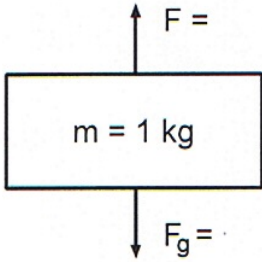
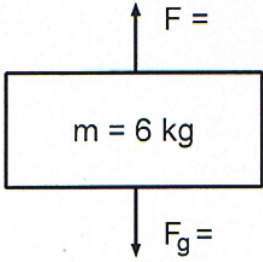
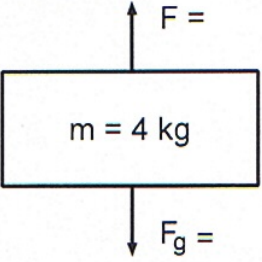
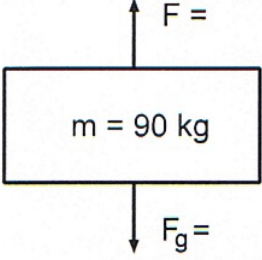
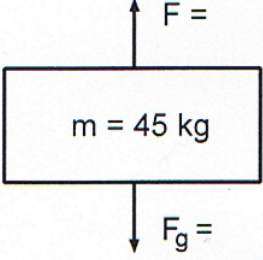
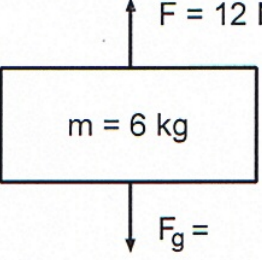
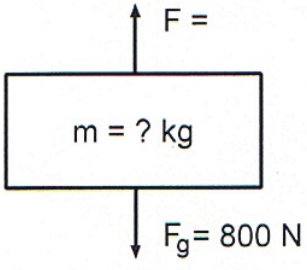
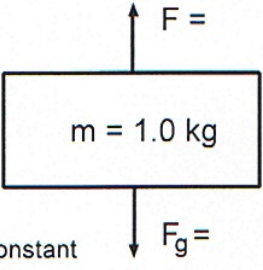
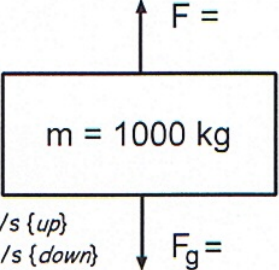
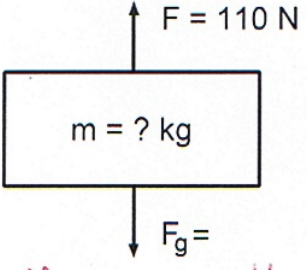
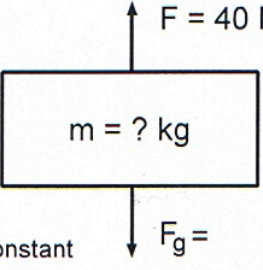
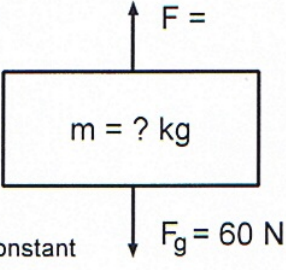


Each of the following free body diagrams represents a different problem. From the given data, solve for the missing quantities. Complete solutions for each problem should be shown (use a separate sheet if necessary). (Use  $g = 10 \text{ m/s}^2$ )

|   |   |  |
|---|---|--|
| <p>1)</p>  <p><math>F_g = mg = (1)(10)</math><br/> <math>F_g = 10 \text{ N [d]} \checkmark</math></p> <p><math>a = 2.0 \text{ m/s}^2 \downarrow</math></p> <p><math>F_{\text{net}} = 2 \text{ N [d]} \checkmark</math></p> <p><math>F = 8 \text{ N [u]} \checkmark</math></p> <p><math>F_{\text{net}} = F + F_2</math><br/> <math>2 \text{ [d]} = F + 10 \text{ [d]}</math><br/> <math>2 \text{ [d]} - 10 \text{ [d]} = F</math></p> | <p>2)</p>  <p><math>F_g = 60 \text{ N [d]} \checkmark</math></p> <p><math>a = 3.0 \text{ m/s}^2 \uparrow</math></p> <p><math>F_{\text{net}} = 18 \text{ N [u]} \checkmark</math></p> <p><math>F = 78 \text{ N [u]} \checkmark</math></p> <p><math>18 \text{ [u]} = F + 60 \text{ [d]}</math><br/> <math>18 \text{ [u]} - 60 \text{ [d]} = F</math><br/> <math>18 \text{ [u]} + 60 \text{ [u]} = F</math></p> | <p>3)</p>  <p><math>F_g = 40 \text{ N [d]} \checkmark</math></p> <p><math>a = 2.0 \text{ m/s}^2 \downarrow</math></p> <p><math>F_{\text{net}} = 8 \text{ N [d]} \checkmark</math></p> <p><math>F = 32 \text{ N [u]} \checkmark</math></p> <p><math>8 \text{ [d]} = F + 40 \text{ [d]}</math><br/> <math>-32 \text{ [d]} = F</math></p>                                  |
| <p>4)</p>  <p><math>F_g = 900 \text{ N [d]} \checkmark</math></p> <p><math>a = 0.5 \text{ m/s}^2 \downarrow</math></p> <p><math>F_{\text{net}} = 45 \text{ N [d]} \checkmark</math></p> <p><math>F = 855 \text{ N [u]} \checkmark</math></p> <p><math>45 \text{ [d]} = F + 900 \text{ [d]}</math><br/> <math>45 \text{ [d]} - 900 \text{ [d]}</math></p>   | <p>5)</p>  <p><math>F_g = 450 \text{ N [d]} \checkmark</math></p> <p><math>a = 1.0 \text{ m/s}^2 \uparrow</math></p> <p><math>F_{\text{net}} = 45 \text{ N [u]} \checkmark</math></p> <p><math>F = 495 \text{ N [u]} \checkmark</math></p> <p><math>45 \text{ [u]} = F + 450 \text{ [d]}</math><br/> <math>45 \text{ [u]} - 450 \text{ [d]}</math></p>   | <p>6)</p>  <p><math>F_g = 60 \text{ N [d]} \checkmark</math></p> <p><math>F_{\text{net}} = 12 \text{ [u]} + 60 \text{ [d]}</math><br/> <math>F_{\text{net}} = 48 \text{ N [d]} \checkmark</math></p> <p><math>a = \frac{F_{\text{net}}}{m} = \frac{48 \text{ [d]}}{6 \text{ kg}} \checkmark</math><br/> <math>a = 8.0 \text{ m/s}^2 \text{ [d]} \checkmark</math></p> |

