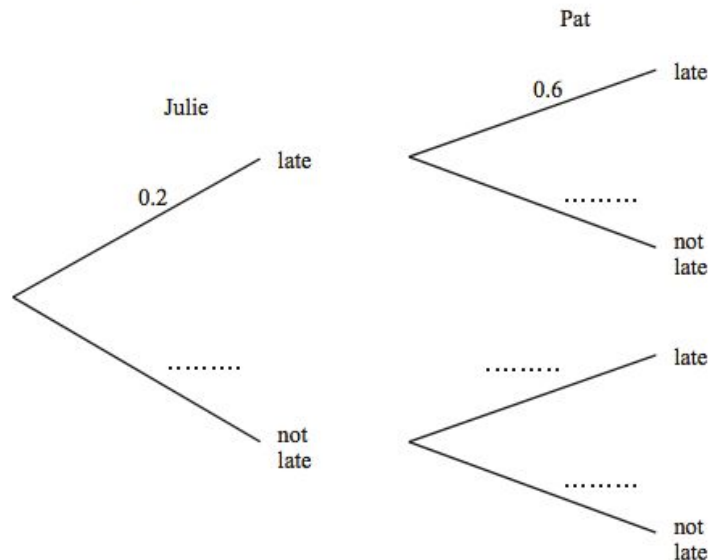


1. **(T5.5,5.6, R, CI)** Julie and Pat are going to the cinema. Let  $A$  be the event that Julie will arrive late and  $P(A)$  is 0.2 Let  $B$  be the event that Pat will arrive late and  $P(B)$  is 0.6 The two events are independent.  
(Oxford, 3.5 p.89)

- Explain what “independence” means in this context.
- Complete the tree diagram, showing this information.



- Work out the probability that Julie and Pat will both arrive late.
  - Work out the probability that either Julie or Pat will arrive late.
  - Complete a Venn diagram, showing this information.
  - Use the formula  $P(A \cup B) = P(A) + P(B) - P(A \cap B)$  and explain what the answer means. Compare to your answer from Qd.
2. **(T2.1,1.3, E, CI)** Let  $f(x) = (x - 5)^3$ , for  $x \in \mathbb{R}$ . (Cirrito 5.4.2, p157; Cirrito 5.4.1, p148)
- Find  $f^{-1}(x)$ .
  - Let  $g$  be a function so that  $(f \circ g)(x) = 8x^6$ . Find  $g(x)$ .
  - Expand  $(x - 5)^3$ .
3. **(T2.2,2.5, R, CI)** For the rational function  $f(x) = \frac{2x-5}{3-4x}$ , determine: (Cirrito 5.3.5, p144)
- The equations of the asymptotes of  $y = f(x)$ .
  - The equation of the inverse function,  $y = f^{-1}(x)$ .
4. **(T3.1, N, CA)** There is another way to measure angles in trigonometry. Let us examine this new method. A circle has  $360^\circ$ , a circle can also be said to have  $2\pi$  **radians**. Using this information answer the following questions: (Cirrito 9.7.1, p309)
- Convert these angles from degrees into radians:
    - $75^\circ$
    - $240^\circ$
    - $90^\circ$
  - Convert these angles from radians into degrees:
    - $\frac{\pi}{3}$
    - $\frac{3\pi}{4}$
    - $\pi$

5. **(T5.1, E, CA)** The following table shows the average weights ( $y$  kg) for given heights ( $x$  cm) in a population of men. *(Oxford 10.2, p339; Oxford 10.3, p345)*

Heights ( $x$ cm)	165	170	175	180	185
Weights ( $y$ kg)	67.8	70.0	72.7	75.5	77.2

- The relationship between the variables is modelled by the regression equation  $y = ax + b$ .
  - Find the value of  $a$  and  $b$ ;
  - Hence, estimate the weight of a man whose height is 172cm.
- Write down the correlation coefficient
- Which **two** of the following describe the correlation between the variables:

Strong	Zero	Negative
Positive	No Correlation	Weak

6. **(T2.3,2.4, E, CA)** Consider the function  $f(x) = x^2 - 4x + 1$ . *(Cirrito 2.4.2, p44)*
- Sketch the graph of  $f$ , for  $-1 \leq x \leq 5$ .
  - This function can also be written as  $f(x) = (x - p)^2 - 3$ . Write down the value of  $p$ .
  - The graph of  $g$  is obtained by reflecting the graph of  $f$  in the  $x$ -axis, followed by a Vertical translation by six units. Show that  $g(x) = -x^2 + 4x + 5$ .
  - The graphs of  $f$  and  $g$  intersect at two points. Write down the  $x$ -coordinates of these two points.
  - A linear function,  $h(x) = mx - 4$  is drawn on the same grid as  $y = f(x)$ . Find all possible values of  $m$  such that the line  $h(x)$  and the quadratic function do not intersect.
7. **(T2.8, E, CA)** You are given two ships, Ship A and Ship B. At noon, Ship A was 15 km due north of ship B. Ship A was moving south at 15 km/h and ship B was moving east at 11km/h. *(Cirrito 3.1.2, p65)*

- Find the distance between the ships at i.) 13:00; ii.) 14:00.
- Let  $s(t)$  be the distance between the ships  $t$  hours after noon, for  $0 \leq t \leq 4$ . Show that  $s(t) = \sqrt{346t^2 - 450t + 225}$ .
- Sketch the graph of  $s(t)$ .
- Due to poor weather, the captain of ship A can only see another ship if they are less than 8 km apart. Can the captain see ship B at anytime between noon and 16:00? Justify your response.