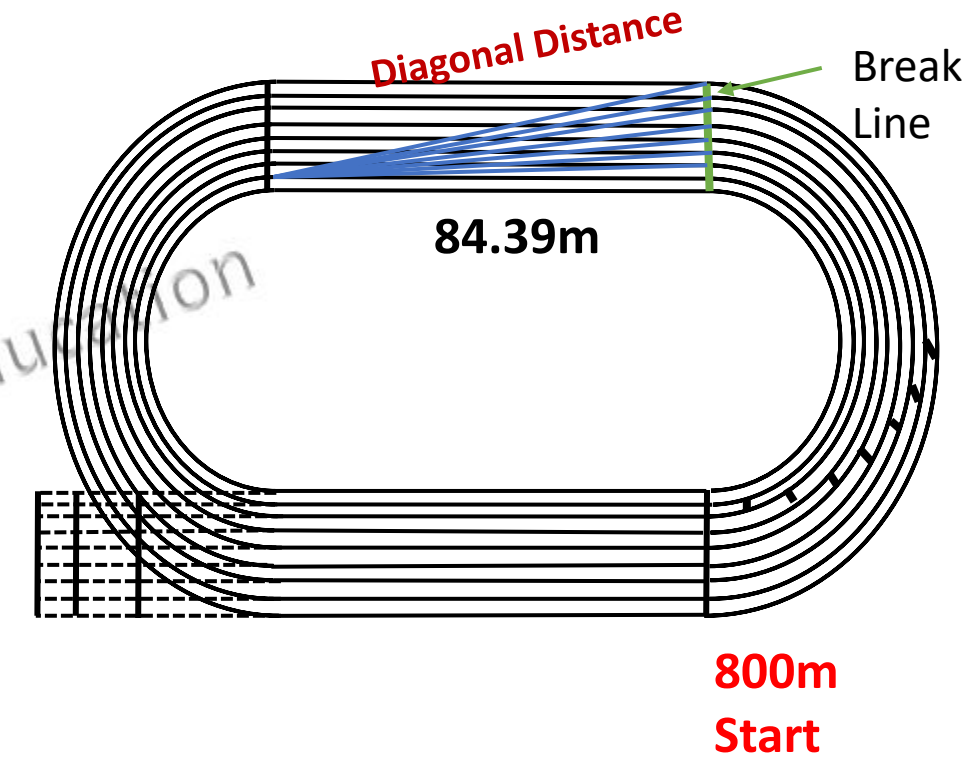
L3 = 84.42m
L4= 84.46m
L5= 84.52m
L6= 84.60m
L7= 84.698m
L8= 84.810m

L3 = 2.34m
L4 = 3.56m
L5 = 4.78m
L6 = 6m
L7= 7.22m
L8 = 8.44m

Fun Learning Education

Diagonal Excess Distance (DED)

L2 = 84.398 – 84.39 = 0.008m
L3 = 84.42 – 84.39 = 0.03m
L4= 84.46 – 84.39 = 0.07m
L5= 84.52 – 84.39 = 0.13m
L6= 84.60 – 84.39 = 0.21m
L7= 84.698 – 84.39 = 0.30m
L8= 84.810 – 84.39 = 0.42m



