

More Practice:

Sydney pushes box 1 with a force causing the system of four boxes to accelerate at 2.0 m/s^2 [E]. Boxes 1, 2, 3, and 4 have masses 1.0 kg , 3.0 kg , 1.0 kg , and 5.0 kg respectively. They are connected and move as a unit. The surface is frictionless.



Calculate:

$$F_{1 \text{ on } 2} = \underline{\hspace{2cm}} \quad F_{2 \text{ on } 1} = \underline{\hspace{2cm}} \quad F_{\text{net } 1} = \underline{\hspace{2cm}}$$

$$F_{2 \text{ on } 3} = \underline{\hspace{2cm}} \quad F_{3 \text{ on } 2} = \underline{\hspace{2cm}} \quad F_{\text{net } 2} = \underline{\hspace{2cm}}$$

$$F_{3 \text{ on } 4} = \underline{\hspace{2cm}} \quad F_{4 \text{ on } 3} = \underline{\hspace{2cm}} \quad F_{\text{net } 3} = \underline{\hspace{2cm}}$$

$$F_A = \underline{\hspace{2cm}} \quad F_{\text{net } 4} = \underline{\hspace{2cm}}$$

$$F_{\text{net sys}} = \underline{\hspace{2cm}}$$

Young Peter connects his toy cars with strings. He then pulls the police car with a force of 4.0 N to the east. The cars move as in a parade along a frictionless surface. The masses of the cars starting with the police car and going left are 1.0 kg, 0.20 kg, 0.80 kg, and 0.50 kg respectively.



Calculate:

Can you write the appropriate net force statements from first principles in order to calculate any of the following?

$$F_{1 \text{ on } B} = \underline{\hspace{2cm}} \quad F_{B \text{ on } 1} = \underline{\hspace{2cm}} \quad F_{\text{net } A} = \underline{\hspace{2cm}}$$

$$F_{2 \text{ on } C} = \underline{\hspace{2cm}} \quad F_{C \text{ on } 2} = \underline{\hspace{2cm}} \quad F_{\text{net } B} = \underline{\hspace{2cm}}$$

$$F_{3 \text{ on } D} = \underline{\hspace{2cm}} \quad F_{D \text{ on } 3} = \underline{\hspace{2cm}} \quad F_{\text{net } C} = \underline{\hspace{2cm}}$$

$$|F_{T1}| = \underline{\hspace{2cm}} \quad F_{A \text{ on } p} = \underline{\hspace{2cm}} \quad F_{\text{net } D} = \underline{\hspace{2cm}}$$

$$|F_{T2}| = \underline{\hspace{2cm}} \quad p = \text{Peter} \quad F_{\text{net sys}} = \underline{\hspace{2cm}}$$

$$|F_{T3}| = \underline{\hspace{2cm}} \quad a_{\text{sys}} = \underline{\hspace{2cm}}$$

Answers:

0.80 N	2.4 N	2.0 N [E]	18 N [E]
2.1 N	2.4 N	2.0 N [E]	-18 N [E]
1.6 m/s ² [E]	-4.0 N [E]	10 N [E]	-12 N [E]
4.0 N [E]	0.80 N [E]	2.0 N [E]	-10 N [E]
0.80 N [E]	-0.80 N [E]	-10 N [E]	20 N [E]
1.3 N [E]	2.1 N [E]	-12 N [E]	10 N [E]
0.32 N [E]	-2.1 N [E]	6.0 N [E]	7 N [E]
1.6 N [E]	-2.4 N [E]	2.0 N [E]	18 N [E]

Question 2:

Question 1: