SUVAT Equations

In all questions, ignore air resistance and friction where appropiate.

i. **A train is initially travelling at 20m/s. It accelerates at 5m/s/s for 10 seconds. What is its new speed?**

ii. **A train is initially stationary. After 20 seconds, it is travelling at 30m/s.**
- **What was its accelaration?**
- **How far as the car travelled in those 20 seconds?**

iii. **A projectile is launched from Earth with an initial velocity 100m/s, directly upward.**
- **What is the projectiles maximum altitude before falling back to Earth?**
- **How long does it take it to reach that maximum height?**

iv. **An althete completes the 100m sprint in 9.85 seconds. Assuming they are constanly accelerating throughout the duration of the race, what must that acceleration have been?**

v. **A ball is held by a string at a height above the ground and then released.**
- **The ball is held at 40m above the ground and then released. How long does it take for the ball to reach the ground?**
- **The ball is now reset so it is held above the ground again. However, this time it is held at a height of x metres above the ground. When released it hits the ground after 3.5 seconds, at a velocity of 30m/s. Find the value of x.**

vi. **A supertanker of mass 4.0×10^8 kg is cruising in the Atlantic at an initial speed of 4.5m/s. It takes one hour to come to rest.**
- **Assuming that the force slowing the tanker is constant, calculate the deceleration of the tanker.**
- **How far does the tanker travel whilst coming to a stop?**