- 1. **(T2.2, Cl)** Consider the functions f(x) and g(x) where f(x) = 3x 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 $(g^{-1} \circ f)(x)$.
 - c. Show that $(f^{-1} \circ g)(x) = \frac{x-1}{3}$.
 - d. Solve $(f^{-1} \circ g)(x) = (g^{-1} \circ f)(x)$.

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.
- (T4.6, 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.
- 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 $l = r \theta$, where θ is measured in radians, find the value of θ .
- 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. $5^{5x-1} = 3^{1-2x}$ 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. **(T1.5, Cl)** Write $4log_3x + \frac{1}{3}log_3(y) 4log_32$ as a single logarithm. Then evaluate the expression if x = 2, and y = 27.

(Oxford 4.6, 123)