26. To find out whether or not the vine breaks, it is sufficient to examine it at the moment Tarzan swings through the lowest point, which is when the vine – if it didn't break – would have the greatest tension. Choosing upward positive, Newton'second law leads to

$$T - mg = m\frac{v^2}{r}$$

where $r = 18$ m and $m = W/g = 688/9.8 = 70.2$ kg. We find the v^2 from energy conservation (where the reference position for the potential energy is at the lowest point).

$$mgh = \frac{1}{2}mv^2 \quad \Longrightarrow \quad v^2 = 2gh$$

where $h = 3.2$ m. Combining these results, we have

$$T = mg + m\frac{2gh}{r} = mg\left(1 + \frac{2h}{r}\right)$$

which yields 933 N. Thus, the vine does not break. And rounding to an appropriate number of significant figures, we see the maximum tension is roughly 930 N.