Hw #2

we have

$$F(w) = a\cos(wt_0) - aj\sin(wt_0)$$
$$= a(\cos(wt_0) - j\sin(wt_0))$$
$$= ae^{j(-wt_0)}$$
$$[F(w) = ae^{-wt_0 j}]$$

1) $|F(w)|^2 = |ae^{-wt_0 j}|^2$

$$= a^2 |e^{-wt_0 j}|^2$$
$$= a^2 \cdot 1$$
$$|F(w)|^2 = a^2$$

2.) we have, $F(w) = ae^{-wt_0 j}$

Phase angle, $\boxed{\phi(w) = -wt_0}$

Group delay, $-\frac{d\phi}{dw} = -\left(\frac{d(wt_0)}{dw}\right)$

$$= -(-1)\, t_0 \frac{dw}{dw}$$

$$\boxed{= t_0}$$