Mixed Problem Solving 1

1. Robert needs $2500 to buy a car. He currently has $1800 in savings, and the best simple interest rate he can get is 5.5% p.a.

a) How long would Robert need to invest his money for to afford the car?
b) Robert finds another bank which offers him a compound interest rate of 5% per annum, compounded monthly. Which option will allow Robert to afford the car earlier?

2. Jennifer takes her dog Max for a walk every morning. On the way from her house to the park, she keeps Max on a leash. She then walks on the footpath along the edge of the rectangular park while Max runs straight across to the other side and then back to Jennifer again along a diagonal. He continues to do this until Jennifer reaches the end of the park. She then puts the leash back on and walks home.

a) The footpath along the park is 800m long. If Jennifer walks at 3.2km/h, how long does it take her to walk from one end to the other?
b) If it takes Max 3 minutes to run across to the other side of the park and back to Jennifer again, how many times does he do this while Jennifer walks along the footpath?
c) Draw a diagram which shows the park, Jennifer's position as she walks along the footpath, and the route Max runs during her walk. Label all known distances.
d) If the perpendicular distance from the footpath to the opposite side of the park is 500m, what distance does Max run in the time that Jennifer walks 800m? (Be careful!)
e) What is Max's average running speed?
f) Assume that Jennifer walks 1km to get to the park, and 1.2km to get home again by a slightly different route. What is the total distance that Jennifer walks every morning?
g) What is the total distance that Max walks/runs every morning?
h) What is Max's overall average speed, assuming that Jennifer always walks at 3.2km/h?

3. Todd has a wooden fence around his triangular backyard. He notices that one side of the fence is starting to rot, and decides to replace that side with new wood. He needs to replace two long beams (which span the length of the fence) and 3 supporting posts. If the other sides of the triangle are 10m and 6m respectively, and the angle between them is 62°:

a) What length of wood will Todd need to buy for each of the long beams (to 1 decimal place)?
b) If each supporting post is 110cm high, what length of wood will Todd need in total?
c) How much will it cost him if the wood he wants costs $4.20 per metre?