

REVIEW OF OPTION PAYOFFS

CALL OPTION

A CALL OPTION GIVES ITS OWNER TO BUY THE UNDERLYING ASSET AT THE EXERCISE PRICE.

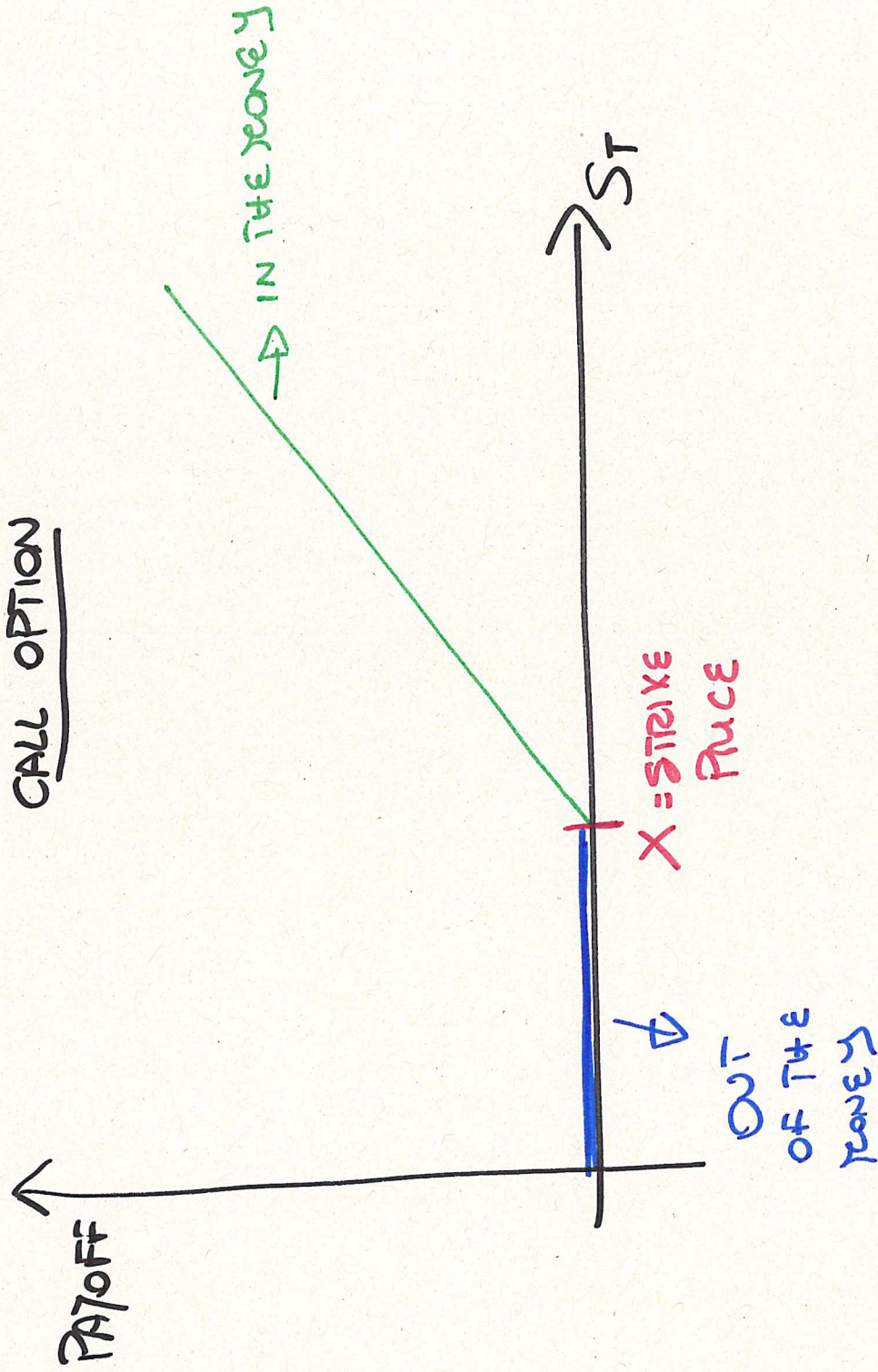
LET X DENOTE THE EXERCISE PRICE OF THE OPTION AND S_T BE THE MARKET PRICE OF THE UNDERLYING ASSET AT THE EXPIRATION DATE.

A CALL OPTION WILL BE EXERCISED IF DOING SO YIELDS A POSITIVE PAYOFF TO THE HOLDER OF THE OPTION, THAT IS, IF $S_T > X \rightarrow S_T - X > 0$. OTHERWISE, IF $S_T < X$, THEN THE CALL OPTION WILL NOT BE EXERCISED AND THE PAYOFF IS ZERO

ALTERNATIVELY:

$$\text{CALL}(c) = \max(S_T - X, 0)$$

CALL OPTION



SUPPOSE THAT THE STOCK OF THE COMPANY "ROOH 11" IS TRADING ON JANUARY AT A PRICE OF €60. A CALL OPTION (EACH CONTRACT SIZE CONSISTS OF 100 SHARES) WITH A STRIKE PRICE OF €60 AND AN EXPIRATION DATE ON FEBRUARY 15 IS TRADING ON JANUARY 16 AT €4 EACH SHARE.

