22.4

Begin by defining

$f(x) = \cos(x+y)$, then

$f'(x) = -\sin(x+y)$ and

$f''(x) = -\cos(x+y)$

Thus,

$$f(x) + f''(x) = 0$$

and

$$f(0) = \cos(y)$$

$$f'(0) = -\sin(y)$$

We then see by the theorem

"If f has a second derivative everywhere and

$$f(x) + f''(x) = 0$$

$$f(0) = a$$

$$f'(0) = b$$

then $f = b \cdot \sin(x) + a \cos(x)$"

where we let $a = \cos(y)$ and $b = -\sin(y)$ that

$$\cos(x+y) = -\sin(y)\sin(x) + \cos(y) \cdot \cos(x)$$

!!og wow!