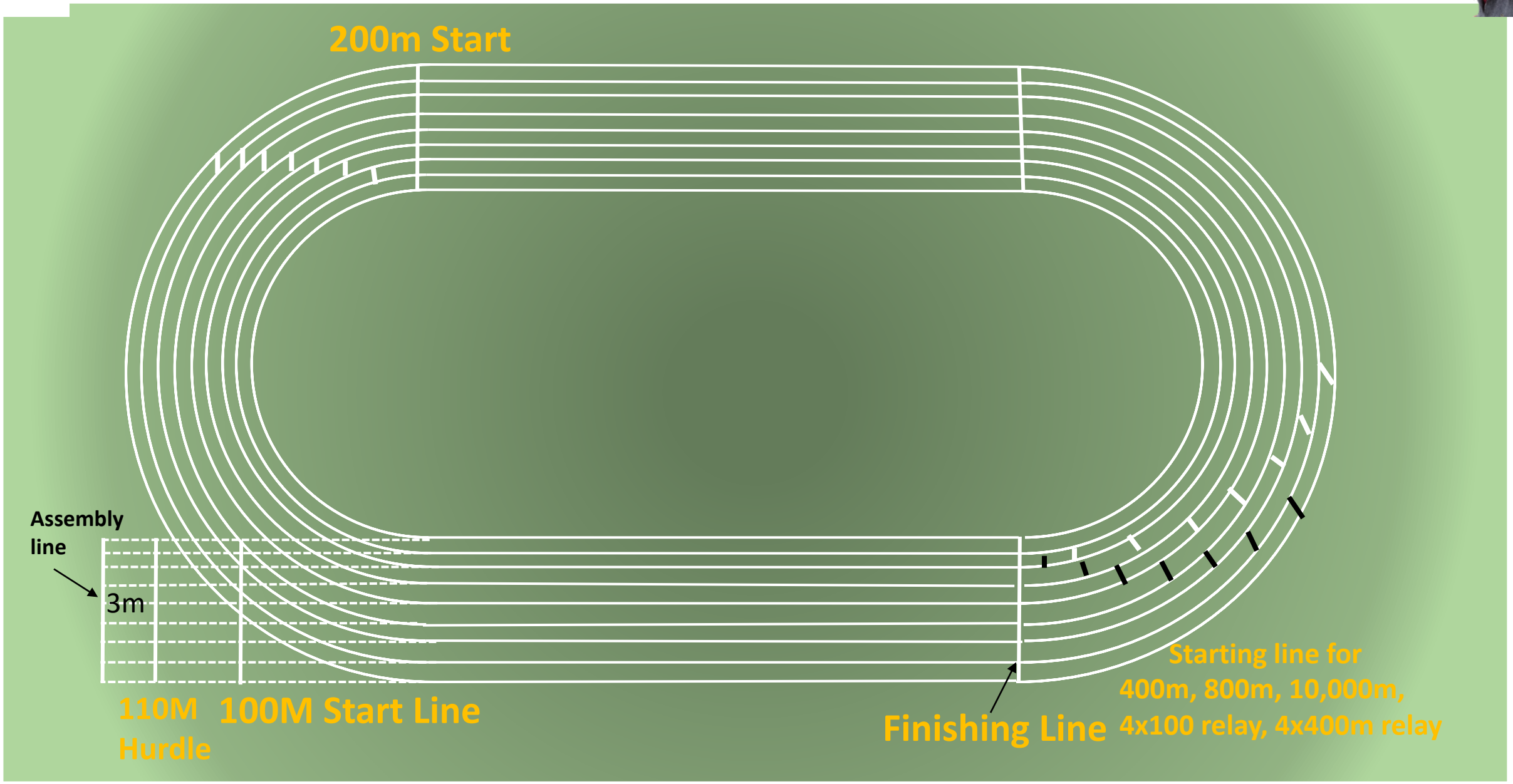
800m Stagger-

Half stagger + DED (Diagonal Excess Distance)

L2 = 3.52 + 0.008 = **3.52m**
L3 = 7.35 + 0.03 = **7.38m**
L4= 11.19 + 0.07 = **11.26m**
L5= 15.02 + 0.13 = **15.15m**
L6= 18.86 + 0.21 = **19.07m**
L7= 22.69 + 0.30 = **22.99m**
L8= 26.53 + 0.42 = **26.95m**

