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Problem Set #1

1.1.2 Use the field properties of the real numbers to provide a careful proof of the elementary algebraic identity $(x+y)^2 = x^2 + 2xy + y^2$.
Proof of exercise 1.1.2:

$(x+y)^2 = (x+y)(x+y)$	Definition of ^{2}
$(x+y)(x+y) = (x+y)x + (x+y)y$	Distributive property
$(x+y)x + (x+y)y = xx + yx + xy + yy$	Distributive property
$xx + yx + xy + yy = xx + xy + xy + yy$	Multiplicative commutativity
$xx + xy + xy + yy = xx + 1xy + 1xy + yy$	Multiplicative identity
$xx + 1xy + 1xy + yy = xx + (1+1)xy + yy$	Distributive property
$xx + (1+1)xy + yy = xx + 2xy + yy$	Define $2 \equiv 1+1$
$xx + 2xy + yy = x^2 + 2xy + y^2$	Defintion of ^{2}
Therefore, $(x+y)^2 = x^2 + 2xy + y^2$	Q.E.D.