

16. Assume that the Black-Scholes framework holds. Let  $S(t)$  be the price of a nondividend-paying stock at time  $t$ ,  $t \geq 0$ . The stock's volatility is 20%, and the continuously compounded risk-free interest rate is 4%.

You are interested in contingent claims with payoff being the stock price raised to some power. For  $0 \leq t < T$ , consider the equation

$$F_{t,T}^P[S(T)^x] = S(t)^x,$$

where the left-hand side is the prepaid forward price at time  $t$  of a contingent claim that pays  $S(T)^x$  at time  $T$ . A solution for the equation is  $x = 1$ .

Determine another  $x$  that solves the equation.

- (A) -4
- (B) -2
- (C) -1
- (D) 2
- (E) 4