10.8

Let X and Y be random variables such that

$E[X] = 2 \qquad E[Y] = 3$

$Var(X) = 4$

a) Show $E[X^2] = 8$

Since

$$Var(X) = E[X^2] - (E[X])^2$$

Putting values and

$$E[X^2] = Var(X) + (E(X))^2$$

$$E[X^2] = 4 + (2)^2$$

$$\boxed{E[X^2] = 8}$$

(b) Determine the expectation of $-2X^2 + Y$

$$E(-2X^2+Y) = -2\,E[X^2] + E[Y]$$

$$= -2(8) + 3$$

$$= -16 + 3$$

$$= -13$$

So

$$\boxed{E(-2X^2+Y) = -13}$$