

Activities Guide for the Rugby Poster

Rugby facts:

Ancient Rugby:

The poster tells us that rugby was invented at Rugby School in 1823. According to some historians, a game similar to rugby was initially played over 2,000 years ago by the Romans. The game was known by the Latin name Harpastum, derived from the Greek term for seize, which seems rather apt given the aim of the game.

Rugby Ball:

Rugby ball's distinctive plum shape makes them aerodynamic, easy to hold, and easy to pass over distances. To encapsulate those qualities, original rugby balls were made from inflated pigs bladders, stitched tightly to trap the air. That's gross but very true!

Ranked no.1 in the world:

Going into the 2023 Rugby World Cup, Ireland was ranked no.1 in the world rugby rankings with 91.82 points. Closely behind in second place is South Africa, with 91.08 points. The 2023 Rugby World Cup will further change the world rugby rankings.

Rugby World Cup:

The Rugby World Cup is held every four years, and its location usually alternates between the northern and southern hemispheres. Ireland has taken part at every Rugby World Cup since the tournament was first held in Australia and New Zealand in 1987. However, Ireland have not yet advanced to the semi-final round. In a World Cup game, Ireland has never faced South Africa or England.

Fun fact: The same whistle is blown at the start of each World Cup. Welsh referee Gil Evans used the same whistle to preside over Rugby games for 20 years, donating it to the New Zealand Rugby Museum in 1969. The tradition was revived for the 1987 Rugby World Cup, and the whistle has been used for every tournament since.

Irish Rugby:

Dublin University, founded in 1854, was the first organized Rugby Football Club in Ireland. Students at the University had first learnt the game while at English Public Schools. The establishment of the Irish Rugby Football Union was in 1879. Since then, Ireland has maintained a unified approach to rugby as the origin of IRFU predates the historical partition of the island into Northern Ireland and the Republic of Ireland in 1921. Instead of splitting Irish rugby under north and south lines, a conscious choice was made to preserve a single international rugby team that incorporates players from both sides of the border. This unification serves as a testament to the inclusive spirit of Irish rugby, transcending regional divisions for the collective benefit of the sport.

Questions for the Maths Week rugby poster 2023:

Question 1: In the pool stages, each team must play the other team in the group once. How many games are needed in each group?

There are five teams in a pool. For example, in pool B, there are: Ireland, South Africa, Scotland, Romania, and Tonga.

Ireland must play the four other teams. Thus, 4 matches.

South Africa must play the four other teams. However, we have already counted their match with Ireland. Thus, it is only three matches.

Scotland must play the four other teams. However, we have already counted their match with Ireland and South Africa. Thus, it is only two matches.

Romania must play the four other teams, however, we have already counted their match with Ireland, South Africa, and Scotland. Thus, it is only 1 match with Tonga.

To find the total number of games in each pool, add up the number of matches together:

$4+3+2+1= 10$ matches are needed in each group.

Additional Question: If there were 6 teams in a pool, how many matches would be needed?

$5+4+3+2+1=15$ matches are needed in each pool.

Question 2: The top two in each group (8 teams) go into the quarterfinals for the knockout stage. How many games are there in the knockout stage? (There is a game between the two beaten semi-finalists to find 3rd Place team)

Solution A:

- Quarterfinals: There are 8 teams that advance to the quarterfinals, and each quarterfinal match involves two teams. So, there are 4 quarterfinal matches.
- Semifinals: The winners of the 4 quarterfinal matches advance to the semifinals. Each semifinal match involves two teams. So, there are 2 semifinal matches.
- Finals: The winners of the 2 semifinal matches face off in the finals. There is 1 final match.
- 3rd Place Match: There is a game between the two beaten semifinalists to determine the 3rd Place team. This is 1 additional match.

To find the total number of games in the knockout stage, add up the number of matches at each stage:

Quarterfinals (4 matches) + Semifinals (2 matches) + Finals (1 match) + 3rd Place Match (1 match) = 8 matches in the knockout stage

Solution B:

Another way of thinking about this is that every match will have one loser. If there are 8 teams, there must be 7 losers, therefore 7 matches. Plus, the extra match for 3rd place.

Solution C:

Draw a diagram to represent the knockout stages.



Question 3: A try is 5 points. If you score a try, you get to take a conversion kick, which, if it goes between the posts and above the crossbar, gives 2 points. You can also kick penalty goals and drop goals, both of which give 3 points. How many different ways are there for a team to score 12 points?

