1. **(T3.2, T3.3 - N) (CI)** Given that $\cos(x) = \frac{5}{6}$ and $0 \leq x \leq \pi$. Find:
(Oxford 13.1, p448)

   a. (i) $\sin(2x)$ (ii) $\cos(2x)$ (iii) $\tan(2x)$
   b. Knowing that $\cos^{-1}(\frac{5}{6}) = 0.6$ radians, solve the equation $6\cos(x) - 5 = 0$ given that $0 \leq x \leq 4\pi$.

2. **(T3.5 - E) (CA)** Solve the equation $2\sin^2(x) + 5\cos(x) = -1$ on the domain of $0 \leq x \leq 4\pi$. Show the algebraic analysis that leads to your solution.
(Cirrito 10.2.2, p332)

3. **(T3.5 - E) (CI)** Solve the following trigonometric equations on the domain of $0 \leq x \leq 3\pi$.
(Cirrito 10.2.2, p332)
   a. $\sin(x) - 1 = \cos^2(x)$ b. $\tan(x) = \sin(x)$

4. **(F2.7, A1.2 - E) (CI)** Solve the exponential equation $2^{x-2} = 5^{2x+3}$.
(Cirrito p226, Ex 7.22)

5. **(A1.2 - N)** **(CI)** Given that $\log_2(5) = K$ and $\log_2(6) = M$ and $\log_2(7) = N$, find expressions in any of K, M, and N for the following:
(Oxford, Chap 4N, p124)

   $\log_2(180)$ b. $\log_2(\frac{125}{7})$ c. $\log_8(1.96)$

6. Given that $P(A) = 0.6,\ P(B) = 0.7$ and that A and B are independent events.
(Cirrito 15.2, p.509)

   a. Find $P(A \cup B)$
   b. Find $P(A \cap B)$
   c. Find $(A \mid B')$
   d. Find $(A' \cap B)$

7. **(SP5.6, SP5.7 - R,N) (CA)** Here are the results of a survey on hours of homework done over the weekend by IB year 1 students. Students were asked to round their studying time to the nearest hour.
(Cirrito 16.1, p527)

Number of hours studied	0	1	2	3	4	5
Number of students	4	12	8	3	2	1
Relative frequency				0.10		

a. Explain why this data table shows an example of a **discrete** data set
b. Find the mean and standard deviation of the number of hours studied.
c. Prepare a frequency histogram of the results.
d. How probable is it that a randomly selected student studied 2 hours?
e. How probable is it that a randomly selected student studied at most 3 hours?
f. How probable is it that a randomly selected student studied either 2 or 3 hours?
g. Complete the row wherein you calculate the relative frequencies.
h. We will now define the variable X as the number of hours studied. Determine:

i. $P(X = 3)$ ii. $P(X \geq 3)$ iii. $P(X = 3 \mid X \geq 3)$ iv. $P(2 \leq X \leq 4)$

8. **(T3.5 - R) (CI)** SKILL: Linear Trigonometric Equations. Solve the following equations on the domain of $0 \leq x \leq 3\pi$:

a. $\sqrt{2}\cos\left(x - \frac{\pi}{4}\right) - 1 = 0$ b. $\sqrt{2}\sin(2x) + 1 = 0$