Find the distance between the points \( P_1(-4, -7) \) and \( P_2(4, 8) \) and the midpoint of the line segment joining them.

(i) Using the distance formula where: \( x_1 = -4, \ y_1 = -7, \ x_2 = 4 \) and \( y_2 = 8 \) we may obtain...

\[
d(P_1, P_2) = \sqrt{(-4 - 4)^2 + (-7 - 8)^2}
\]

\[
= \sqrt{(-8)^2 + (-15)^2}
\]

\[
= \sqrt{64 + 225}
\]

\[
= \sqrt{289}
\]

\[
= 17
\]

(ii) Using the midpoint formula where: \( x_1 = -4, \ y_1 = -7, \ x_2 = 4 \) and \( y_2 = 8 \) we see that...

\[
x_3 = \frac{-4 + 4}{2} = \frac{0}{2} = 0
\]

and

\[
y_3 = \frac{-7 + 8}{2} = \frac{1}{2}
\]

i.e., \( M(0, \frac{1}{2}) \)