You have this solution to Maxwell's equations in vacuum:

$$\tilde{\vec{E}}(x,y,z,t) = \tilde{\vec{E}}_0 \exp\left[i\left(\vec{k}\bullet\vec{r} - \omega t\right)\right]$$

If this wave travels in the y direction, is polarized in the x direction, and has a complex phase of 0,

what is the x component of the physical wave?

A) $E_x = E_0 \cos(kx - \omega t)$

B) $E_x = E_0 \cos(ky - \omega t)$

C) $E_x = E_0 \cos(kz - \omega t)$

D) $E_x = E_0 \cos(k_x x + k_y y - \omega t)$

E) Other!!

To think about: What is the y component?

What would change if the complex phase of E_0 was 90^0? -90^0?

A point source of radiation emits power P_o isotropically (uniformly in all directions). A detector of area a_d is located a distance R away from the source. What is the power p ***received*** by the detector?

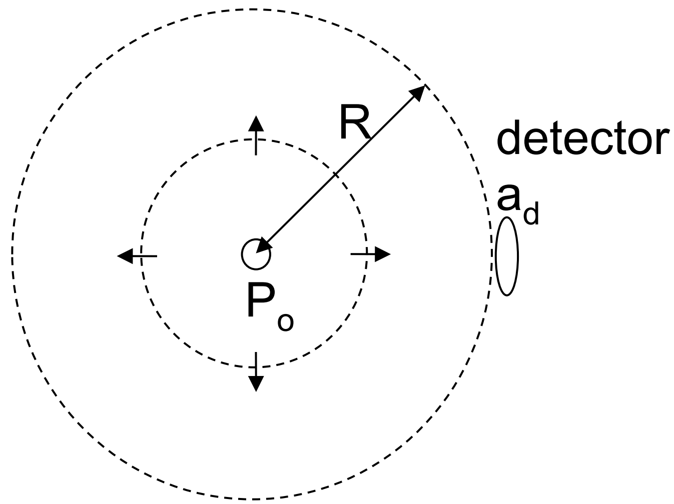
A) $\dfrac{P_o}{4\pi R^2} a_d$

B) $P_o \dfrac{a_d^2}{R^2}$

C) $P_o \dfrac{a_d}{R}$

D) $\dfrac{P_o}{\pi R^2} a_d$

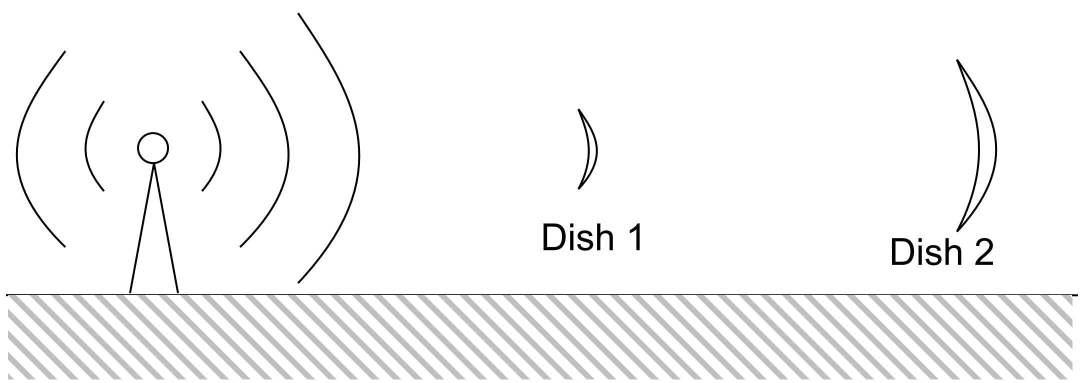
E) None of these



Two radio dishes (shaped like bowls) are receiving signals from a radio station which is sending out radio waves in all directions with power P. Dish 2 is twice as far away as Dish 1, but has twice the diameter. Which dish receives more power? (Dish 2 is not in the shadow of Dish 1.)

A: Dish 1 B: Dish 2

C: Both receive the same power



A parabolic dish focuses the EM radiation from a source into a beam of constant diameter D :

The intensity of the light in the beam falls with distance R as:

A) $I \sim 1/R^2$

B) $I \sim 1/R$

C) $I = \text{constant}$

D) Something else