86. When $\phi = 0$ it is clear that the superposition wave has amplitude $2\Delta p_m$. For the other cases, it is useful to write

$$\Delta p_1 + \Delta p_2 = \Delta p_m \left(\sin(\omega t) + \sin(\omega t - \phi)\right) = \left(2\Delta p_m \cos\frac{\phi}{2}\right) \sin\left(\omega t - \frac{\phi}{2}\right) \ .$$

The factor in front of the sine function gives the amplitude for all cases considered: $\phi = \frac{\pi}{2}, \frac{\pi}{3}, \frac{\pi}{4}$ gives $\Delta p_m\sqrt{2}, \Delta p_m\sqrt{3}, \Delta p_m\sqrt{2+\sqrt{2}}$, respectively.