

HANG TIME- MAXIMUM JUMP HEIGHT DETAILS

WHAT IS HANG TIME?

t_{hang} is measured from the instant the basketball player's feet leave the ground until the time the player's feet return to the ground.

To calculate your HANG TIME from your measured MAXIMUM JUMP HEIGHT

Complete the steps below to determine your stretching reach and then your jumping reach

- 1- Stand sideways against the tape measure with both feet on the ground.
- 2- Reach up with one hand, stretch and place the small magnet on the highest point on the tape
- 3- This is your stretching reach height.
Fill it in: **STRETCHING REACH HEIGHT = _____ INCHES**
- 4- Next, jump up as high as you can and place the small magnet on the highest point on the tape.
- 5- This is your jumping reach height.
Fill it in: **JUMPING REACH HEIGHT = _____ INCHES**
- 6- Subtract measurement in step 3 from the measurement in step 5. This is the height your feet are above the floor.
Fill it in: **MAXIMUM JUMP HEIGHT h_{max} = _____ INCHES**
- 7- Put the height from step 6 into the Equation below. Use a calculator to get the Square Root.

$$t_{hang} = \sqrt{(h_{max}/48)} \text{ seconds} = \underline{\hspace{2cm}} \text{ seconds}$$

In words the Equation says that your HANG TIME t_{hang} (in seconds) is the Square Root of your MAXIMUM JUMP HEIGHT h_{max} (in inches) when divided by 48

The symbol " $\sqrt{\hspace{1cm}}$ " stands for the **Square Root**.

The Square Root of a **number** is a value that, when multiplied by itself, gives that very same **number**. For example the square root of the number 4 is $\sqrt{4} = 2$, since $2 \times 2 = 4$; the square root of $(1/16)$ is $\sqrt{(1/16)} = (1/4)$, since $(1/4) \times (1/4) = (1/16)$; and the square root of 2 is $\sqrt{2} = (1.414)$, since $(1.414) \times (1.414) = 2$

To see how to derive the Equation above that relates HANG TIME t_{hang} to the MAXIMUM JUMP HEIGHT h_{max} see the other handout sheet.

For example, using the Equation for **HANG TIME** vs **MAXIMUM JUMP HEIGHT** we get:

If h_{\max} is **6** inches, then

$$t_{\text{hang}} = \sqrt{6/48} \text{ seconds} = \sqrt{1/8} \text{ seconds} = 0.353 \text{ second}$$

If h_{\max} is **12** inches, then

$$t_{\text{hang}} = \sqrt{12/48} \text{ seconds} = \sqrt{1/4} \text{ seconds} = 0.5 \text{ second}$$

If h_{\max} is **24** inches then

$$t_{\text{hang}} = \sqrt{24/48} \text{ seconds} = \sqrt{1/2} \text{ seconds} = 0.707 \text{ second}$$

If h_{\max} is **36** inches then

$$t_{\text{hang}} = \sqrt{36/48} \text{ seconds} = \sqrt{3/4} \text{ seconds} = 0.866 \text{ second}$$

If h_{\max} is **48** inches then

$$t_{\text{hang}} = \sqrt{48/48} \text{ seconds} = \sqrt{1} = 1.000 \text{ second}$$

FROM THE GRAPH BELOW ONE CAN ESTIMATE YOUR HANG TIME FROM YOUR JUMP HEIGHT

