1. (T2.2, CI) Consider the functions $f(x)$ and $g(x)$ where $f(x)=3 x-2$ and $g(x)=x-3$.
(Cirrito 5.4.1, p148; Cirrito 5.4.2, p157)
a. Find the inverse function, $f^{-1}$.
b. Given that $g^{-1}(x)=x+3$, find $\left(g^{-1} \circ f\right)(x)$.
c. Show that $\left(f^{-1} \circ g\right)(x)=\frac{x-1}{3}$.
d. Solve $\left(f^{-1} \circ g\right)(x)=\left(g^{-1} \circ f\right)(x)$.

Let $h(x)=\frac{f(x)}{g(x)}, x \neq 3$,
e. Write down the equations of the asymptotes.
f. Find the $x$ - and $y$-intercept(s).
g. Sketch the graph of $h$ for $-6<x<10$ and $-4<y<10$.
2. (T1.2, CA) In an arithmetic sequence, the first term is 2 and the second term is 5 .
(Cirrito 8.1.1, p241)
a. List the first 5 terms of this sequence.
b. Find the common difference.
c. Find the eighteenth term.
d. Find the sum of the first eight terms of the sequence.
3. ( $\mathbf{T} 4.6, \mathbf{C l}$ ) 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.
4. (T3.4,CA) Consider the following circle with centre $O$ and radius 6.8 cm . The length of the arc PQR is 8.5 cm .
(Cirrito 9.7, p309)
a. Given that the formula for arc length is $I=r \theta$, where $\theta$ is measured in radians, find the value of $\theta$.
b. You can find the area of a sector of a circle by using the formula $A=\frac{1}{2} \theta r^{2}$. using this formula, find the area of the sector OPR.
c. Hence, determine the area of the shaded region of the circle above.

5. (T2.9, CA) Solve the following exponential equations without the use of graphs:
(Cirrito 7.4, p226)
a. $5^{5 x-1}=3^{1-2 x}$
b. $3=\frac{2}{1-e^{-x}}$
6. (T3.1, CA) A right-circular cone has a base with a diameter of 10 , and a height of 12 .
a. What is the slant-length of the cone?
b. Hence or otherwise, what is the surface area of the cone?
c. A sphere is formed, which has the same surface area as the cone. What is the radius of this sphere?
7. (T4.6, CI) The Set " $U$ " is defined as the set of all positive integers less than or equal to 15 . The subsets " $A$ " and " $B$ " are defined as:
$A=\{$ integers that are multiples of 3$\}$
$B=\{$ integers that are factors of 30$\}$
(Oxford 3.2, p68)
a. List the elements of
i. $A$
ii. B.
b. Draw a venn diagram and place the elements of $A$ and $B$ in the appropriate regions.
c. A number is chosen at random from "U." Find the probability that the number is
i. Both a multiple of 3 and a factor of 30
ii. Neither a multiple of 3 nor a factor of 30
iii. A multiple of 3 given that it is a factor of 30
8. ( $\mathbf{T 1 . 5}, \mathbf{C l}$ ) Write $4 \log _{3} x+\frac{1}{3} \log _{3}(y)-4 \log _{3} 2$ as a single logarithm. Then evaluate the expression if $x=2$, and $y=27$.
(Oxford 4.6, 123)