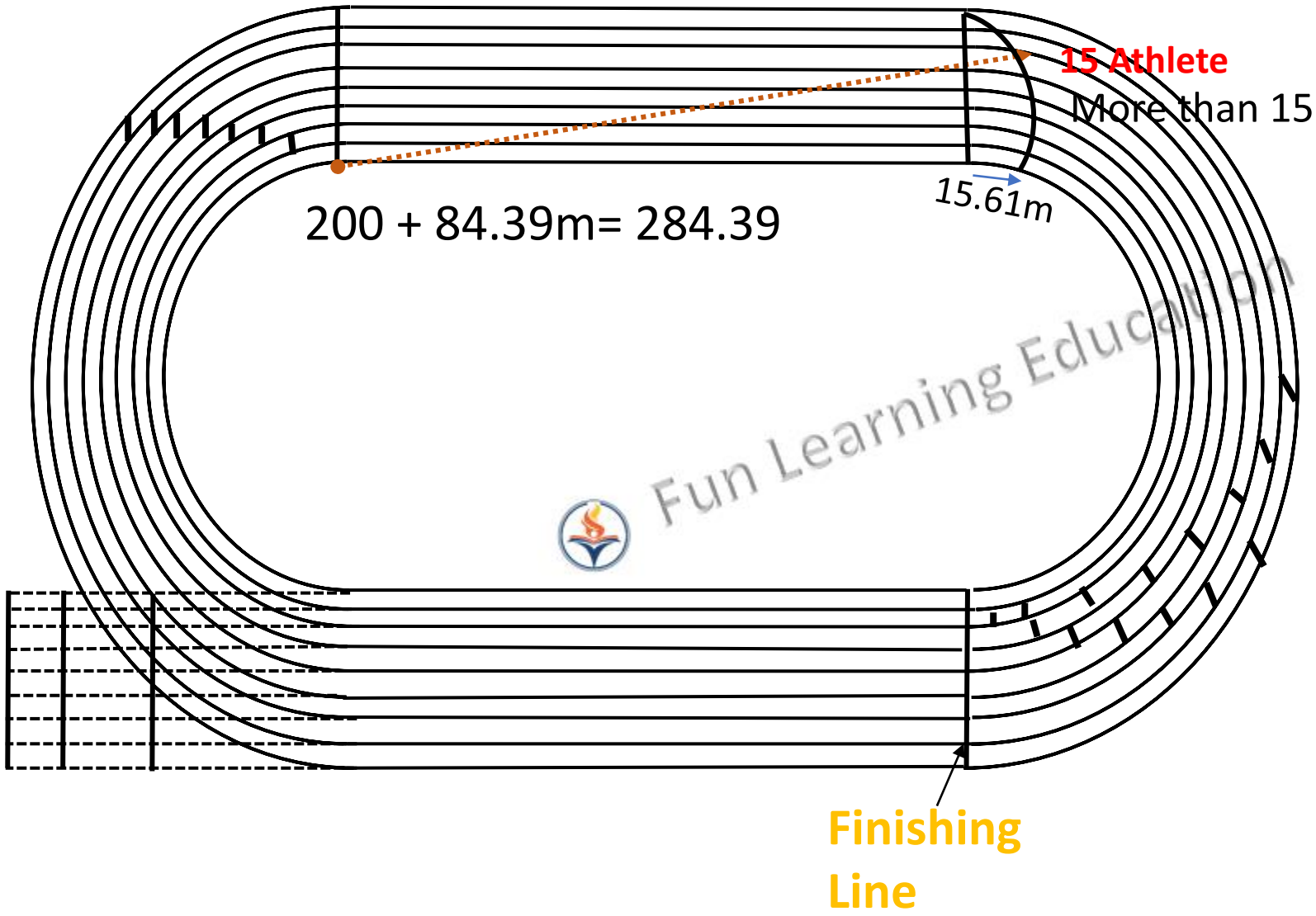
Fun Learning
Education

800m Stagger



1500m Curve Start

1500m Curve Start



15 Athlete

More than 15 Athlete **– Hits**

400 | 1500 | 3
1200
300

3 Round+ 300m

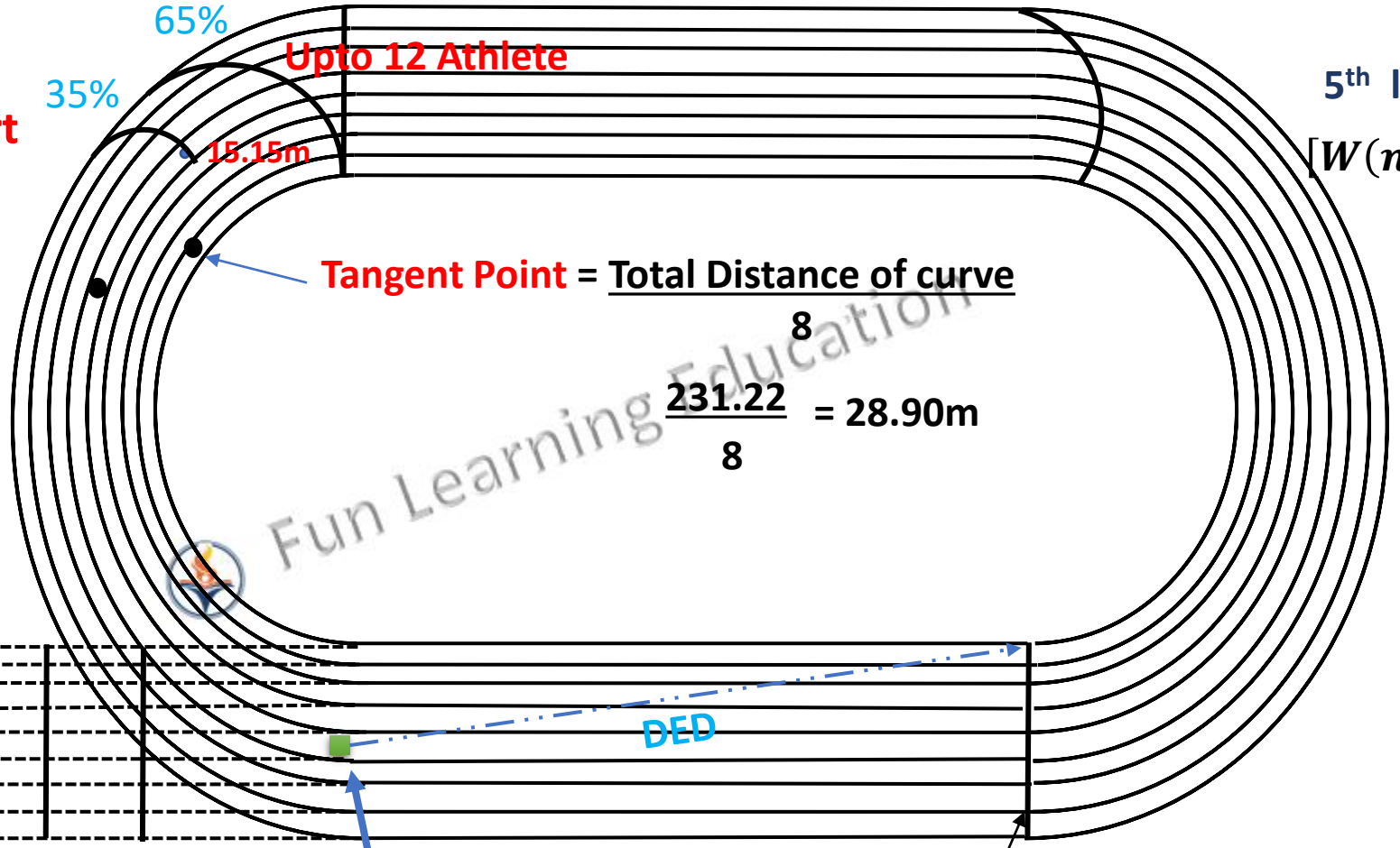
Finishing Line

5000m Start

5000m Curve Start

12 Round 200m

1500m Curve Start



13-19 Athlete – **Split Start**

65% 35%

E,g- **18 athlete**

65% (12) 35% (6)

$18 \times \frac{65}{100} = 11.7 = 12$

$18 \times \frac{35}{100} = 6.3$

More than 19 Athlete – **Hits**

Tangent Point = $\frac{\text{Total Distance of curve}}{8}$

$\frac{231.22}{8}$ = 28.90m

Break Point (5000m)

