

1. **(T4.6, R, CI)** In a class of 22 students, 9 are full diploma students, and 10 play at least one sport.

a. Is this enough information to draw a Venn Diagram? Explain your answer. *(Oxford, 3.2 p.68)*

We know that there are four students that are both full IB and play sports.

- b. Draw a Venn Diagram for this situation
 c. Hence, how many students are not full IB and don't play sports?
 d. If a student is randomly selected from this class
 i. What is the probability that they play sports, but does not do full IB?
 ii. What is the probability that they play sports, given that they do not do full IB?
 iii. Why are the answers for i and ii different? Explain.

2. **(T2.3, R, CI)** For each of the following equations, draw a sketch of the graph. *(Oxford, 1.2 p.8)*

- a. $y = 3x - 7$
 b. $h(x) = -\frac{1}{2}x^2$
 c. $f(x) = x^3 + x^2 - 2x$ (hint: rewrite it in factored form)
 d. $y = |x + 4|$

3. **(T2.2, R, CI)** Given the functions $f(x) = 3x + 2$, $g(x) = \sqrt{x - 3}$, and $h(x) = x^2 + 4$ *(Oxford, 1.2 p.8)*

- a. Write the domain and range for $f(x)$, $g(x)$, and $h(x)$.
 b. Write the function $r(x)$ where $r(x) = h \circ g(x)$.
 c. Hence determine the domain of $r(x)$.

4. **(T1.5, R, CI)** Simplify the following expressions, *(Oxford, 4.1 p.103)*

- a. $(36a^2)^{\frac{1}{2}}$ b. $\frac{8x^4y^{-2}}{2xy^3}$ c. $3x^3(4xy^3)^2$

5. **(T3.4, N, CA)** Up until now we have always used degrees as the units to represent angles. We know that the three angles in a triangle add up to 180° and that there are 360° in a circle. It is time to introduce another unit of measure for angles: Radians. *(Oxford, 11.7 p.391)*

- a. Go online and look up the definition of radians and write that in your notes.
 b. How many radians are there in a circle (that is, 360° is equal to how many radians)?
 c. Convert the following angles from degrees to radians

- i. 30° ii. 150° iii. 270° iv. 540°

6. **(T3.7, R, CA)** Equations of the form $f(x) = A \sin B(x + C) + D$ or $g(x) = A \cos B(x + C) + D$ are referred to as “sinusoidal” equations. Using [DESMOS](#) graph the function $y = 3 \sin 30(x + 3) + 4$.

(Oxford, 13.4 p.462)

- Write the equation of the axis of the curve (or equilibrium axis).
- What is the period of this function?
- What is the amplitude?
- How are these three “values” related to the equation
- Draw a sketch of this function in your notes on a domain of $0 \leq x \leq 24$ and label the key features.

7. **(T1.2, E, CA)** Right now Yasmin has 1300le. Each week her parents give her 400le.

(Oxford, 6.2 p.164)

- If she doesn’t spend any of it, how much will she have next week? In two weeks? Write out a pattern showing her total money over the first 8 weeks.
- How much money should she have after 30 weeks? In a year (52 weeks). Try to write an equation that models this situation.

Yasmin doesn’t always save her money, obviously. But she really wants a new phone. Yamsin decides that she can save 300 each week, only spending 100le.

- In that scenario, assuming she sticks with her plan, how many weeks will take her to save up 12839le for a new iPhoneXR?

8. **(T4.4, R, CA)** The table on the right shows the grams of fat and total calories of a variety of McDonalds sandwiches. Does there seem to be a connection or a relationship between grams of fat and calories? (Oxford, 10.1 p.334)

- Determine the mean grams of fat, and the mean number of calories for the McDonalds sandwiches. This coordinate pair (*mean g of fat, mean calories*) can be referred to as the ‘*mean point*.’
- Using your calculator, enter the data into a table and plot the points in a graph, this is called a ‘*scatterplot*.’
- Find the line-of-best fit, also known as the regression line, and plot that on the graph as well. Include a sketch of this in your notebook.
- Based on the mathematics, does there seem to be a connection or relationship between grams of fat and calories? Explain.

Meal	Total fat (g)	Total Calories
Hamburger	9	260
Cheeseburger	13	320
Quarter Pounder	21	420
Quarter Pounder with Cheese	30	530
Big Burger	31	560
Toasted Sandwich	31	550
Chicken Wings	34	590
Crispy Chicken	25	500
Fish Fillet	28	560
Grilled Chicken	20	440
Grilled Chicken Light	5	300