Introduction to Newtonian Dynamics

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

 16N 6N 115N 198N

 10N83N

 11N 30N

 1N

 1.8N

 2.8N99N

 77N

 41N

 74N 52N

 26N 48N

 65N

 111N

 275N

 22N

 900N 1400N

 500N

 75N 200N 9N

 9N

 12N 3N

 15N

 16N

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

a. b.

5N 14N 80N

 140N

∑**F**=9N right ∑**F**=60N left

c.

 24N 18N d.

 12N 32N 21N

 47N

 36N

∑**F**=6N right ∑**F**=0N

 5100N

e. 3600N f.

 40N

 2900N

∑**F**=5800N up 30N

 ∑**F**=50N [37o below +x]

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

a. b.

8N 21N 0.60N

 1.0N

**a**=6.5m/s2 right **a**=0.20m/s2 left

c.

 7N 5N d.

 4N 120N 96N

 160N

**a**=1.0m/s2 right 140N

 5100N **a**= - 2.0m/s2 **x**

e. 3600N f.

 2.00N

 8700N

 1.50N

**a**=0m/s2 **a**=1.25m/s2 [37o below +x]

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

a. ∑**F**=2N left b. ∑**F**=32N right

 16N 6N 115N 230N

 8N83N

 11N 21N

c. ∑**F**=9N down d. ∑**F**= 0.70N [21o below –x]

 2.0N

 3.5N

 21o

6.2N

 41N 6.2N

 5.4N

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

 74N 64N

 26N 48N

 6.4N

 6.6N

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

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

 7.0N

 16N16N

8.0N

 10N 20.0N

 7.0N

c. **a**=-12m/s2 **x** d. **a**=4.0m/s2 **y** 32N

 80.0N 120N

 100N 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

 84N

 F5

**F1**=5.0N [37o above –x]

**F2**=5.0N [37o above –x]

**F3**= 77N [34o above +x]

**F4**= 55N left

**F5**=1.0x102N down

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

a. **a**= 5.0m/s2 right b. **a**=1.20m/s2 up

 15.4N

 120N

12kg

6.0x10N

2.00kg

 13.0N

c. **a**= 2.0m/s2 left

 20N [20o above –x]

 d. **a**= 1.8m/s2 [68o above –x]

 11N

4.0kg

 48N

 7N 62o

2.0kg

 27o

 87N [4.5o below –x] 71N