

## Solutions

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Each answer shows the steps, then the **result**.

### 2.1

- $W = mg = 12 \times 9.8 = 118 \text{ N}$

### 2.2

- It falls to one quarter (inverse square)

### 2.3

- Mass stays the same; weight changes (because  $g$  changes)

### 2.4

- $g = W/m = 3.2/2 = 1.6 \text{ m s}^{-2}$

### 3.1 C

- gravity follows an inverse-square law

### 3.2 C

- mass is the same everywhere

### 3.3

(a)

- The force on B is one quarter of that on A

(b)

- Doubling  $r$  makes  $1/r^2$  one quarter, so the force is quartered

### 3.4

(a)

- $W = 3 \times 9.8 = 29.4 \text{ N}$

(b)

- Mass still 3 kg; weight =  $3 \times 20 = 60 \text{ N}$