1. **(T5.6, R, CI)** A box contains six red marbles and two blue marbles. Anna selects a marble from the box. She replaces the marble and then selects a second marble. *(Oxford 3.5, p89)*

   a. Write down the probability that the first marble Anna selects in red.
   b. Find the probability that Anna selects two red marbles.
   c. Find the probability that one marble is red and marble is blue.

2. **(T2.5, E, CI)** Let $f(x) = 3x - 2$ and $g(x) = \frac{5}{3x}$, for $x \neq 0$. The graph of h has a horizontal asymptote at $y = 0$. *(Cirrito 5.4.2, p157; Cirrito 5.4.1, p148)*

   a. Find $f^{-1}(x)$.
   b. Show that $(g \circ f^{-1})(x) = \frac{5}{x+2}$.
   c. Let $h(x) = (g \circ f^{-1})(x)$. Find the *x*- and *y*-intercepts of the graph of *h(x)*.
   d. Hence, sketch the graph of *h*.
   e. For the graph of h^{-1}, write down the *x*-intercept and the equation of the vertical asymptote.
   f. Given that $h^{-1}(a) = 3$, find the value of *a*.

3. **(T5.1,5.2,5.3, R, CA)** A group of 100 IB students was given a math test that was graded out of 20 points. The following table shows the distribution of the marks obtained: *(Cirrito 13.2, p471)*

mark	9	10	11	12	13	14	15	16	17	18	19
number of students	1	1	3	5	8	13	19	24	14	10	2

   a. Write down the mode.
   b. Draw a cumulative frequency graph.
   c. Calculate the mean.
   d. Find the median.
   e. Find the upper and lower quartiles
   f. Draw a box & whisker plot for the data.
   g. Another group of 50 students had a mean mark of 17.16 on the same test. Calculate the mean of the entire group of 150 students.

4. **(T2.1,2.3, R, CI)** Two functions are defined as follows: $f(x) = 2x^2 - 6$ and then $g(x) = x - 5$. Both functions are limited to a domain of {-4 < *x* < 4}. *(Cirrito 5.4.1, p148; Cirrito 5.4.2, p157)*

   a. State the range of both functions, $f(x)$ and *g(x)*.
   b. A new function, *h(x)* is defined as the composite of $f(x)$ with *g(x)* (as in $h(x) = f \circ g(x)$). Write the equation of *h(x)*.
   c. The new function, *h(x)*, represents a transformed version of $f(x)$. Describe what transformations have been applied to $f(x)$ to create the function of *h(x)*.
   d. Mr. S asks if the order of composition makes a difference. Determine the equation for the composite of *g* with f i.e. $g \circ f(x)$ and hence, answer Mr. S's question.
   e. Determine the equation of the inverse of *h(x)*.
   f. **(CA)** Find the intersection point(s) of *h(x)* and its inverse.

5. **(T3.6, R, CA)** The following
   diagram shows triangle ABC.
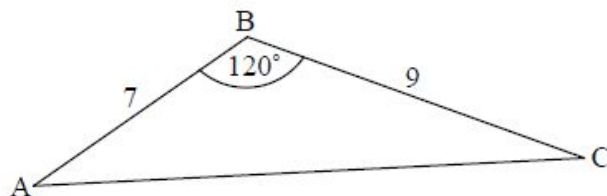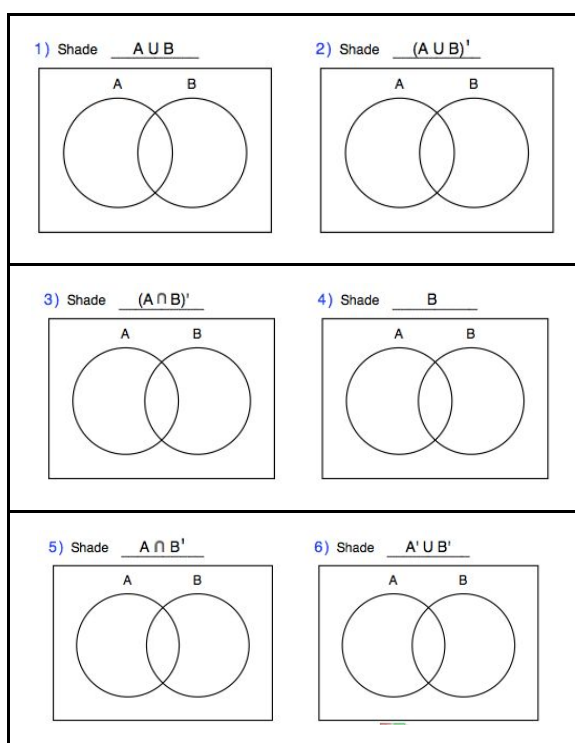   *(Cirrito 9.5.4, p300)*

   a. Find AC.
   b. Find angle BAC.

   B
   120°
   7
   9
   A
   C

   diagram not to scale

6. **(T5.5, N, CI)** Shade the following regions in the Venn diagrams: *(Cirrito 15.2, p508)*

   1) Shade ___A ∪ B___

   A   B

   2) Shade ___(A ∪ B)'___

   A   B

   3) Shade ___(A ∩ B)'___

   A   B

   4) Shade ___B___

   A   B

   5) Shade ___A ∩ B'___

   A   B

   6) Shade ___A' ∪ B'___

   A   B

7. **(T2.5,6.1, E, CA)** Let $f(x) = \frac{2x-6}{1-x}$ for $x \neq 1$.   *(Cirrito 5.3.5, p144)*
   a. For the graph of f.
      i.   Find the x-intercept;
      ii. Write down the equation of the vertical asymptote;
      iii. Find the equation of the horizontal asymptote.
   b. Find $\lim\limits_{x \to \infty} f(x)$. That is, what is the "end behavior" of $f(x)$ as x gets really big?