1. The Reload Problem

There are fifty zombies staggering towards you. You have a gun that holds six bullets and it’s fully loaded (after all there’s zombies out there so you’ll make sure you’re prepared before stepping out of your safe house). Assuming you don’t miss with any of your shots (and you’d better not or they’ll get you!), how many times will you have to reload your gun before you’ve kill all of them?

A. 6
B. 7
C. 8
D. 9
What answer did you get?

A: That’s not nearly enough ... there’s still going to be loads of zombies coming towards you!
B: You’re getting closer but there’d still be two dead men walking.
C: Spot on, and you’ll still have four bullets left in case you run into any more.
D: Whoa, calm down there – that’s one too many reloads. Don’t get so trigger happy, you can’t afford to waste your precious ammunition.

How to work it out: You’re going to have to fire 50 shots to kill 50 zombies (we’ll cover the subject of what happens if you aren’t a perfect shot in a later problem). You’ve got six bullets in your gun already, so that’s 6 zombies dead before you have to reload meaning there’s 44 left (50 – 6). Each time you reload the gun, you put six bullets into it, so if we divided 44 (the number of bullets needed to kill the rest of the undead horde) by 6 (the number of bullets the gun can hold), you get 7.333. Since you can’t load a gun 0.333 times, this number needs to be rounded up to 8, and so we arrive at the answer. If there had been 48 zombies, the answer would be (48 – 6)/6, which is 7 (there’s no decimal fraction so there’s no need to round the answer up). If there were 52 zombies, the answer would be (52 – 6)/6, which is 7.6667, so again you’d need to reload your gun 8 times but this time you’d only have two bullets left in the gun by the time they’re all dead.