Complete the following problems, showing your work.

1. Compute the average power in the following signals.
   a. \(a(t) = 3\cos(\pi t + 3) - j\cos(2t)\)
      \[
      \frac{3^2}{2} + \frac{1 - j}{2} = 4.5 + \frac{1}{2} = 5
      \]
   b. \(b(t) = 1 + \sin(\pi t + 3)\)
      \[
      1^2 + \left(\frac{1}{2}\right)^2 = 1.5
      \]

2. Sketch \(x(t) = (t^2 - 2)[u(t + 1) - u(t)]\). Carefully label your sketch.

3. Complete the following integrals involving the delta-function:
   a. \(\int_{-\infty}^{\infty} (\tau^2 - 1)\delta(\tau + 3)\,d\tau\)
      \[
      = (\tau^2)^2 - 1 = 8
      \]
   b. \(\int_{-\infty}^{\infty} (\tau^2 - t)\delta(\tau + 3)\,d\tau\)
      \[
      = (9-t)u(t + 3)
      \]
Complete the following problems, showing your work.

1. Compute the average power in the following signals.
   a. \( a(t) = \cos(\pi t + 3) + 4\cos(2t) \)
      \[
      = \frac{1^2}{2} + \frac{|(-4)|^2}{2} = \frac{1}{2} + \frac{16}{2} = 8.5
      \]
   b. \( b(t) = 2 - 3\sin(\pi t + 3) \)
      \[
      = (2)^2 + \frac{(-3)^2}{2} = 4 + 4.5 = 8.5
      \]

2. Sketch \( x(t) = (t - 2)[u(t+1) - u(t-3)] \). Carefully label your sketch.

   ![Sketch](attachment:sketch.png)

3. Complete the following integrals involving the delta-function:
   a. \( \int_{-\infty}^{\infty} (1 + \tau^2) \delta(\tau + 4) \, d\tau \)
      \[
      = 1 + (\zeta)^2 = \zeta
      \]
   b. \( \int_{-\infty}^{\infty} (t + \tau^2) \delta(t - 1) \, d\tau \)
      \[
      = (t + 1) u(t - 1)
      \]