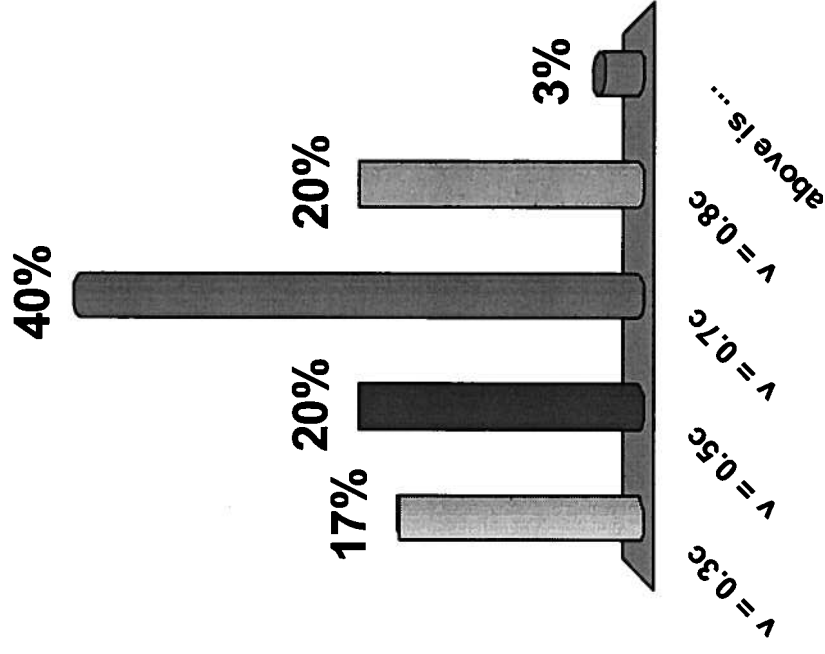


Given that an object with velocity v' in the x' direction in a frame, S' (which frame is moving with speed V in the x direction in the S frame of observer, O) will have in S the velocity: $v = (v' + V)/(1 + v'V/c^2)$, calculate v when $v' = 0.3c$, and $V = 0.5c$. The value of v is, most nearly,

- a) $v = 0.3c$
- b) $v = 0.5c$
- c) $v = 0.7c$
- d) $v = 0.8c$
- e) None of the above is within 10%.



The most nearly correct answer is

c) $0.7c$; as follows.

• Compute directly from the given formula:

$$v = (v' + V)/(1 + v'V/c^2)$$

$$= (0.3 + 0.5)c / (1 + (0.3 \cdot 0.5)c^2/c^2)$$

$$= 0.8c / 1.15$$

$$= 0.6957c \approx 0.7c, \text{ most nearly.}$$

• (Also, $0.7c$ is within 10% of the correct answer, excluding answer e)