

We know the formula:  $F = \frac{mv^2}{r} = \frac{3 \cdot 1}{2} = 1.5 \text{ N}$ .

(a) Twice the mass:  $F = \frac{2mv^2}{r} = 2 \cdot \frac{mv^2}{r} = 2 \cdot 1.5 = 3 \text{ N}$ .

Answer: 3 N.

(b) Twice speed:  $F = \frac{m \cdot (2v)^2}{r} = 4 \cdot \frac{mv^2}{r} = 4 \cdot 1.5 = 6 \text{ N}$ .

Answer: 6 N.

(c) Twice the length of string (radial distance):  $F = \frac{mv^2}{2 \cdot r} = \frac{1}{2} \cdot \frac{mv^2}{r} = \frac{1}{2} \cdot 1.5 = 0.75 \text{ N}$ .

Answer: 0.75 N.

(d) Twice mass, twice speed and twice distance all at the same time:

$$F = \frac{(2m) \cdot (2v)^2}{2r} = \frac{2 \cdot 4}{2} \cdot \frac{mv^2}{r} = 4 \cdot \frac{mv^2}{r} = 4 \cdot 1.5 = 6 \text{ N}.$$

Answer: 6 N.