Midterm Exam #1 Formula Sheet

Pricing Forwards

$$F(t,T) = V(t)e^{r(T-t)}$$
, where

F(t, T) = today's (date t) price for a forward contract that matures at date T; r = annualized (U.S.) riskless rate of interest; and V(t) = today's (date t) value of the underlying asset.

V(t) for stock with a continuous dividend yield:

$$V(t) = S(t)e^{-\delta(T-t)}$$
, where

 δ corresponds to the annualized continuous dividend yield.

V(t) for foreign currency:

$$V(t) = S(t)e^{-r_{\text{foreign}}(T-t)}$$
, where

 r_{foreign} corresponds to the annualized foreign (non-U.S.) riskless interest rate.

Bounds for European and American Calls & Puts (Non-Dividend Paying Stock):

$$S(t) \ge c(t,T) \ge max[0, S(t) - Ke^{-r(T-t)}];$$
 and $Ke^{-r(T-t)} \ge p(t,T) \ge max[0, Ke^{-r(T-t)} - S(t)],$ where

c(t, T) = date t price for a call option that expires at date T; and p(t, T) = date t price for a put option that expires at date T.

Replicating portfolio approach to option pricing:

At inception:
$$V_{RP}(t) = \Delta S(t) + \beta B(t)$$
,
At expiration: $V_{RP}(T) = \Delta S(T) + \beta B(T)$, where

 $V_{RP}(t) = \text{date } t \text{ value of the replicating portfolio};$

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 $\Delta = \text{number of shares};$

 β = number of bonds;

B(t) = date t value of one bond; and

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Put-call parity equation for a non-dividend paying stock

$$c(t,T) + Ke^{-r(T-t)} = p(t,T) + S(t).$$