Consider the following continuously-compounded yields for US Treasury STRIPs:

Maturity (Years)	STRIP Yield
0.5	0.0500
1.0	0.0520
1.5	0.0510
2.0	0.0530

What would be the no-arbitrage value on a Treasury note that has a face (principal) value of \$100, a time until maturity of exactly 2 years, and pays semi-annual coupons at an annual coupon rate of 6.00 percent?

State your answer in dollars to the nearest 1 cent, e.g., 103.45

$$C = cF = 0.03 \times 100 = 3$$

$$\frac{1\times 3}{\left(1+\frac{0.05}{2}\right)^{2\times\frac{1}{2}}} + \frac{1\times 3}{\left(1+\frac{0.052}{2}\right)^{2\times 1}} + \frac{1\times 3}{\left(1+\frac{0.051}{2}\right)^{2\times\frac{3}{2}}}$$

$$+ \frac{1\times 3}{\left(1+\frac{0.053}{2}\right)^{2\times 2}} + \frac{100}{\left(1+\frac{0.053}{2}\right)^{2\times 2}} = 101.3271214$$

Consider the following continuously-compounded spot yields for zero-coupon bonds.

Maturity (Years)	Spot Yield
0.5	0.0500
1.0	0.0520
1.5	0.0510
2.0	0.0530

What would be the no-arbitrage forward rate on a "12 by 18" forward rate agreement (FRA)? That is, what is the forward rate $f_0(1,1.5)$ assuming an m=180-day investment maturity?

State your answer as a percentage rate to 2 decimal places using the standard money market rate convention used in FRA quotes, e.g., 5.12 .

$$P(0,1) = e^{-0.052 \times 1} = 0.9493288668$$

$$P(0,1.5) = e^{-0.051 \times 1.5} = 0.9263529143$$

$$f_0(1,1.5) = \underset{\frac{1}{m}}{2}\left(\frac{P(0,1)}{P(0,1.5)} - 1\right) = 4.96\%$$

On Friday, September 23, 2022 the following quotes were given for a Treasury Bond maturing on May 15, 2038. Note that these quotes are for a face value of $100 and are in terms of dollars and cents, not in terms of 32nd of a dollar.

Maturity	Coupon	Bid	Ask	Change
Treasury Bond				
May 15, 2038	4.500	109.2640	109.2740	+0.1440

Find the invoice price for buying $100,000 in face (principal) value of this bond.

State your answer to the nearest $1, for example 97,243 .

Ask price

$m=2$

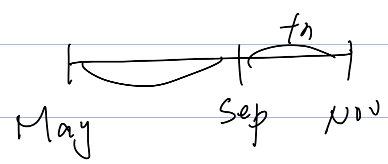
$t_b = 184$

$t_n = 53$

$\rightarrow t_a = 131$

$$B_0 = 109.2740 + \frac{4.5}{2} \times \frac{131}{184}$$

$$= 110.8759$$



$110.8759 \times 1000 = 110876$

A U.S. Treasury STRIP matures in exactly 5 years and has a continuously-compounded yield to maturity of 4.40%. Suppose that the continuously-compounded forward rate for borrowing or lending over one-half of a year starting in 4.5 years and ending in 5.0 years equals 4.30%. What is the no-arbitrage, continuously-compounded yield to maturity on a U.S. Treasury STRIP maturing in exactly 4.5 years?

State your answer as a percentage rate to the third decimal point, for example, 4.132 .

$$f_0(t, t+m) = \frac{t+m}{m} y(0, t+m) - \frac{t}{m} y(0,t)$$

$$0.043 = \frac{5}{0.5} 0.044 - \frac{4.5}{0.5} y(0, 4.5)$$

$$0.043 = 0.44 - 9y(0.45)$$

$$y(0, 4.5) = \frac{0.44 - 0.043}{9} = 0.04411$$

An underwriter is setting the terms of a new 2-year corporate note (bond) that a corporation plans to issue soon. The note will pay semi-annual coupons and will have a 2-year maturity. The underwriter observes the following semi-annually compounded yields on U.S. Treasury STRIPs:

$m=2$

Maturity (Years)	Spot Yield
0.5 $y(0, \frac{1}{2})$	0.040
1.0 $y(0,1)$	0.044
1.5 $y(0, \frac{3}{2}$	0.048
2.0 $y(0,2)$	0.050

The underwriter wants to set the note's coupon rate so that the note sells at its par value. Given the corporation's credit risk, the underwriter expects that investors will require a coupon rate equal to 200 basis points (2.00%) greater than that of an equivalent maturity, default-free Treasury note that sells at par. What coupon rate should the underwriter set for this new corporate note?

Express your answer for the coupon rate as a percentage of face value to the second decimal point, for example, 5.23 .

$$p(0, \tfrac{1}{2}) = e^{-0.04 \times \frac{1}{2}} = 0.98019867$$

$$p(0, 1) = e^{-0.044} = 0.95695395$$

$$p(0, \tfrac{3}{2}) = e^{-0.048 \times 1.5} = 0.9305308958$$

$$p(0, 2) = e^{-0.05 \times 2} = 0.904837418$$

$$C = \frac{2(1 - p(0,2))}{p(0,\frac{1}{2}) + p(0,1) + p(0,\frac{3}{2}) + p(0,2)} = 0.05045$$

$$\rightarrow 5.047 + 2 = 7.047$$