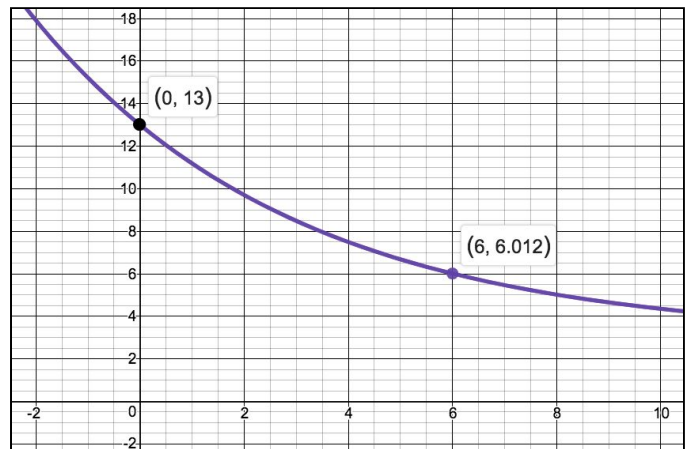


1. **(F2.6 - R) (CA)** Let $f(x) = Ae^{kx} + 3$. Part of the graph of f is shown below. The y -intercept of the function is at $(0, 13)$.



(Cirrito 5.3.3, p131)

- Show that $A = 10$.
- Given $f(6) = 6.012$, find the value of k .
- Let $g(x) = -x^2 + 12x - 24$. Solve the inequality $g(x) > f(x)$.

2. **(A1.1 - E) (CA)** In an arithmetic series, the tenth term is 25 and the sum of the first 10 terms is 160. Find the sum of the first 24 terms. **(Cirrito 8.1.2, p245)**

3. **(A1.2 - E, F2.3, F2.6) (CA)** Working with the parent function of $f(x) = \ln(x)$: **(Cirrito 5.3.4, p138)**

- Graph the function $f(x) = \ln(x)$ and label the intercept(s) and asymptote(s).
- State the domain and range of this parent function.
- Find the equation of the inverse function of $f(x) = \ln(x)$
- (CI) Now put the calculator away and sketch and label the asymptote(s) and determine the intercept(s) and include them on your sketch:
 - $g(x) = \ln(x - 5) + 7$
 - $h(x) = -2\ln(x) + 3$
- (CI) State the domain of $f(x) = \ln(x^2 - 4)$

4. For events C and D it is known that: $P(C) = 0.7$, $P(C' \cap D') = 0.25$, and $P(D) = 0.2$.

(Oxford, 3.4, p85)

- Find $P(C \cap D)$.
- Find $P(C \cap D')$.
- Explain why C and D are not independent events (using mathematics).

5. A box has a square base with side length 6cm , and a volume of 250cm^3 .

- Determine the height of the box.
- A cylinder has the same height as the box, but double the volume. Determine the radius of the base of this cylinder.

6. **(A1.1 - N) (CA)** Here are two geometric series: ***(Cirrito 8.2.4, p263)***
- i. $2 + 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots$
 - ii. $75 + 30 + 12 + 4.8 + \dots$
- b. For each series,
- i. Find the common ratio, r .
 - ii. Use your calculator to find S_{10} , S_{15} and S_{20} . Record the complete value (no rounding)
- c. Do you notice any patterns? Why do you think this is happening?
- d. Now use your calculator to evaluate S_{30} . Do you think your calculator is correct? Why or why not?
- e. What does the term “convergent series” mean?
7. **(CI)** Solve: ***(Oxford, 4.8, p131)***
- a. $\log_3(4x - 1) = 3$
 - b. $\log_{x+1}(x - 1) = 2$
 - c. $\log_3(2\log x) = 4$
 - d. $\log_2(x - 2) - \log_2(x - 1) = 3$
8. **(F2.3 - R) (CI)** Here is a graph of $y = f(x)$. Given the following mappings, identify the: ***(Cirrito 6.1, p167; Cirrito 6.2, p177)***
- i. Transformations being communicated;
 - ii. Transform $y = f(x)$ and provide a graph of the new function (label critical points in your new graphs)
- a. $g(x) = f(2x) + 3$
 - b. $g(x) = 4 - 2f(0.5x)$
 - c. $g(x) = -4 + 3f(x - 2)$

