1. (T5.5, R, CA) Jonas can either walk or bike to school. $25 \%$ of the time he walks to school, and there is a $16 \%$ probability that he is late to first period. The rest of the time he bikes to school and there is only an $8 \%$ chance he is late to first block. (Oxford, 3.5 p.89)
a. Complete a tree diagram modelling this situation.
b. What is the probability that Jonas is late for class?
c. Given that Jonas is late to class, what is the probability that he walked to school?
d. Assume that each day is an independent event. What is the probability that Jonas is on time to class every day for a week?
2. (T1.1, T2.6, R, CA) Mr. Santowski has been exposed to radioactive material when he ate a suspiciously green-glowing sandwich the other day. At the point of exposure he got tested and had 1200 mg of radioactive substance in his body. When he got test again 4 hours later it was down to 800mg. (Cirrito 7.2, p209)
a. Assuming that the radioactive material decays exponentially, what is the half-life of the radioactive material in Mr. Santowski?
b. Hence, write an equation modelling this situation.
c. In order to return to work, the amount of material in his body must be less than 50 mg . How long from the time of initial exposure will it be until he can safely return to work?
3. ( $\mathbf{T} 5.5, \mathbf{R}, \mathbf{C I})$ Of the 28 students in a class, 12 have a part time job, 22 have a part time job or do regular volunteer work, and 4 of the students have a part time job and do regular volunteer work. (Cirrito 15.2, p508)
a. Display the data in a Venn diagram.
b. How many of the students do not have a part time job or do not volunteer regularly?
c. How probable is it that a student does volunteer work given that they have a part time job?
4. ( $\mathbf{T} 1.1, \mathbf{N}, \mathbf{C l}$ ) What is the pattern in the following number sequences? (if none, write "no pattern"). If possible, predict the 10th term in each sequence. (Cirrito 8.1.1, p241)
a. $8,11,14,17, \ldots$
b. $800,400,200,100, \ldots$
c. $-1,6,-14,2,11,18, \ldots$
d. $3,8,15,24,35,48, \ldots$
e. $-3,1,7,15,25,37, \ldots$
f. $2,4,8,16,32,64, \ldots$
g. $8,17,31,56,76,93, \ldots$
5. (T2.1, 2.7, 3.6, R, CI) Given the functions $f(x)=2 x-5$ and $g(x)=\sqrt{9-x}$,
(Cirrito 5.2.1, p115, Cirrito 5.4.2, p157)
a. State the domain and range of $y=g(x)$.
b. Determine the equation of $y=g^{-1}(x)$.
c. Solve the equation $f(x)=g(x)$ and state the meaning of the solution.
d. Given your work in $Q(c)$, state the solution set for $f(x)>g(x)$.
e. (CA) Determine the angle that the line $y=2 x-5$ makes with the positive $x$ axis.
6. (T3.6, R, CA) Jana is standing on the ground. Looking up at an angle of elevation of $26^{\circ}$ she sees Sarah at the top of a tall building. She knows she is standing 60 meters away from the base of the building. (Cirrito 9.5, p290)
a. How high is the building?
b. Now assume that the ground upon which Jana is standing is inclined away from the building at an angle of $10^{\circ}$. Determine the new height of the building, assuming the same angle of elevation and distance from the building.
7. (T2.6, A1.2, R, CI) Given that $2^{m}=8$ and $2^{n}=16$, (Cirrito 7.1.2, p201)
a. Write down the value of $m$ and $n$.
b. Hence or otherwise solve $8^{2 x+1}=16^{2 x-3}$.
