Bernoulli Principle Calculation

(5) $P_1 + ½\rho v_1^2 + \rho g y_1 = P_2 + ½\rho v_2^2 + \rho g y_2$

P = pressure
ρ = density (blood: 1060 kg/m^3)
v = velocity
g = acceleration due to gravity
y = height

Inserting equation (2) into equation (3):

$$(6)\ \tau = \eta \frac{8v}{d}$$

Soleus
Equation (5):
33,330 Pa + ~~½(1060 kg/m^3)(0 m/s)^2~~ + (1060 kg/m^3)(9.8m/s^2)(.1 m) = ~~(0 Pa)~~ + ½(1060 kg/m^3)v_2^2 + ~~(1060 kg/m^3)(9.8m/s^2)(0 m)~~
33,330 Pa + 1038.8 kg/m*s^2= (530 kg/m^3)$(v_2)^2$
v_2 = 8.05 m/s

Equation (6):

$$\tau = \eta \frac{8v}{d} = (0.035P)\frac{8\left(805\frac{mm}{s}\right)}{0.7\ mm} =$$ **322 Pa = 3,220 dyn/cm²**

Gastrocnemius
Equation (5):
28,664 Pa + ~~½(1060 kg/m^3)(0 m/s)^2~~ + (1060 kg/m^3)(9.8m/s^2)(.1 m) = ~~(0 Pa)~~ + ½(1060 kg/m^3)v_2^2 + ~~(1060 kg/m^3)(9.8m/s^2)(0 m)~~
28,664 Pa + 1038.8 kg/m*s^2= (530 kg/m^3)$(v_2)^2$
v_2 = 7.48 m/s

Equation (6):

$$\tau = \eta \frac{8v}{d} = (0.035P)\frac{8\left(748\frac{mm}{s}\right)}{0.7\ mm} =$$ **299.2 Pa = 2,992 dyn/cm²**

ArtAssist Machine
Equation (5):
15,998 Pa + ~~½(1060 kg/m^3)(0 m/s)^2~~ + (1060 kg/m^3)(9.8m/s^2)(.1 m) = ~~(0 Pa)~~ + ½(1060 kg/m^3)v_2^2 + ~~(1060 kg/m^3)(9.8m/s^2)(0 m)~~
15,998 Pa + 1038.8 kg/m*s^2= (530 kg/m^3)$(v_2)^2$
v_2 = 5.67 m/s

Equation (6):

$$\tau = \eta \frac{8v}{d} = (0.035P)\frac{8\left(567\frac{mm}{s}\right)}{0.7\ mm} =$$ **226.8 Pa = 2,268 dyn/cm²**