Abbreviations:

- T(try)=5 pts.
- C(conversion)=2 pts.
- P(penalty)=3 pts.
- D(drop goal)=3 pts.

$T+T+C=12.$

$P+P+P+P=12.$

$P+P+D+D=12$

$D+D+D+D=12.$ (We could have different combinations with penalties and drop goals)

Advance Question: How many ways are there for a team to score 21 points?

$T+T+T+P+P= 5+5+5+3+3=21.$

$T+T+C+P+P+P= 5+5+2+3+3+3=21.$

$$T+C+T+C+T+C= 5+2+5+2+5+2=21.$$

$$7 \times P = 21$$

$$7 \times D = 21$$

Question 4: How many possible different orders could the group finish in (assuming there are no tied positions).

Rugby World Cup: POOL B

Ireland
South Africa
Scotland
Tonga
Romania

Answer: $5 \times 4 \times 3 \times 2 \times 1 = 120$ different possible orders

Question 5: A rather ponderous pundit is asked for a prediction for the finishing order in Group 1 in the World Cup and gives the following:

Ireland will finish ahead of Tonga.

Romania will finish two places behind Scotland

Tonga will finish two places behind South Africa

Scotland will finish behind Ireland

Ireland will finish three places ahead of Tonga

It's not a very direct answer, but can you work out the pundit's prediction?

1	Ireland
2	South Africa
3	Scotland
4	Tonga
5	Romania

Points:

Q 6. In a rugby match, Team A scores 3 tries and successfully converts 2 of them. How many points did Team A score in total?

Answer:

$$5(3)+2(2)=15+4=19.$$

Q 7. In a knockout stage match, Team B scores 2 tries and successfully converts one of them. How many points did they earn from those scoring events?

Answer:

$$5(2)+2= 12 \text{ points.}$$

Tries and Conversions:

Q 8. If a rugby team scores a total of 17 points in a match and wins by 5 points, how many tries and conversions did they score, assuming they didn't kick any penalty goals or drop goals?

Answer:

$$5+5+5+2: 3 \text{ tries and 1 conversion.}$$

Q 9. If a rugby team wins a match by scoring 24 points and they score 4 tries, how many successful conversions did they have?

Answer:

4 tries is 20 points in total.

24-20 is 4 points left.

A conversion is 2 points.

4 divide by 2= 2 conversions.

Brian O'Driscoll

Tries:

A try is when you run into the end zone with the ball in your hands and touch the ball down. 5 points are given to the scoring team when a try is achieved.

Brian O'Driscoll is a former Irish professional Rugby Union player. During his 15-year career, he captained Leinster, Ireland and the British and Irish Lions. He is the 8th-highest try scorer in international rugby union history, and the highest scoring center of all time. O'Driscoll holds the Six Nations record for most tries scored with 26.



Question: How many points in total has Brian O'Driscoll received in his Six Nations records with 26 tries?
A try is 5 points.

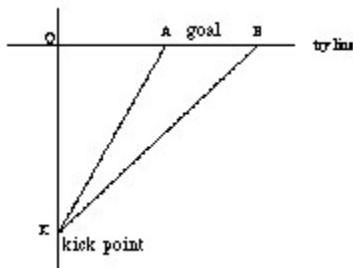
Answer: $26 \times 5 \text{ points} = 130 \text{ points}$.

Angles:

Angles are super important in rugby. Players need to figure out the right angles for lots of things, like passing the ball to a friend or trying to kick it through the goalposts after scoring a try.

When a team scores a try, they can try to get extra points by kicking the ball over the crossbar and between the posts. People used to think that the best angle to kick the ball was 45 degrees, but that didn't consider how the air slows the ball down.

Scientists investigated it and found that when you think about air slowing the ball down, the best angle to kick it is actually 30 degrees. So, players have to pay attention to the angles to do their best in the game!

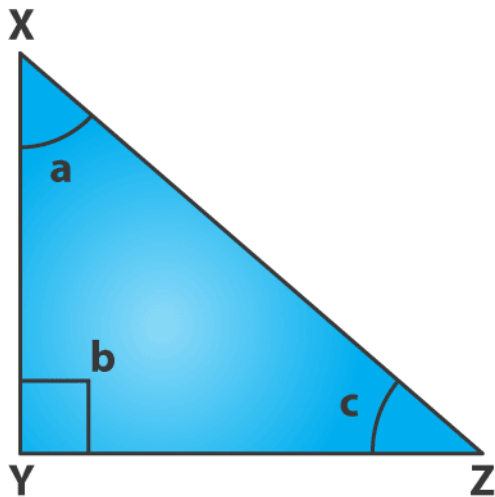


Question: If a rugby player kicks the rugby ball at point Z using 30 degrees at angle C. Calculate angle A (the angle between "Y" the base of the goalpost and "Z" the starting position of the rugby ball).