|   |   |   |
|---|---|---|
| <p>7)</p>  <p><math>m = \frac{F_g}{g}</math>    <math>m = 80 \text{ kg}</math> ✓</p> <p><math>a = 1.0 \text{ m/s}^2 \downarrow</math></p> <p><math>F_{\text{net}} = 80 \text{ N [d]}</math> ✓</p> <p><math>F = 720 \text{ N [u]}</math> ✓    <math>80 \text{ [d]} = F + 800 \text{ [d]}</math>    <math>F = 10 \text{ N [u]}</math> ✓    * forces are balanced!</p>  | <p>8)</p>  <p><math>v = \text{constant}</math></p> <p><math>F_g = 10 \text{ N [d]}</math> ✓</p> <p><math>a = \ominus</math> (if <math>v</math> is constant) ✓</p> <p><math>F_{\text{net}} = \ominus</math> ( cuz <math>a = \ominus</math> ) ✓</p> <p><math>F = 10 \text{ N [u]}</math> ✓    * forces are balanced!</p> | <p>9)</p>  <p><math>v_1 = 2 \text{ m/s \{up\}}</math><br/> <math>v_2 = 2 \text{ m/s \{down\}}</math><br/> <math>\Delta t = 4.0 \text{ s}</math></p> <p><math>a = \frac{v_2 - v_1}{t} = \frac{2 \text{ [d]} - 2 \text{ [u]}}{4}</math><br/> <math>a = 1.0 \text{ m/s}^2 \text{ [d]}</math> ✓</p> <p><math>F_g = 10000 \text{ N [d]}</math> ✓</p> <p><math>F_{\text{net}} = 1000 \text{ N [d]}</math> ✓</p> <p><math>F = 9000 \text{ N [u]}</math> ✓</p> |
| <p>10)</p>  <p>* difficult question!!</p> <p><math>a = 1.0 \text{ m/s}^2 \text{ \{up\}}</math></p> <p><math>F_g = mg</math> ✓    <math>F_g = 100 \text{ N [d]}</math> ✓<br/> <math>= 10 \text{ m [d]}</math></p> <p><math>F_{\text{net}} = F_1 + F_2</math><br/> <math>1 \text{ m [u]} = 110 \text{ [u]} + 10 \text{ [d]}</math> ✓<br/> <math>1 \text{ m [u]} - 10 \text{ [d]} = 110 \text{ [u]}</math> ✓<br/> <math>11 \text{ m [u]} = 110 \text{ [u]}</math> ✓<br/> <math>m = 10 \text{ kg}</math> ✓<br/> <math>F_{\text{net}} = 10 \text{ N [u]}</math> ✓</p> | <p>11)</p>  <p><math>v = \text{constant}</math></p> <p><math>a = \ominus</math> ✓</p> <p><math>F_{\text{net}} = \ominus</math> ✓</p> <p><math>F_g = 40 \text{ N}</math> ✓    forces are balanced</p> <p><math>m = 4.0 \text{ kg}</math> ✓    <math>F_g/g</math></p>  | <p>12)</p>  <p><math>v = \text{constant}</math></p> <p><math>a = \ominus</math> ✓</p> <p><math>F = 60 \text{ N [u]}</math> ✓    forces are balanced</p> <p><math>F_{\text{net}} = \ominus</math> ✓    forces are balanced</p> <p><math>m = 6.0 \text{ kg}</math> ✓    <math>F_g/g</math></p>   |