

## Netball Answers

Like basketball, the game is played on a hard court with scoring rings at both ends and with a ball resembling a basketball (lighter, smaller and often softer in construction). The hoops are of smaller dimension and contain no backboards. The court is divided into thirds which regulate where individuals in each team are allowed to move, and two semi-circular "shooting circles" at each end from within which all scoring shots must be taken.

Netball rules do not permit players to let their landing foot touch the ground again if it is lifted at all while in possession of the ball (however it is possible to balance on the other foot if the landing foot is accidentally lifted). Consequently, the only way to move the ball towards the goal is to throw the ball to a team-mate. The ball cannot be held by a player for more than three seconds at any time, and players may not tap the ball to themselves more than once. This, combined with the restrictions on where one player can move, ensures that everyone on the team is regularly involved in play.

### **Quintic Video Files you will use for these questions:**

- 1) 1v1\_BV
- 2) Shot 18\_FV
- 3) Triangle Defending\_FV
- 4) Pick + Shoot L\_45
- 5) Zig Zag + Ball R\_45
- 6) Hoop change direction with ball L\_45
- 7) Overhead Pass\_SV
- 8) Shoulder Pass\_SV
- 9) Bounce Pass \_SV
- 10) Clock\_BV
- 11) Shot\_SV

### **PLAY AND PAUSE**

**Open the video file '1v1\_BV'**

- 1) Watch the video at full speed by pressing this button 

- (i) What are the advantages of playing the clip in real time?  
*Watching the video in full time you get to see the actual speed at which is especially important in netball as you only have 3 seconds to shoot the ball.*

- (ii) Watch the clip a number of times at full speed and then at the slower speeds. If you were a netball coach at what speed would you watch the clip? Explain your answer.

*Even though the real speed allows you to assess the shot time-wise, using the slower speeds provides a deeper, more beneficial analysis of the shooting technique of the player.*

- 2) Now watch the video through frame by frame. Imagine that you are teaching a novice. Write a descriptive account of the shooting technique including arm movement, leg movement and finishing position.

*When lining up to take the shot, feet are firmly on the ground at shoulder width apart pointing towards the goal, arms are held extended above the head and knees are fully extended. To execute the shot, the knees and arms are flexed and as you push up heels come off the ground and the ball is released. The finishing position of the player is similar to that of the starting one, with the heels off the ground.*

### Open the video file 'Shot 18\_FV'

Scroll to the video frame at which the players knees are most flexed

- (i) Which frame is this at?

*Frame 48*

- (ii) In this frame, which points are identified by these co-ordinates:

a. X= 397.00 Y= 323.00

*The player's right elbow*

b. X= 597.00 Y= 545.00

*Rim of the goal*

c. X= 413.00 Y= 135.00

*The player's right knee*

d. X= 393.00 Y= 66.00

*The player right toe*

**TIMING**

Open the video file ‘Triangle Defending\_FV’

3) Set your markers at frames 12, 29, 30, 35, 42, 58.

These frames mark significant points during the action and you can use the stopwatch function to find the time differences between these points

Use the options from the box below to complete the table matching up the frame numbers, descriptions of key frames and time differences

| Frame Number | Descriptions                 | Time |
|--------------|------------------------------|------|
| • 30         | right toes leaves ground     | 0.10 |
| • 42         | ball is released             | 0.34 |
| • 29         | left heel strikes the ground | 0.32 |
| • 58         | contact with ball            | 0.02 |
| • 12         | right foot fully lands       | 0.14 |
| • 35         | player is totally in the air |      |

| Frame | Description                         | Time Difference |
|-------|-------------------------------------|-----------------|
| 12    | <i>Ball is released</i>             | 0.34 sec        |
| 29    | <i>Right toe leaves ground</i>      |                 |
| 30    | <i>Contact with ball</i>            | 0.02 sec        |
| 35    | <i>Player is totally in the air</i> | 0.10 sec        |
| 42    | <i>Left heel strikes the ground</i> | 0.14 sec        |
| 58    | <i>Right foot fully lands</i>       | 0.32 sec        |