Answer: 180 degrees = all angles in the triangle.

$180 - 90(\text{the right angle}) - 30(\text{the starting position}) = 30 \text{ degrees}$.

Angle A = 30 degrees.



Rugby speed:

Aaron Sexton is an Irish rugby union player who plays wing or fullback for Ulster in the United Rugby Championship. Aaron Sexton is one of the fastest players in Irish Rugby. In school, he was a track sprinter who won All-Ireland championships in the 100m and 200m, representing Bangor Grammar School. Sexton holds a 10.43 second PB for the 100m and 20.69 for the 200m. Separately, he's been clocked at 37.8 km per hour on a rugby field. 37.8km per hour is the same as around 23.49 miles per hour.



Question: Convert Sexton's speed of 37.8km per hour to meters per second.

Answer:

37.8km per hour = 37,800 meters per hour.

37,800 meters per hour divided by 60 = 630 meters per minute.

630 meters per minute: divide by 60 = 10.5 meters per second.

Question: Convert Sexton's speed of 23.49 miles per hour to miles per second.

Answer:

23.49 miles per hour divided by 60= 0.3915 miles per minute.

0.3915 miles per minute: divided by 60= 0.006525 miles per second.

Rory Best:

Rory David Best OBE is an Irish former rugby union player who was the captain of the Ireland national team from 2016 to 2019. He also played hooker for Ulster Rugby. Rory is one of the most capped rugby players of all time, with 124 caps for Ireland. In rugby, a cap is a player's appearance in a game at an international level e.g., Rory Best has represented Ireland in rugby matches 124 times in his career. On the 26th of November 2016, he became just the fifth man to reach 100 Ireland caps as they had beaten Australia 27-24. Rory Best is said to weigh 105kg. The average weight of a human in Europe is said to be 70kg.



Question: Calculate how much heavier Rory Best is with 105kg compared to the average human weight of 70kg?

Ireland's Women Rugby Team:

Ireland made their debut in the Women's Six Nations Championship in 1996. Ireland won their first championship in 2013, winning both a Triple Crown and a Grand Slam at the same time. The Triple Crown is contested amongst the home nations where England, Wales, Scotland and Ireland compete. Italy and France are not included in the Triple Crown. A Grand Slam is when one team wins every match in a single Six Nations Championship.

On the 9th of February 2013, Ireland's Women's rugby team defeated England for the first time. Alison Miller scored a hat-trick of tries as Ireland won 25–0. A hat-trick is when a player scores three or more tries in a game.

Question: Calculate how many tries in total did Ireland score that day. Note: A try is 5 points each.

Answer: 25 divided by 5= 5 tries.

Question: When Ireland won the Women's Six Nations championship, they defeated France 15–10. Calculate the different ways Ireland could have achieved the 15 points.

Answer: 3 Tries: $5+5+5=15$.

5 drop goals: $3+3+3+3+3=15$

5 penalty goals: $3+3+3+3+3=15$

Two tries with one conversion and a penalty goal: $5+2+5+3=15$

Penalty and Scrum:

When a scrum is formed, the 8 forwards from each team bind together to form their own pack. The two packs then oppose each other by binding together head-to-head with a tunnel between the two packs. At this stage, the scrum-half of the team that did not commit the penalty puts the ball into their scrum.

List of players in Ireland's Women's Scrum:

1. Linda Djougang (Loosehead prop) 86kg
2. Christy Haney (Tighthead Prop) 90kg
3. Brittany Hogan (No.4 Lock) 72kg
4. Neve Jones (Hooker) 72kg
5. Edel McMahon (Openside Flanker) 90kg
6. Sam Monaghan (Centre) 88kg
7. Grace Moore (Blindside Flanker) 80kg
8. Maeve Óg O'Leary (No.8) 70kg
9. Aoife Wafer (Blindside Flanker) 80kg

There are always 8 forward players needed per team for a rugby scrum.

Note: Ireland's team has an extra blindside flanker. However, whichever player who plays as the blindside flanker has the same weight.

Question: Calculate the weight of Ireland's Women's scrum. Do not include Aoife wafer.

Answer: 728kg in total.