Finishing Line

5th lane half stagger-

$[W(n-1) - 10cm]\pi$

= 15.02m

5th lane DED-

= 0.13m

15.02+ 0.13m

=15.15m

10000m Start

25 Round

Break line

5000m Start

65%

35%

Upto 12 Athlete

DED

15.15m

13-27Athlete – **Split Start**

65% 35%

E,g- **18 athlete**

65% (12) 35% (6)

$18 \times \frac{65}{100} = 11.7 = 12$

$18 \times \frac{35}{100} = 6.3$

Tangent Point = $\frac{\text{Total Distance of curve}}{8}$

$\frac{231.22}{8}$ = 28.90m

5th lane half stagger-

$[W(n-1) - 10cm]\pi$

= 15.02m

5th lane DED-

= 0.13m

15.02+ 0.13m

=15.15m

35%

65%

Upto 12 Athlete

More than 27 Athlete – **Hits**

Finishing Line 10,000m Start

Fun Learning Education

Steeple Chase

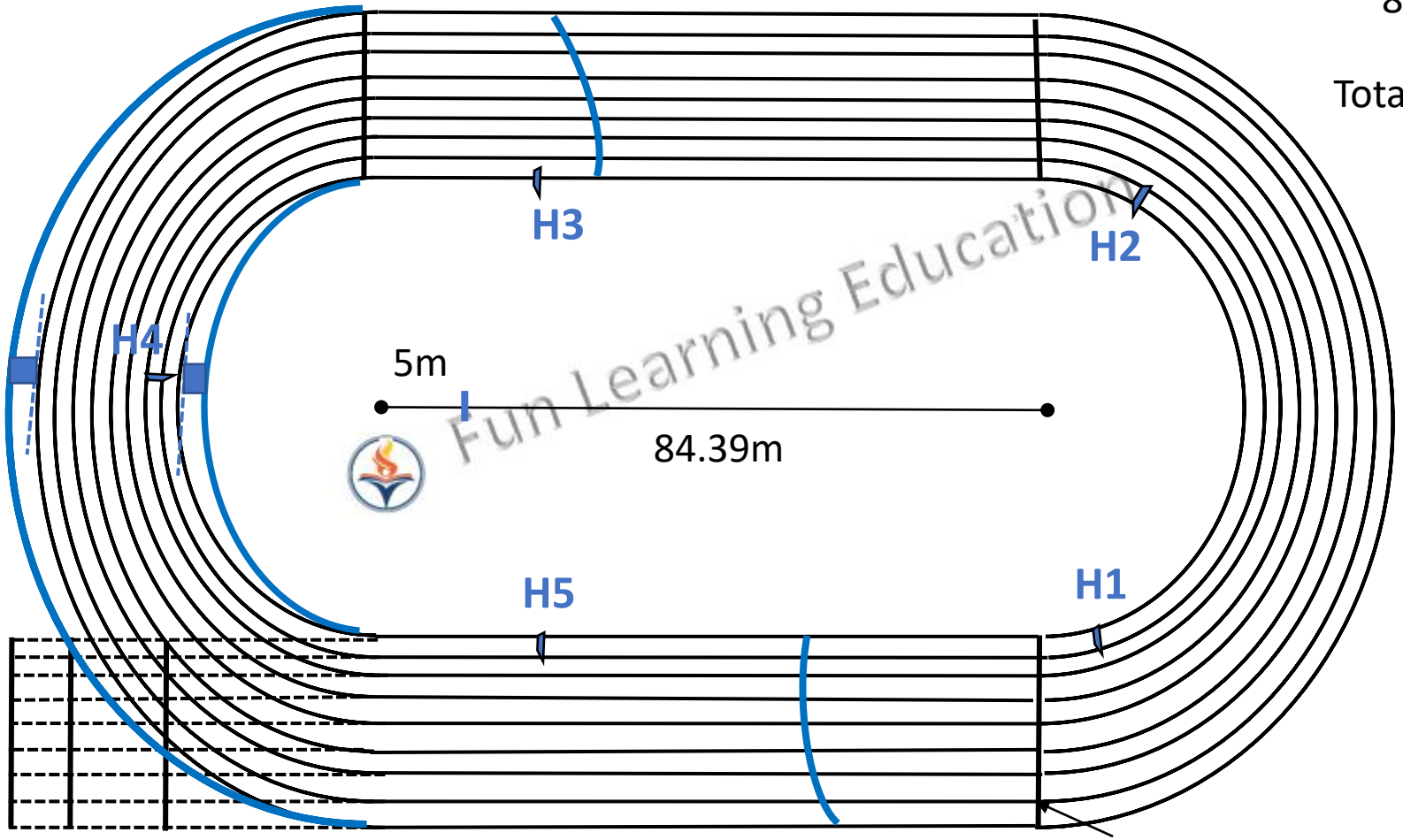
(2000m , 3000m)