**Open the video file 'Pick + Shoot L\_45'**

- 4) Use the markers and the stopwatch function to find the time difference between:
- (i) Frame 0 and the 'player making contact with the ball'  
*1.38 sec*
  - (ii) 'Heels leave the ground' and 'release of the ball'  
*0.08 sec*
  - (iii) Frame 137 and 'release of ball'  
*0.78 sec*
  - (iv) 'Contact with ball' and 'end of follow through'  
*2.22 sec*

**ANGLES AND SHAPES****Open the video file 'Zig Zag + Ball R\_45'**

- 5) Set the zoom to 1.2. Every 5 frames between frames 65-105, use the buttons shown below draw a red circle round the ball, a yellow line joining the hip and shoulder, a green line joining the hip and knee and a blue line joining the shoulder and wrist on the left hand side of the player



This will create a trace of the path of movement of the ball and player throughout part of the movement.



**Open the video file 'Hoop change direction with ball L\_45'**

- 6) Set the zoom to 1.5.  
(i) Using the button shown below, draw and record the following angles between frames 10-140



Frame 10 – angle of the right elbow: (shoulder-elbow-wrist)  
*97.86°*

Frame 20 – angle of the right knee: (ankle-knee- hip)  
*72.20°*

Frame 30 – angle of the right shoulder: (hip-shoulder-elbow)  
*116.00°*

Frame 40 – angle of the right hip: (shoulder-hip-knee)  
*160.51°*

Frame 50 – angle of the left knee: (ankle-knee-hip)  
*121.57°*

Frame 60 – angle of the right ankle: (knee-ankle-toe)  
*88.26°*

Frame 70 – angle of the right knee: (ankle-knee-hip)  
*104.67°*

Frame 80 – angle of the right elbow: (shoulder-elbow-wrist)  
*84.64°*

Frame 90 – angle of the right hip: (shoulder-hip-knee)  
*170.69°*

Frame 100 – angle of the left knee: (ankle-knee-hip)  
*163.84°*

Frame 110 – angle of the left elbow: (shoulder-elbow-wrist)  
*71.73°*

Frame 120 – angle of the left ankle: (knee-ankle-toe)  
*118.79°*

Frame 130 – angle of the left shoulder: (hip-shoulder-elbow)  
54.92°

**SYNCHRONISATION**

**Open the video file ‘Overhead Pass SV-1’ in the Main Window**  
**Open the video file ‘Shoulder Pass SV-4’ in the Best Window**

- 7) Set the zoom on the main video to 1.2. Scroll both videos to the frame at which the ball is released
- (i) Synchronise these videos at this point
  - (ii) Play the videos through and point out 2 similarities and 2 differences between the passes

| Similarities  | Differences   |
|---|---|
| <ul style="list-style-type: none"> <li>• <i>Both passes are the same type of movement i.e. bringing the ball behind the body and pushing it forward</i></li> <li>• <i>Both players step into the same stance when passing the ball with left leg flexed in front of the body and right leg extended behind</i></li> </ul> | <ul style="list-style-type: none"> <li>• <i>The overhead pass is a 2 handed pass whereas the shoulder pass is just one hand</i></li> <li>• <i>The torso of the player doing the shoulder pass is rotated more due to the fact that it is a one handed pass</i></li> </ul> |

**BLEND**

**Open the video file ‘Bounce Pass\_SV’**

- 8) ‘Set Background’ at frame 5 so it can be used in the blend function
- (i) In comparison with the background, how has the netball player changed her body shape in the following frames:

Frame 25?

*The player has stepped forward with the left foot resulting in the right knee being slightly more flexed as is the left hip. The player’s torso has rotated slightly and she has dropped her left shoulder as a result.*

Frame 32?

*The player has a similar lower body position as in frame 25 with the left leg a slightly more flexed front of the body and the right like extended behind the body. The elbows and wrists have been flexed towards the body in preparation to push the ball. The torso has begun to rotate back in the opposite direction to return to a neutral position.*

Frame 37?

*Elbows are fully extended following the release of the ball. The torso has returned to a fully neutral position. The heel of the right foot has come off the ground slightly during the follow through.*

Frame 46?

