

The centripetal force equals $F = ma_c = mr\omega^2 = \frac{mv^2}{r}$.

a) If the rock will 8 times lighter, than its mass will equal: $\frac{m}{8}$. So, we can find the centripetal force in

this case: $F_1 = \frac{m}{8} \cdot \frac{v^2}{r} = \frac{1}{8} \cdot \frac{mv^2}{r} = \frac{1}{8} \cdot F$. So, the centripetal force will be lower in 8 times than

it was if the rock will 8 times lighter.

Answer: lower in 8 times.

b) If the rock will swung 7 times faster than its velocity will be equal $7 \cdot v$. So, we can find the

centripetal force in this case: $F_2 = \frac{m(7v)^2}{r} = 49 \cdot \frac{mv^2}{r} = 49 \cdot F$. so, it will be greater in 49

times.

Answer: greater in 49 times.

c) If the sling will be 6 times longer than the radius of this circular motion will be 6 times greater and

equals $6 \cdot r$. So, we can find the centripetal force in this case: $F_3 = \frac{mv^2}{(6 \cdot r)} = \frac{1}{6} \cdot \frac{mv^2}{r} = \frac{1}{6} \cdot F$.

So, it will be 6 times lower.

Answer: lower in 6 times.