**How to calculate arrow velocity**

Using the distance of the sight from the archer’s eye and the distance between the 20m and 60 m sight marks.

First let’s take a look at the parabolic trajectory:

s = distance to target. Vo = Arrow velocity.

Arrow elevation. g0 = 9,82 m/s2 (at latitude 60-65)



For small angles (< 8o ) cosine is very close to 1

Thus the arrow velocity for small elevation angles is:



Now we define two elevation angles:

**** = elevation angle for hitting the target at 20 meters

**=** elevation angle for hitting the target at 60 meters

eye

α2

**



**=the angle between 20m and 60m sight marks and the sighting eye.



The arrow velocity ( v ) is of course the same whether we shoot at 20m or 60m:



Squaring both sides and dividing by g**0**/2 we get









And then

sin() = 3 sin

For small angles, sin(+) = sin + sin

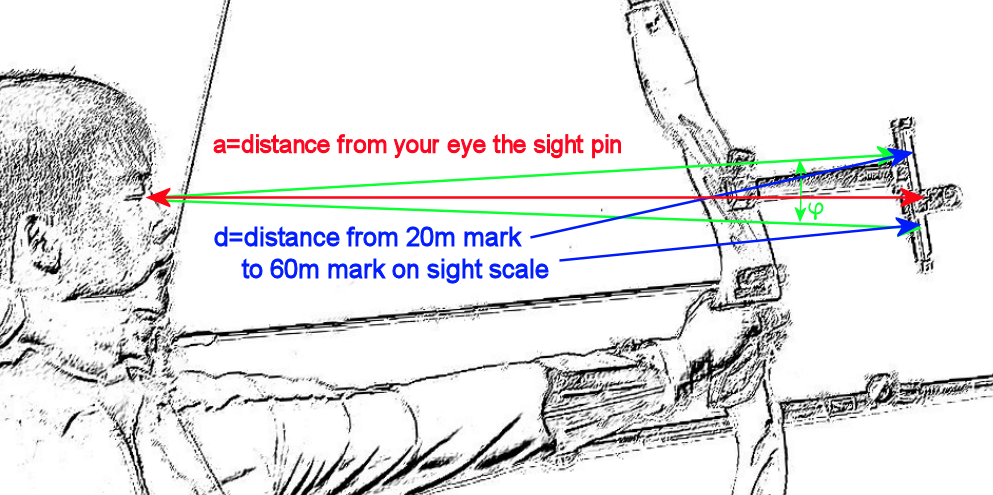
giving us

sin + sin = 3 sin

thus sin = 0,5\*sin



**a** is the distance from eye to sight pin, and **d** is the distance between the 20m and 60m sight marks



By definition, **sin** is d/a, and



For example, **a** = 960 mm and **d** = 58 mm gives **v** = 57.0 m/s.

If you want it in feet/s you have to multiply with 3.28

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| First name | Last name | Type | Length  mm | Point grain | Vanes | Spine | Eye to sight pin mm | 20-60  mm | Cal. m/s | Mesum/s |
| Mikael | Ekholm | X10 | 666 | 110 | Spin-w | 550 | 860 | 39 | 65,8 | 65,3 |
| Göran | Bjerendal | X10 | 675 | 100 | Spin-w | 470 | 1035 | 59 | 63,8 | 63,2 |
| Hans | Sonesson | ACE | 740 | 90 | Spin-w | 520 | 930 | 46 | 63,1 | 63,4 |
| Leif | Jansson | X10 | 710 | 100 | Spin-w | 620 | 910 | 52 | 58,6 |  |
| Christine | Bjerendal | X10 | 637 | 100 | Spin-w | 830 | 860 | 50 | 58,1 |  |
| Klas | Vängman | ACE | 765 | 95 | Arizona | 670 | 1020 | 60 | 57,8 |  |
| Nore | Åhlund | ACE | 707 | 90 | Spin-w | 780 | 900 | 56 | 56,2 |  |
| Claes | Colmeus | ACE | 749 | 80 | K-spin | 670 | 1000 | 65 | 55,0 |  |
| Bertil | Olsson | ACE | 765 | 70 | K-spin | 720 | 1010 | 66 | 54,8 | 55,2 |
| Rolf | Svensson | X10 | 750 | 90 | Spin-w | 600 | 960 | 63 | 54,7 |  |
| Ervin | Herbertsson | ACE | 706 | 60 | Spin-w | 850 | 753 | 56 | 51,4 |  |
|  |  |  |  |  |  |  |  |  |  |  |

about 1%

The estimated **arrow velocity** may control as measured by

ArrowSpeedometer see [www.ide-teknik.com/eanalys-velocity.htm](http://www.ide-teknik.com/eanalys-velocity.htm)

