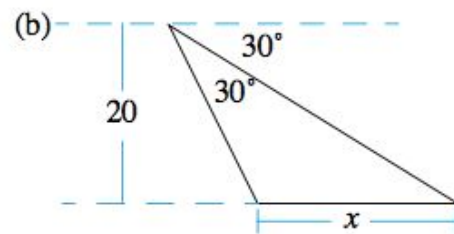
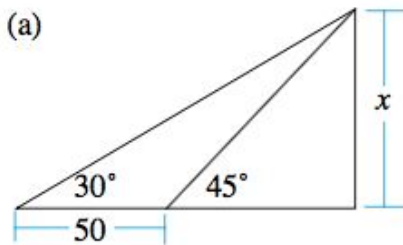


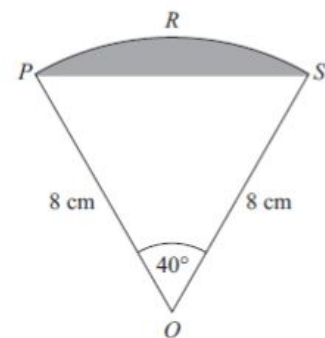
1. **(T3.6, CI)** Find the exact value of x in the following diagrams: *(Cirrito 9.1, p273; Oxford 13.1, p48)*



2. **(T3.2, T3.5 - E) (CI)** For the following trigonometric equations, start by (i) drawing the two special right triangles and (ii) drawing one cycle of a sine and a cosine curve and labeling the five critical points on each graph. *(Cirrito 10.4, p351)*

- Solve $\sqrt{2} \cos(x) - 1 = 0$ on the domain of $-2\pi < x < 2\pi$
- Solve $2\cos^2(x) - \cos(x) - 1 = 0$ on the domain of $0 < x < 720^\circ$

3. **(T3.1 - N) (CA)** The diagram shows a sector of a circle with centre O . The radius of the circle is 8 cm. PRS is an arc of the circle. PS is a chord of the circle. Angle $POS = 40^\circ$. Calculate the:
- perimeter of the sector
 - area of the shaded section



4. **(F2.1, F2.4 - R) (CI)** For the following quadratic functions, (i) factor the equation and (ii) then hence or otherwise determine the minimum/maximum value of the quadratic function.

(Cirrito 2.4.2, p44)

- $f(x) = 3x^2 + 11x - 4$
- $g(x) = -4x^2 + 9x - 2$
- For each quadratic function, predict the slope of the tangent line that can be drawn at the min/max point. Explain your reasoning.

5. **(T1.1 - E) (CI)** Find the value of p so that $p + 5$, $4p + 3$ and $8p - 2$ are three successive terms of an arithmetic sequence. *(Cirrito, 8.1, p241)*

6. **(T3.4 - R) (CI)** The number of empty bird nests in a park is approximated by the sinusoidal model $N(t) = 74 + 42\sin\left(\frac{\pi}{12}t\right)$, where t is the number of hours after midnight.

(Cirrito 10.5, p361)

- Determine the equation of the sinusoidal axis (axis of the curve) and explain its meaning in the context of this problem.
- Determine the period of the function.
- Given the domain of two days, determine the maximum and minimum number of empty bird nests and at what times these occur.
- At what times of the day is the number of bird nests equal to 95?
- Sketch a graph of the function, labeling the maximum(s) and minimum(s)

7. **(T3.2, T3.3 - N) (CI)** Determine the sine and cosine ratios of $\frac{\pi}{3}$, $\frac{3\pi}{4}$ and $-\frac{5\pi}{6}$. Use these ratios to determine the value of: (Cirrito 10.1.2, p316; Cirrito 10.2.1, p327; Cirrito 10.2.2, p332)

- the expression $\sin^2(x) + \cos^2(x)$ for $x = \frac{\pi}{3}$ and $x = \frac{3\pi}{4}$ and $x = -\frac{5\pi}{6}$.
- the expression $\frac{\sin(x)}{\cos(x)}$ for $x = \frac{\pi}{3}$, $\frac{3\pi}{4}$ and $-\frac{5\pi}{6}$ and compare to the value of $\tan(x)$ for the same angles of $x = \frac{\pi}{3}$, $\frac{3\pi}{4}$, $-\frac{5\pi}{6}$

8. **(A1.2 - E) (CI)** To find the solutions for the following equations, the use of logarithms is required, either in isolating exponents or in requiring the use of the laws of logarithms.

(Cirrito 7.4, p219)

- Solve $2 = e^{0.075x}$
- Solve $3^{x-4} = 24$
- $\log_3(2x - 5) = 2$
- $\log_2(x) + \log_2(10 - x) = 4$
- $\ln(x - 2) + \ln(2x - 3) = 2\ln(x)$