WHAT IS YOUR TOTAL PAYOFF IF THE MARKET PRICE OF "ROCK M" IS €70 PER SHARE AT EXPIRATION DATE?

$$S_T = 70$$

$$X = 60$$

$$\text{CALL}(C) = \max(S_T - X, 0)$$

$$\text{TOTAL PAYOFF} = 100 (70 - 60) = 1,000 \text{€}$$

$$\text{TOTAL PROFIT} = 100 (70 - 60 - 4) = 600 \text{€}$$

PUT OPTION

A PUT OPTION GIVES ITS OWNER TO SELL THE UNDERLYING ASSET AT THE EXERCISE PRICE.

LET X DENOTE THE EXERCISE PRICE OF THE OPTION AND S_T BE THE MARKET PRICE OF THE UNDERLYING ASSET AT THE EXPIRATION DATE T .

A PUT OPTION WILL BE EXERCISED IF DOING SO YIELDS A POSITIVE PAYOFF TO THE HOLDER OF THE OPTION - THAT IS IF $S_T < X \rightarrow X - S_T > 0$. OTHERWISE, IS $S_T > X$, THEN THE PUT OPTION WILL NOT BE EXERCISED AND THE PAYOFF IS ZERO.

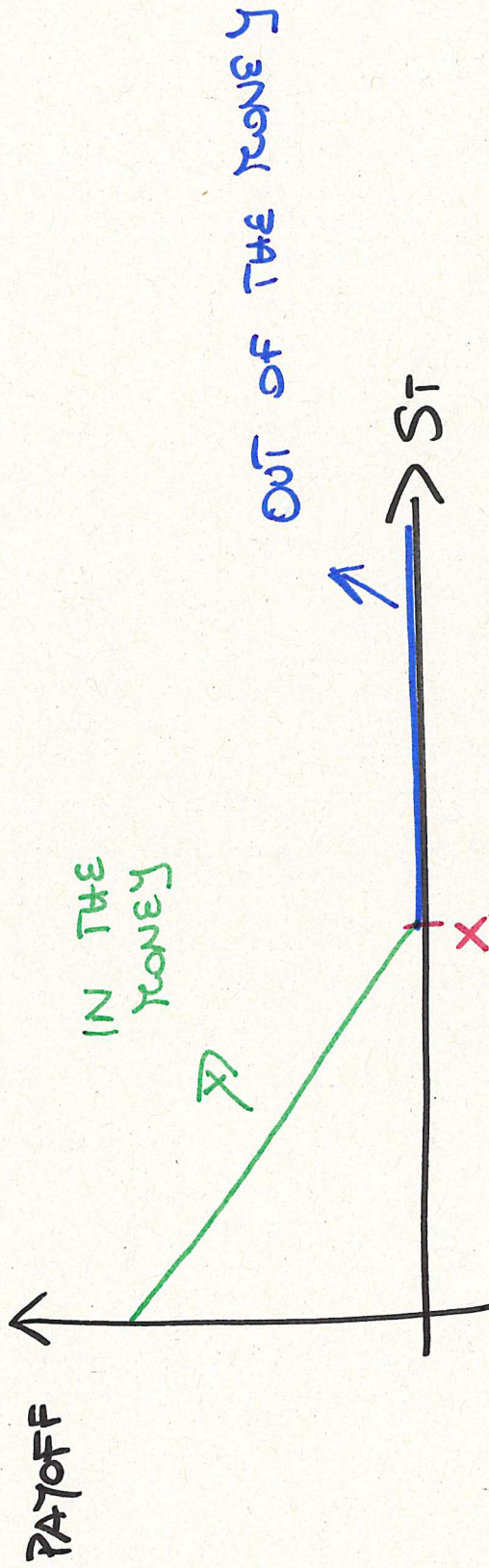
ALTERNATIVELY: $PUT(P) = \max(X - S_T, 0)$

PUT OPTION

$$X - S_T > 0$$

$$\text{if } X < S_T$$

$$\text{PUT}(P) = \max(X - S_T, 0)$$



EXAMPLE OF A PUT OPTION

SUPPOSE THAT YOU HAVE A PORTFOLIO OF 100 SHARES OF THE STOCK OF THE COMPANY "MILOS". ON JANUARY 16, THE STOCK HAS A TRADING PRICE OF €50. A PUT OPTION (EACH CONTRACT SIZE CONSISTS OF 100 SHARES) WITH A STRIKE PRICE OF €50 AND AN EXPIRATION DATE ON FEBRUARY 15 IS TRADING AT €6 EACH SHARE.

WHAT WOULD YOUR TOTAL PAYOFF ON THE OPTION CONTRACT BE AT EXPIRATION DATE IF YOU BOUGHT THE PUT OPTION TO PROTECT THE VALUE OF YOUR PORTFOLIO AND THE STOCK PRICE DROPPED TO €30? WHAT WOULD YOUR TOTAL PROFIT BE?

$$S_T = 30$$

$$X = 50$$

$$\text{TOTAL PAYOFF} = 100(50 - 30) = €2,000$$

$$\text{TOTAL PROFIT} = 100(50 - 30 - 6) = €1,400$$