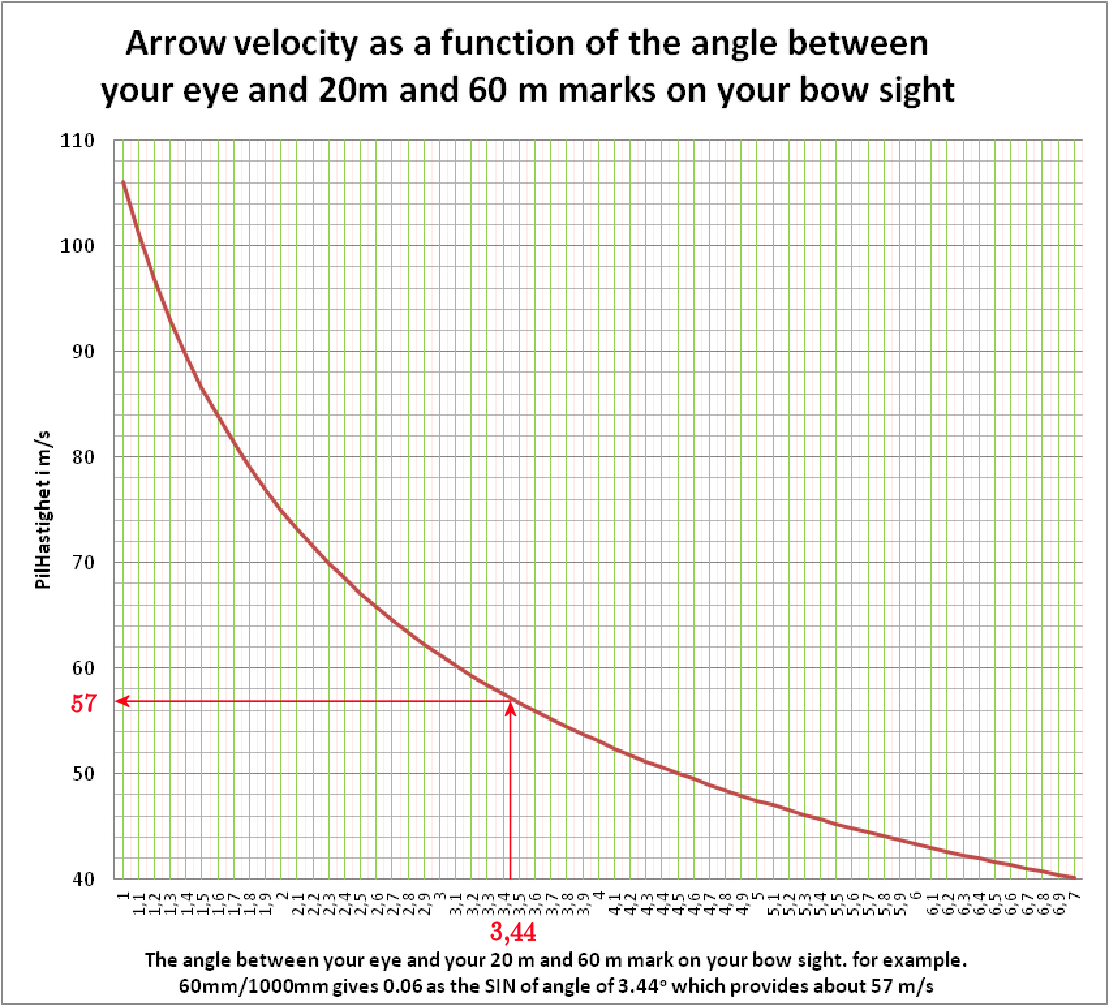
**Reference:**

<http://margo.student.utwente.nl/sagi/artikel/speed/arrow.html>

<http://www.bio.vu.nl/thb/users/kooi/tuko92.pdf>

**Arrow velocity calculate:**

You can use this link: <http://www.ide-teknik.com/arrowspeed.htm> or use the diagram below



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