390m
5

78m- hurdle

7 Round + 270m

3000m Steeple chase



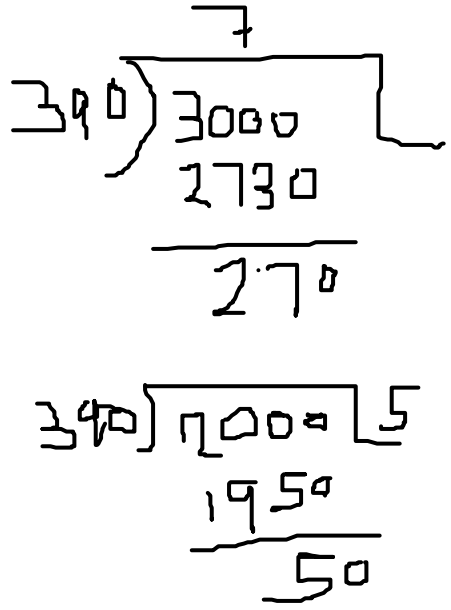
2000m Steeple chase Finishing Line

84.39m-5m=79.39m

Total track= 2x 79.39+ 231.22

= 158.79+ 231.22

= 390m

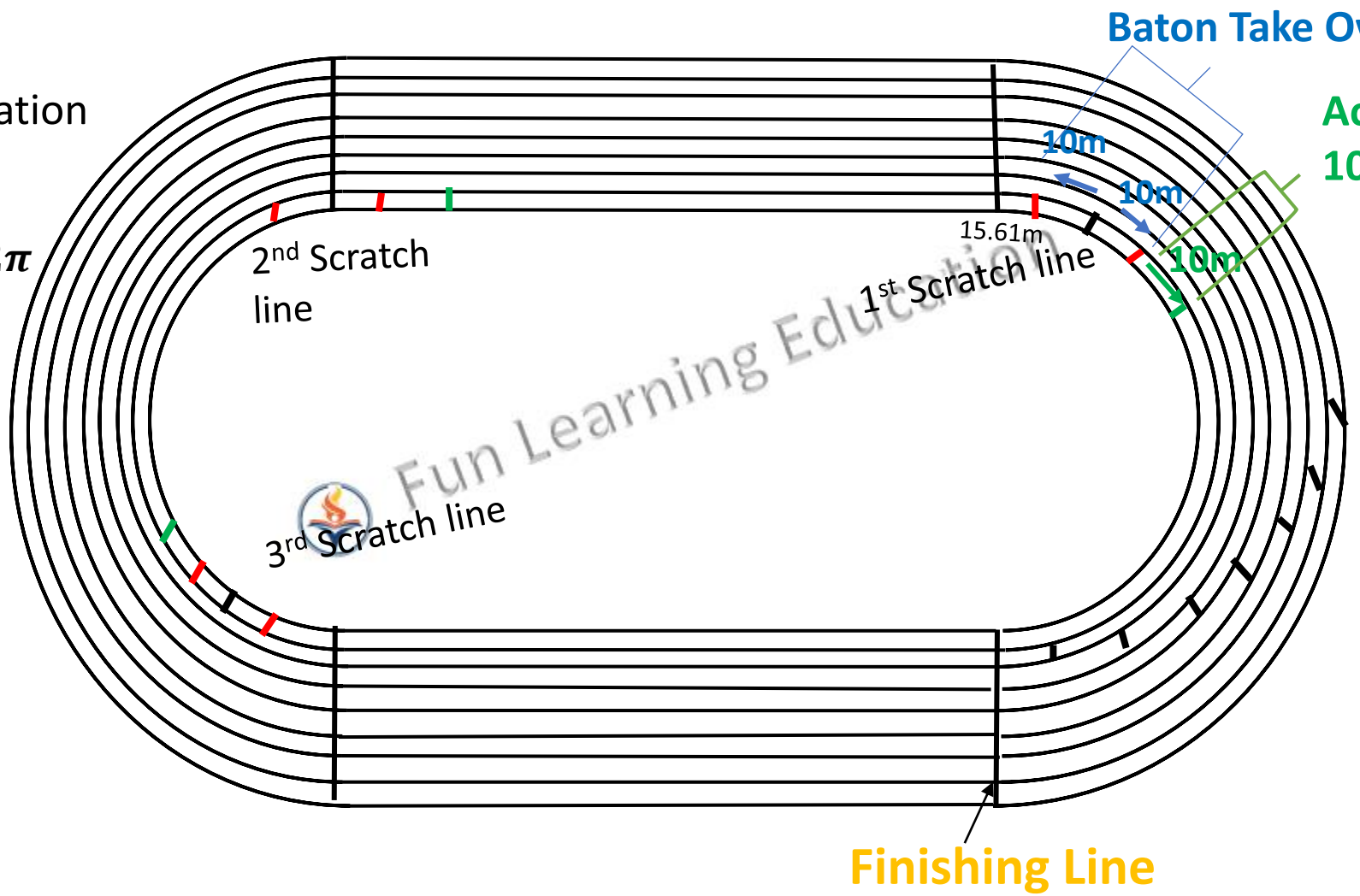


4x100m Relay

1 team - 4 Players

- Baton- 50g
- Lane boundation
- Full Stagger

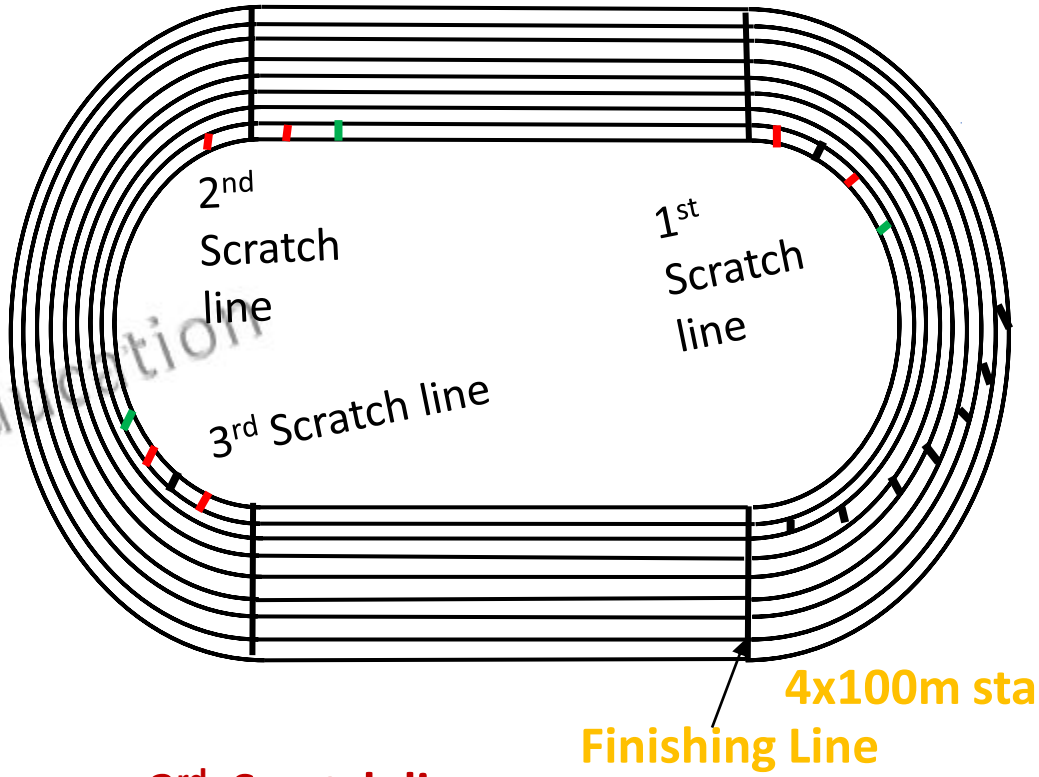
$[W(n-1)-10cm]2\pi$



4x100m Relay

Scratch Line = $\frac{t - ds}{t}$ **X Full Stagger of that line**

- t = Total distance of curve (231.22)
