2011 Q5

(a) $\hat{y} = 0.137 + 0.240x$ x: wind velocity (mph)
y: electricity production (amperes)

(b) $\hat{y}(25) = 0.137 + 0.240(25) = 6.137$
$\hat{y}(15) = 0.137 + 0.240(15) = 3.737$
2.4 amperes

(c) $r^2 = 0.873$
About 87.3% of the variation in electricity production is explained by the LSRL model which relates electricity production to wind velocity.

(d) β = slope of the LSRL for the population model relating electricity production and wind velocity

$H_0: \beta = 0$
$H_a: \beta \neq 0$

Inference for regression (on slope)

conditions
The problem states "regression model assumptions were checked and determined to be reasonable"

From the software output: $t = 12.63$
$p\text{-value} = 0.000$
$df = n - 2 = 25 - 2 = 23$

With $\alpha = .05$, p-value $= 0.000$ is low so we reject H_0, we do have sufficient statistical evidence to conclude that electricity production by the windmill is related to wind velocity.