Introduction to Newtonian Dynamics

1. For each of the following the object is in equilibrium (=0). Find the unknown forces. Diagrams are not drawn to scale.

16N 6N 115N F2

F1 83N

11N F3

1N

1.8N

F4 99N

77N

41N

74N F5

26N 48N

F6

111N

F7

22N

900N 1400N

F8

75N 200N 9N

9N

F9

3.0N 3N

4.0N F10 15N

F11

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **F1** | **F2** | **F3** | **F4** | **F5** | **F6** | **F7** | **F8** | **F9** | **F10** | **F11** |
|  |  |  |  |  |  |  |  |  |  |  |

2. Find the **net force** ( ) on each of the following. Be sure to state the direction!

a. b.

5N 14N 80N

140N

c.

24N 18N d.

12N 32N 21N

47N

36N

5100N

e. 3600N f.

40N

2900N

15N

7.0N 30N

26o

51o

g.

3. For each of the following objects the mass is 2.0kg. Find the acceleration.

a. b.

8N 21N 0.60N

1.0N

c.

7N 5N d.

4N 120N 96N

160N

140N

5100N

e. 3600N f.

2N

8700N

1.5N

15N

7.0N

26o

51o

g.

4. For each of the following find the missing force.

a. =2N left b. =32N right

16N 6N 115N F2

F1 83N

11N F3

c. =9N down d. = 0.70N [21o below –x]

2.0N

3.5N

21o

F4

41N 6.2N

5.4N

e. =12N **x** f. = -1.4 N **y**

74N F5

26N 48N

F6

6.6N

5. For each of the following find the missing force(s). Assume the mass is 5.0kg.

a. = 0.40m/s2 right b. =2.0m/s2 up 30.0N

7.0N

F2 16N

8.0N

F1

F3

7.0N

c. =-12m/s2 d. = 4.0m/s2 F5

80.0N 120N

F4

12N

6. For the following assume the object is in equilibrium. State the magnitude ***and direction*** of the missing force(s).

F1 F2

2.0N

4.0N

2.0N 6.0N

3.0N

5.0N

F3

76N 88N

33o36N

F4 51o

F6

84N

F7

F5

36o

22N

42o

66o

F6

F7

71o

410N

7. Find the SINGLE missing force and draw it in place.

a. = 5.0m/s2 right b. =1.2m/s2 up

120N

12kg

2.0kg

13N

c.= 2.0m/s2 left

11N d. = 1.8m/s2 [68o above –x]

4.0kg

48N

7N

62o

2.0kg

27o

71N