- ds = curve distance upto that scratch line



1st Scratch line -

$$\frac{t - ds}{t} \text{ X Full Stagger}$$

$$\frac{231.22 - 100m}{231.22m} \text{ X Full Stagger}$$

= 0.56m X F. S.

2nd Scratch line -

$$\frac{231.22 - 115.61m}{231.22m} \text{ X Full Stagger}$$

= 0.5m X F. S.

3rd Scratch line -

$$\frac{231.22 - 215.61m}{231.22m} \text{ X Full Stagger}$$

= 0.06m X F. S.

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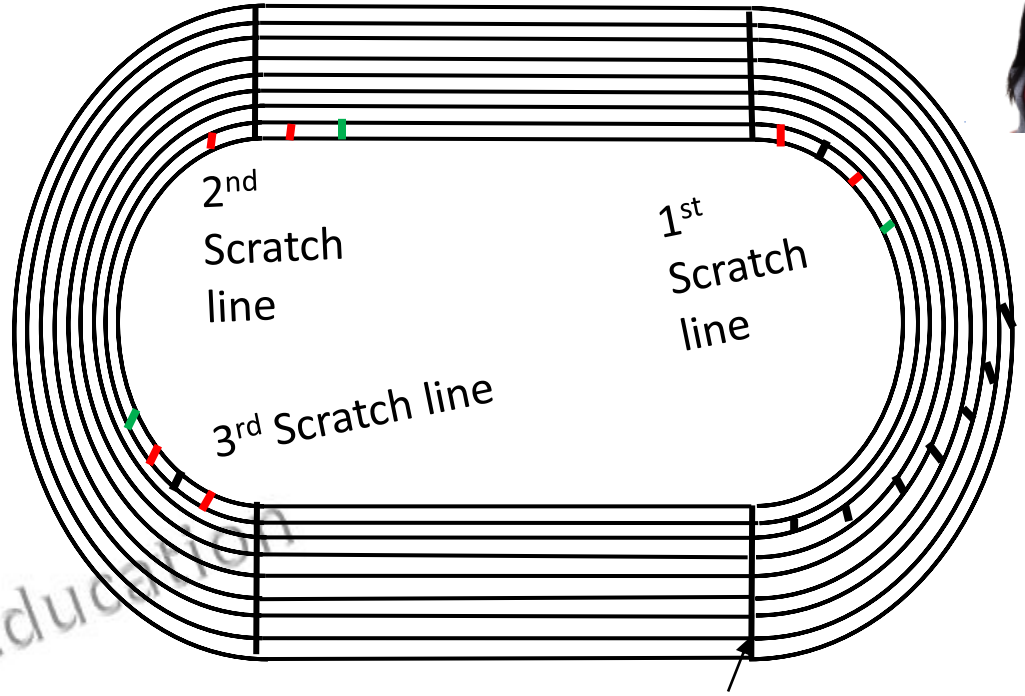
1st Scratch line for -

2nd lane = 0.56 x 7.04 = 3.94m
3rd lane = 0.56 x 14.71 = 8.23m
4th lane = 0.56 x 22.38 = 12.53m
5th lane = 0.56 x 30.05= 16.82m
6th lane = 0.56 x 37.72 = 21.12m
7th lane = 0.56 x 45.39 = 25.41m
8th lane = 0.56 x 53.06 = 29.71m



2nd Scratch line for -

2nd lane = 0.5 x 7.04 = 3.52m
3rd lane = 0.5 x 14.71 = 7.3m
4th lane = 0.5 x 22.38 = 11.19m
5th lane = 0.5 x 30.05= 15.02m
6th lane = 0.5 x 37.72 = 18.86m
7th lane = 0.5 x 45.39 = 22.69m
8th lane = 0.5 x 53.06 = 26.53m

3rd Scratch line for -

2nd lane = 0.06 x 7.04 = 0.42m
3rd lane = 0.06 x 14.71 = 0.88m
4th lane = 0.06 x 22.38 = 1.34m
5th lane = 0.06 x 30.05= 1.80m
6th lane = 0.06 x 37.72 = 2.26m
7th lane = 0.06 x 45.39 = 2.72m
8th lane = 0.06 x 53.06 = 3.18m

Full Stagger-

2nd lane- = 7.04m
3rd lane- = 14.71m
4th lane- = 22.38m
5th lane- = 30.05m
6th lane- = 37.72m
7th lane- = 45.39m
8th lane- = 53.06m

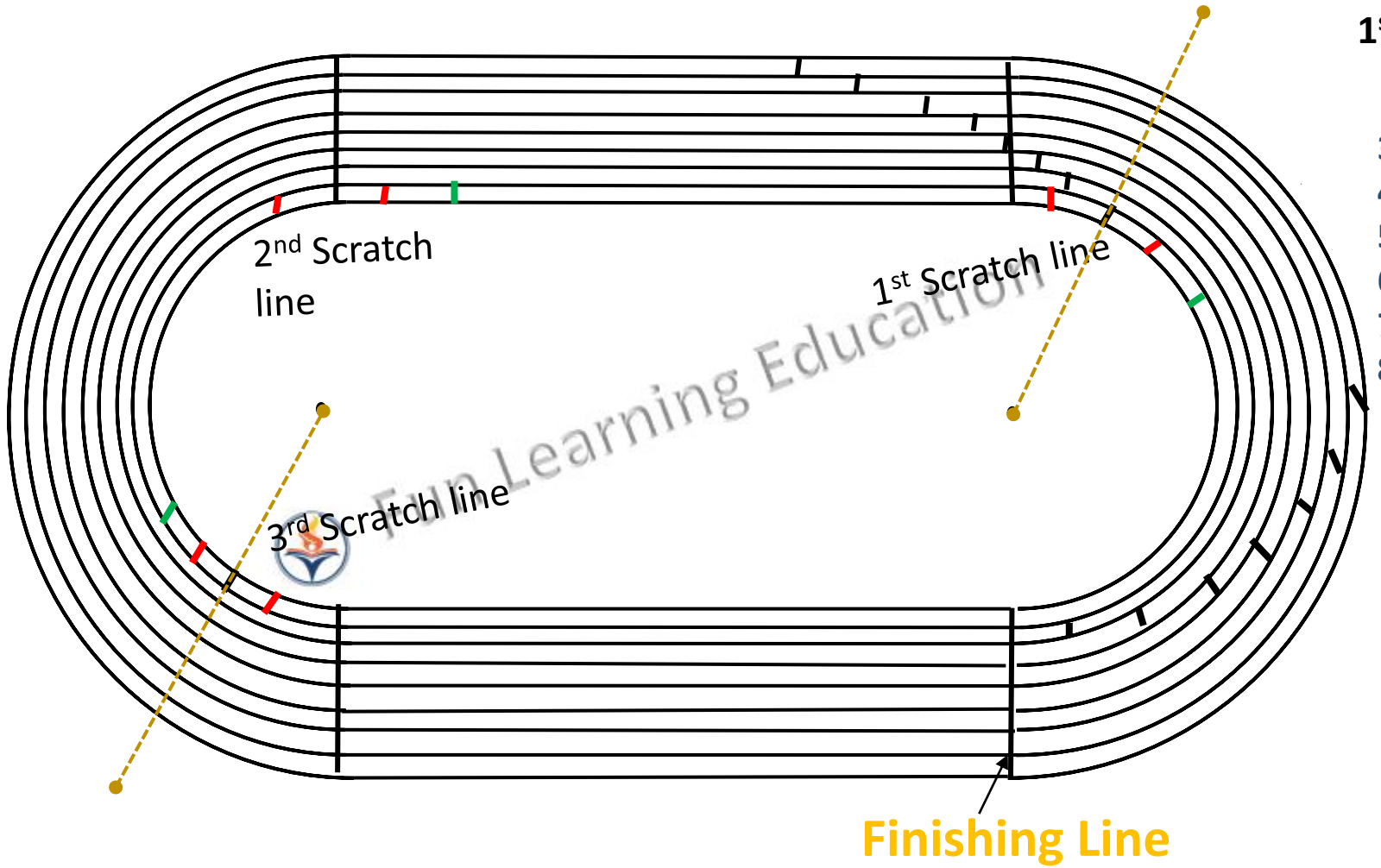
4x100m Relay

2nd Scratch line -

- 2nd lane = 3.52m
- 3rd lane = 7.3m
- 4th lane = 11.19m
- 5th lane = 15.02m
- 6th lane = 18.86m
- 7th lane =22.69m
- 8th lane = 26.53m

