

1. **(T4.6 - R) (CI)** 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?

2. **(T1.5 - R) (CA)** Use your calculator to evaluate the following logarithmic expressions:
 $\log_6 36 = ??$ and $\log_3 \frac{1}{9} = ??$. So, in a log equation (like $\log_5 125 = 3$), explain the meaning/significance of the three numbers (the 5, the 125, the 3)
(Cirrito 7.3, p217)

3. **(T1.5 - R) (CA)** Solve the following logarithmic equations.
(Cirrito 7.3, p217)

(a) $\log_2 x = 4$	(b) $\log_3 9 = x$	(c) $\log_4 x = \frac{1}{2}$
(d) $\log_x 3 = \frac{1}{2}$	(e) $\log_x 2 = 4$	(f) $\log_5 x = 3$

4. **(T4.6 - R) (CI)** Max travels to school each day by bicycle, by bus or by car. The probability that he travels by bus on any day is 0.6 and the probability that he travels by bicycle on any day is 0.3.
(Oxford 3.5, p89)
 - a. Draw a tree diagram which shows the possible outcomes for Max's journeys on Monday and Tuesday. Label the tree diagram, writing the probabilities of each outcome.
 - b. What is the probability that he travels
 - i. by bicycle on Monday and Tuesday?
 - ii. by bicycle on Monday and bus on Tuesday?
 - iii. by the same method on Monday and Tuesday?
 - c. Max traveled to school by bicycle on Monday and Tuesday. What is the probability that he does not travel to school by bicycle on Wednesday, Thursday and Friday?
 - d. What is the probability that in any three days Max travels twice by car and once by bus or twice by bicycle and once by car?

5. **(T2.7 - E) (CI)** By considering the discriminant, or otherwise, find the value(s) of k for which the equation $x^2 - kx + 3 = 0$ has two distinct real roots.
(Cirrito 2.4.1, p39)

6. **(T2.1, T2.2, T2.5, T2.8 - R) (CI)** Consider the functions $f(x) = 3x - 2$ and $g(x) = x - 3$.

(Cirrito 5.4.1, p148; Cirrito 5.4.2, p157)

- Find the inverse function, f^{-1} .
- Given that $g^{-1}(x) = x + 3$, find $(g^{-1} \circ f)(x)$.
- Show that $(f^{-1} \circ g)(x) = \frac{x-1}{3}$.
- Solve $(f^{-1} \circ g)(x) = (g^{-1} \circ f)(x)$.

Let $h(x) = \frac{f(x)}{g(x)}$, $x \neq 3$,

- Write down the **equations** of the asymptotes.
- Find the x- and y-intercept(s).
- Sketch** the graph of h for $-6 \leq x \leq 10$ and $-4 \leq y \leq 10$.

7. **(T3.7 - R) (CI)** Jamie rides a Ferris wheel for five minutes. The diameter of the wheel is 20 meters, and its center is 12 meters above the ground. Each revolution of the wheel takes 60 seconds.

- Draw a diagram of the sinusoidal function that shows the relationship between Jamie's height and the time of the ride.
- Determine a cosine equation that models this relationship between Jamie's height and time.
- Being more than 15 meters above the ground enables Jamie to see the ocean. For how many seconds does Jamie see the ocean?

(Cirrito 10.5, p361)

8. **(T1.9 - N) (CI)** I have a collection of four boxes each holding two balls, one marked with an x and one marked with the number 1. I choose exactly one ball from each box.

(Cirrito 14.2, p498)

- In how many ways can I choose two xs and two ones from the four boxes?
 - What is the coefficient of x^2 in the expansion of $(x + 1)(x + 1)(x + 1)(x + 1)$?
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