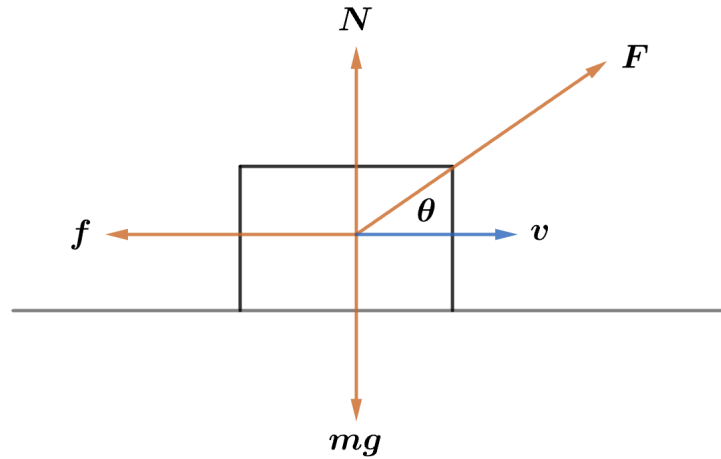# 2009 F=ma Exam: Problem 15

Kevin S. Huang

Since the suitcase is moving at constant velocity, the net force on the suitcase is zero. By Newton's 2nd law, we have

$$F \cos \theta = f$$

in the horizontal direction and

$$F \sin \theta + N = mg$$

in the vertical direction. Since $f = \mu N$, we substitute in the first and second equations:

$$\mu = \frac{F \cos \theta}{N} = \frac{F \cos \theta}{mg - F \sin \theta} = \frac{(100\,\text{N})(\cos 30°)}{(22\,\text{kg})(10\,\text{m/s}^2) - (100\,\text{N})(\sin 30°)} = 0.509$$

so the answer is $\boxed{\text{C}}$.