3rd Scratch line -

- 2nd lane = 0.42m
- 3rd lane = 0.88m
- 4th lane = 1.34m
- 5th lane = 1.80m
- 6th lane = 2.26m
- 7th lane = 2.72m
- 8th lane = 3.18m



1st Scratch line -

- 2nd lane = 3.94m
- 3rd lane = 8.23m
- 4th lane = 12.53m
- 5th lane = 16.82m
- 6th lane = 21.12m
- 7th lane = 25.41m
- 8th lane = 29.71m

Fun Learning Education

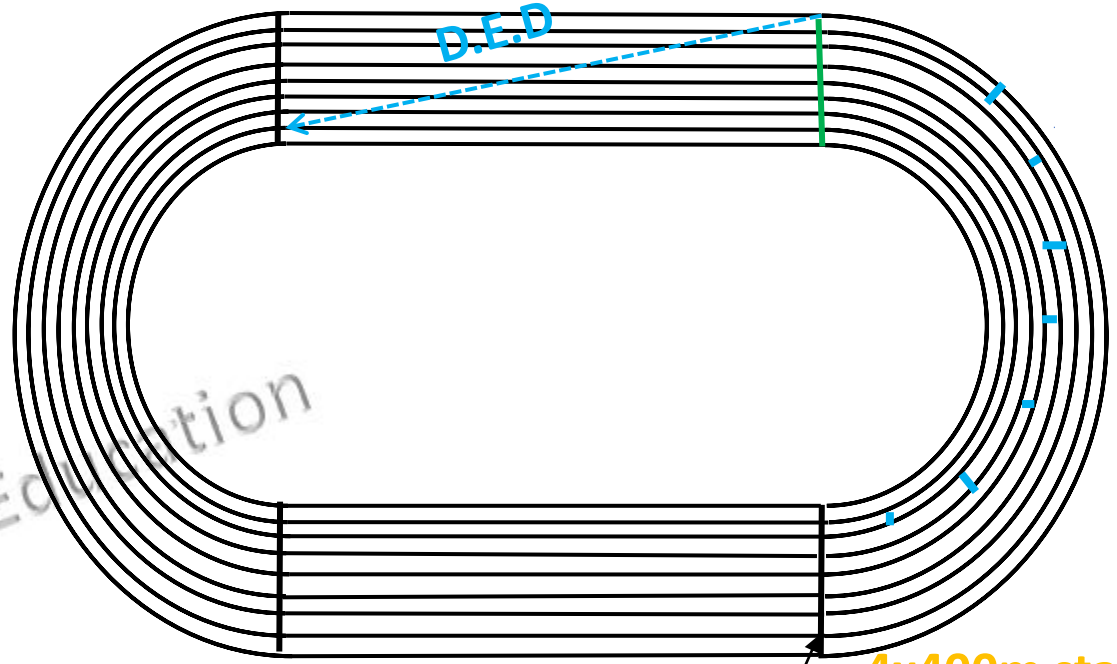
4x400m Relay

➢ **3 Curve Boundation**

$$[W(n-1)-10cm]3\pi + D.E.D$$

Or

Full Stagger + Half Stagger + D.E.D



2nd lane-	7.04 + 3.52 + 0.008	= 10.57m
3rd lane-	14.71 + 7.35 + 0.03	= 22.09m
4th lane-	22.38 + 11.19 + 0.07	= 33.64m
5th lane-	30.05 + 15.02 + 0.13	= 45.2m
6th lane-	37.72 + 18.86 + 0.21	= 56. 79m
7th lane-	45.39 + 22.69 + 0.30	= 68.38 m
8th lane-	53.06 + 26.53 + 0.42	= 80.01m

D.E.D

L2 = 0.008m
L3 = 0.03m
L4= 0.07m
L5= 0.13m
L6= 0.21m
L7= 0.30m
L8= 0.42m

Full Stagger-

2nd lane-	= 7.04m
3rd lane-	= 14.71m
4th lane-	= 22.38m
5th lane-	= 30.05m
6th lane-	= 37.72m
7th lane-	= 45.39m
8th lane-	= 53.06m

Half Stagger

2nd lane-	+ 3.52m
3rd lane-	+ 7.35m
4th lane-	+ 11.19m
5th lane-	+ 15.02m
6th lane-	+ 18.86m
7th lane-	+ 22.69m
8th lane-	+ 26.53m

Fun Learning
Education

4x400m Relay

1st Scratch line-

Half stagger + DED (Diagonal Excess Distance)

L2 =	3.52	+ 0.008	= **3.52m**
L3 =	7.35	+ 0.03	= **7.38m**
L4=	11.19	+ 0.07	= **11.26m**
L5=	15.02	+ 0.13	= **15.15m**
L6=	18.86	+ 0.21	= **19.07m**
L7=	22.69	+ 0.30	= **22.99m**
L8=	26.53	+ 0.42	= **26.95m**