

1. **(T2.5, 2.7, CI)** Given the function $f(x) = \frac{5}{x+1} + 2$, *(Cirrito 5.4.5, p144)*
 - a. State the equation(s) of the asymptotes of f .
 - b. Show that $\frac{5}{x+1} + 2$ is the same as $\frac{2x+7}{x+1}$.
 - c. Hence, or otherwise, find the equation of $f^{-1}(x)$.

2. **(T3.1, CA)** A sphere has a radius of 10 cm.
 - a. Determine the
 - i. Volume of the sphere to the nearest cm^3 .
 - ii. Surface area of the sphere to the nearest cm^2 .
 - b. Imagine a cylinder with the same diameter and the same “height” as the sphere.
 - i. Write down the radius of the base of the cylinder, and the height of the cylinder.
 - ii. What is the volume of the cylinder?
 - iii. What is the surface area of the cylinder?

3. **(T1.9, CA)** Write down the coefficient of the x^3 term in the expansion of $(2x - 3y)^7$.
(Oxford, 6.9, p.184)

4. **(T2.2, 2.3, CA)** Given the cubic polynomial defined by $P(x) = (x - 3)(x + 1)(x + 4)$, answer the following questions about this function. *(Cirrito 5.2.1, p.115; Cirrito 18.1.3, p.582)*
 - a. Evaluate $P(-2)$.
 - b. Solve $P(x) = -2$.
 - c. In which domain interval are the function values of $P(x)$ increasing?
 - d. An average rate of change is determined by finding the slope between two points of a function. Find the average rate of change of $P(x)$ between the values of $x = 2$, and $x = 3$.

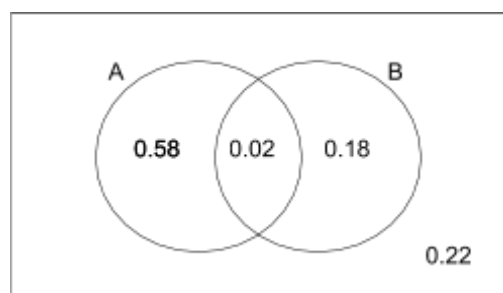
Your calculator has the ability to draw tangent lines on the graphs of your functions (to find the DRAW menu, go to 2nd \Rightarrow PRGM \Rightarrow 5 \Rightarrow now input your x value, for example, $x = -3$).

- e. Draw the line that is tangent to $P(x)$ at $x = -3$ and write down its equation.
- f. At which x -values would you expect the tangent lines to be horizontal? Why?
- g. Explain the significance of the slope of the tangent line.

5. **(T4.6, CA)** A six-sided die is weighted such that the probability of rolling a 1 is $\frac{6}{10}$. *(Oxford, 3.3, p.77)*
- If Sarah were to roll this die 15 times, how many times would she expect to get a “1.”
 - Sarah rolls the die five times.
 - What is the probability that she gets at least 4 “1”s?
 - What is the probability that she gets at least 1 “1”?

6. **(T4.6, CA)** The two events A and B are such that $P(A) = 0.6$, $P(B) = 0.2$, and $P(A|B) = 0.1$. What is the probability that: *(Oxford, 3.2, p.68)*

- Both of the events occur
- At least one of the events occur,
- Exactly one of the events occur,
- B occurs given that A occurs.



7. **(T1.5, 2.9, CI)** For each of the following functions, determine the inverse function, $f^{-1}(x)$. *(Oxford, 4.5, p.118)*
- $f(x) = 3e^{2x}$
 - $f(x) = 10^{3x}$
 - $f(x) = \log_2(4x)$

8. **(T1.5, CI)** Express as single logarithms: *(Oxford, 4.5, p.118)*

- $\log(5) + \log(6)$
- $\log(24) - \log(2)$
- $2\log(8) - 4\log(2)$
- $\frac{1}{2}\log(49)$
- $3\log(x) - 2\log(y)$
- $\log(x) - \log(y) - \log(2)$
- $\log(x) + 2\log(y) - 3\log(xy)$

Laws of logarithms

- $\log x + \log y = \log xy$
- $\log x - \log y = \log \frac{x}{y}$
- $\log x^n = n \log x$
- $\log \frac{1}{x} = -\log x$