

## Solutions

### Exercises

1.  $5.5 \text{ m/s}$
2.  $9.09 \text{ m/s}$
3. 3 times faster
4. 5 km
5. 37.16 m
6. 9.72 km
7. 1h 3mins
8. 5 mins
9. 16h 20mins 59s 17ms, so Katie finishes the race within the limit

### Problem Set

1.  $d = 15 \text{ m}$
2.  $d = 20 \text{ m}$
3.  $d_{\text{hill}} = 4 \text{ km}$
4.  $d = 10.6 \text{ km}$ ;  $s = 7.1 \text{ km/h}$
5.  $d_{\text{total}} = 3.9 \text{ km}$
6. (a)  $d = 140 \text{ m}$ ; (b)  $t = 80 \text{ s}$ ;  $d_{\text{Curly}} = 560 \text{ m}$ ; (c)  $d_{\text{Hoppy}} = 400$ , so Hoppy just makes it to safety.
7.  $s_{\text{passenger train}} = 50 \text{ km/h}$ ;  $s_{\text{freight train}} = 30 \text{ km/h}$
8.  $s = 10.5 \text{ m/s}$ ;  $d = 129.6 \text{ km}$
9.  $t = 5000 \text{ s}$ ;  $d_{\text{Chris}} = 40 \text{ km}$
10. (a) estimate:  $d_{\text{Moon}} = 385 \times 10^3 \div 4 \times 10^4 = 9.6$       actual:  $d_{\text{Moon}} = 384403 \div 40075 = 9.5690289832$
- (b) estimate:  $d_{\text{Sun}} = 15 \times 10^7 \div 4 \times 10^4 = 3750$       actual:  $d_{\text{Sun}} = 149600000 \div 40075 = 3733.0006$
- (c)  $t_{\text{Moon}} = 384403 \div 893 = 430.46 \text{ hr}$ ;  $t = 17.94 \text{ days}$ ;  $t = 0.05 \text{ yrs}$
- (d)  $t_{\text{Sun}} = 149600000 \text{ div } 893 = 167525 \text{ hr}$ ;  $t = 6980.2 \text{ days}$ ;  $t = 19.124 \text{ yrs}$
- (e)  $s = 384403 \div (4 \times 24) = 4004.2 \text{ km/h}$