Q1. Given vectors **a** = $\begin{pmatrix} 2 \\ -1 \\ 4 \end{pmatrix}$ and **b** = $\begin{pmatrix} -3 \\ 2 \\ 0 \end{pmatrix}$, calculate:

    i.   **2a – b**   ii. **b – 2a**   iii. $|a + b|$

Q2. The minutes (in minutes) it takes a professional snooker player to pot the final ball in a game is recorded and shown below:

$$12 \quad 18 \quad 21 \quad 23 \quad 26$$

Calculate the mean and standard deviation

Q3. A quadratic equation is given as $\quad y = (x+2)^2 - 5$
   a. Find the co-ordinates of the turning point and state its nature
   b. Write down the equation of the axis of symmetry.

Q4. A straight line has the equation 2x – 4y = 6
   a. State the gradient
   b. Find the co-ordinates where the straight line meets the x axis.

Q5. Solve the inequation $3 + 2(x-3) \geq 4(x+5)$

Q6. Simplify, expressing with a positive power where necessary:

    a. $\dfrac{g^4 \times g^3}{g^5}$ b. $\dfrac{m^4}{m^7 \times m}$ c. $(2f^{-3})^2$

Q7. Determine the nature of the roots of the function f(x) = 3x² - 7x + 2

Q8. A Function is given by $f(x) = x^2 + 8x$
   a. Evaluate f(- 2)
   b. Find the two solutions when f(m) = 20

Q9. Simplify $\dfrac{3x}{x^2-9} \div \dfrac{2}{x+3}$, $x \neq \pm 3$, as a single fraction in its simplest form.
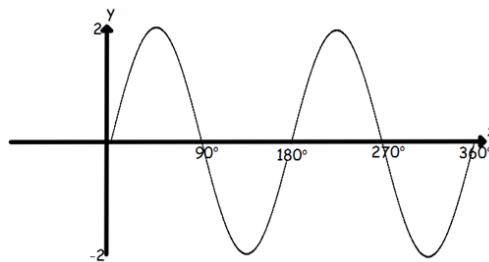
Q10. Change the subject of the formula to x:

    a. $(x + y)^2 = z$ b. $\dfrac{y}{x} - 5 = z$ c. $y - \dfrac{1}{5}x = z$

Q11. The graph of y = **b**sin**a**x is shown below. State the values of **b** and **a**.

Q12.