*Left foot is flexed in front of the player while the right foot is extended behind the player in a toe off position. Right arm is flexed and adducted across the body.*

Frame 57?

*The left knee and hip has been extended. The right knee is in a similar position with the heel of the right foot returning to the ground. The upper body is upright with the right elbow flexed across the chest.*

### **PHOTO SEQUENCE**

**Open the video file 'Clock\_BV'**

- 9)  
 (i) Create a 9 frame 'Multiple Screen Capture' of the following frames showing the desired angles and a text box showing the angle value.

Frame 44 – Angle of the right elbow (shoulder-elbow-wrist)

Frame 224 – Angle of the right shoulder (elbow-shoulder-hip)

Frame 307 – Angle of the right shoulder to the vertical (elbow-shoulder)

Frame 392 – Angle of the right elbow

Frame 551 – Angle of the left elbow

Frame 645 – Angle of the left elbow to the horizontal (wrist-elbow)

Frame 737 – Angle of the left hip (shoulder-hip-knee)

Frame 832 – Angle of the left shoulder

Frame 1037 – Angle of the right elbow



## DIGITISATION

Open the video file 'Shot\_SV'

- 10) A digitisation template has already been completed for this video, which tracks the right hand side of the player
  - (i) Load the frame template
  - (ii) Complete a digitisation trace between frames 0 and 34
  - (iii) Save this trace



11) This video file has already been calibrated for you. Using the ruler function (shown below) find out the lengths of the following segments.



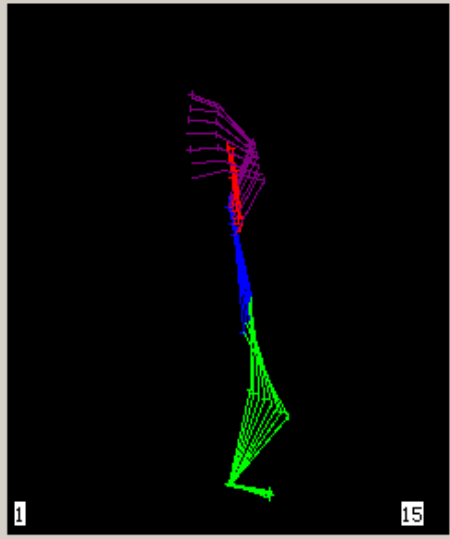
*(Hint: Scroll through the video frames until you see the best angle at which to take your measurement i.e. for the upper-arm measurement, when the shoulder and elbow are clearly visible)*

| Segment   | Length (m) |
|-----------|------------|
| Thigh     | 0.48       |
| Upper Arm | 0.33       |
| Lower Leg | 0.46       |
| Trunk     | 0.52       |
| Foot      | 0.25       |

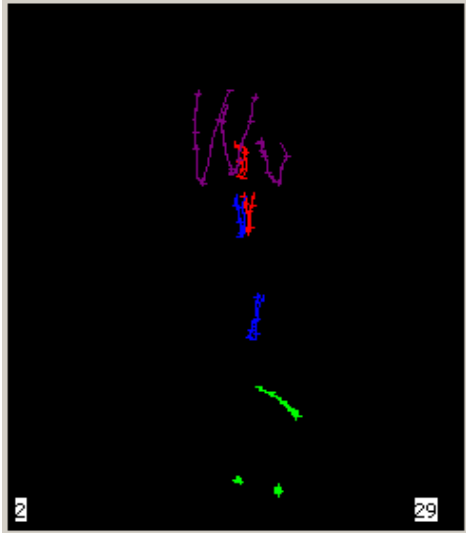
12) Open the animation window

(i) Which buttons are used in combination to create the following pictures



*(Hint: Take note of the frame number in the bottom right hand corner of each animation)*





