QUESTION:
What id the equation for calculating the tension on a violin string (given length, frequency, and linear density)?

ANSWER
We can calculate the tension on a string using Mersenne's law (for fundamental harmonic):

$$f = \frac{1}{2L}\sqrt{\frac{F}{\mu}}$$

f is the frequency, L is the length of a string, F is a force (tension), and $\mu = \frac{m}{L}$ is linear density of a string (the mass per unit length)
Hence

$$f^2 = \frac{1}{4L^2}\frac{F}{\mu}$$

$$F = 4\mu L^2 f^2$$

ANSWER

$$F = 4\mu L^2 f^2$$