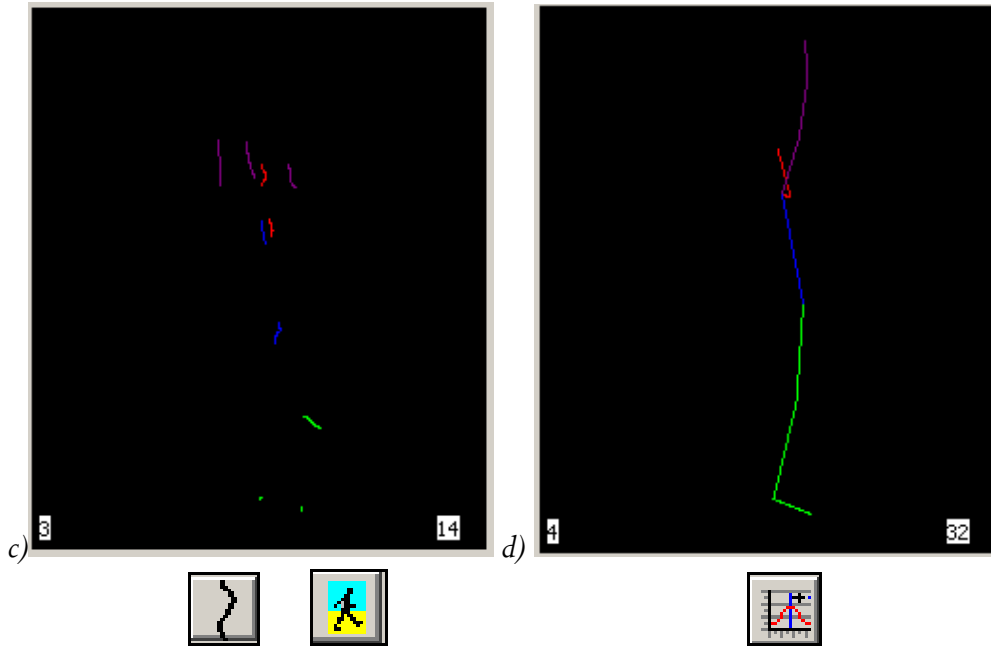
a)



b)



Open the Linear Analysis window using the button shown below.



13) Look at the digitised data and save it as an excel file. Open this file in Excel and use it to answer the following questions.

In frame 22, what are the values of:

- (i) Vertical acceleration of the right shoulder?  
 **$12.81 \text{ ms}^{-2}$**
- (ii) Horizontal velocity of the right 3<sup>rd</sup> finger?  
 **$1.39 \text{ ms}^{-1}$**
- (iii) Distance of the right knee?  
 **$0.26 \text{ m}$**
- (iv) Acceleration of the right wrist?  
 **$22.61 \text{ ms}^{-2}$**
- (v) Velocity of the right elbow?  
 **$1.09 \text{ ms}^{-1}$**
- (vi) Vertical acceleration of the right ankle?  
 **$1.66 \text{ ms}^{-2}$**

14) Given that there are 50 frames per second, find the following values after 0.28sec:

- (i) Vertical acceleration of the vertex of the head?  
 **$18.85 \text{ ms}^{-2}$**
- (ii) Distance of the right 3<sup>rd</sup> finger?  
 **$0.38 \text{ m}$**

- (iii) Acceleration of the right toe?  
 $-1.16 \text{ ms}^{-2}$
- (iv) Horizontal velocity of the 7<sup>th</sup> cervical?  
 $0.13 \text{ ms}^{-1}$
- (v) Vertical acceleration of the hip?  
 $20.56 \text{ ms}^{-2}$
- (vi) Horizontal acceleration of the right elbow?  
 $-1.13 \text{ ms}^{-2}$

15) Find the values of the following from the frame at which the ball is released:

- (i) Horizontal velocity of the right knee?  
 $-1.01 \text{ ms}^{-1}$
- (ii) Vertical acceleration of the right toe?  
 $1.20 \text{ ms}^{-2}$
- (iii) Acceleration of the vertex of the head?  
 $-9.08 \text{ ms}^{-2}$
- (iv) Horizontal acceleration of the right hip?  
 $3.90 \text{ ms}^{-2}$
- (v) Vertical velocity of the 7<sup>th</sup> cervical?  
 $0.80 \text{ ms}^{-1}$
- (vi) Distance of the right 3<sup>rd</sup> finger?  
 $0.79 \text{ m}$