

Engineering Economy
Fall, 2009

Name: _____ Pre-Exam 2 Practice ID#(last 4 digits)_____

1. An engineer working for a DSL provider expects to earn bonuses of \$5000 per year for 5 years, beginning 1 year from now. If the engineer invests the money at 10% per year how much will she have in the account immediately after she makes the last deposit? (Factor notation only)

Answer: $F = \$5000(F/A, 10\%, 5)$

2. In order to expand its product lines, a manufacturer is planning to increase the size of its warehouse. To finance it, the company will borrow \$100,000 two years from now. If the company wants to repay the loan with 4 equal payments, starting one year after he gets the loan, what must be the size of each one at an interest rate of 10% per year? (Factor notation only)

Answer: $A = \$100000(A/P, 10\%, 4)$

3. If a person deposits \$5,000 per year for five years beginning 3 years from now, how much will be in the account 17 years from now if the account earns interest at 10% per year? (Factor notation only)

Answer: $F = \$5000(F/A, 10\%, 5)(F/P, 10\%, 10)$

4. For the series of deposits shown below, how much would be in the account in year 15 if the account earns 10% per year? (Factor notation only)

Years Deposit/year

1-3 \$2000

4-9 \$0

10-15 \$3000

Answer: $F = \$2000(F/A, 10\%, 3)(F/P, 10\%, 12) + \$3000(F/A, 10\%, 6)$

5. A series of payment of \$2,000 for four years beginning in year 4 would be equivalent to how much in year 14 at an interest rate of 10%? (factor notation only)

Answer: $F = \$2000(F/A, 10\%, 4)(F/P, 10\%, 7)$

6. What is the present worth in year 0 of a uniform series of payments of \$1,000 in year 1 through 5 and another series of \$2000 payments in years 8 through 12 at an interest rate of 10% per year? (Factor notation only)

Answer: $P = \$1000(P/A, 10\%, 5) + \$2000(P/A, 10\%, 5)(P/F, 10\%, 7)$

7. The present worth of \$400 in year 1 and amounts increasing by \$30 per year through year 6 at an interest rate of 10% per year is how much? (Factor notation only)

Answer: $P = \$400(P/A, 10\%, 6) + 30(P/G, 10\%, 6)$

8. A large bank that was trying to attract new customers started a program wherein a person starting a checking account could borrow up to \$5,000 at an interest rate of 10% per year simple interest for 1 year. A person who borrows the maximum amount for the maximum time would owe how much interest at the end of 1 year period.

Answer: $F = \$500$

9. How long would it take for \$1000 to accumulate to \$4000 at an interest rate of 12% per year?

Answer: 12 years

10. Sun Oil Company is considering the installation of new flow meters in one of its pipelines. If the company goes ahead with the project, it will spend \$50,000 each year for four years starting 4 years from now. What is the present worth of the investment at an interest rate of 10% per year? (Factor notation only)

Answer: $= \$50000(P/A, 10\%, 4)(P/F, 10\%, 3)$

11. In order to expand its product lines, a manufacturer of personal care products is planning to increase the size of its warehouse. To finance the expansion, the company will borrow \$250,000 two years from now. If the company wants to repay the loan with four equal payments, starting one year after it gets the loan, what must be the size of each one at an interest rate of 12% per year? (Factor notation only)

Answer: $A = \$250,000(A/P, 12\%, 4)$

12. If a person deposits \$5,000 per year for six years beginning four years from now, how much will be in the account 17 years from now if the account earns interest at 10% per year? (Factor notation only)

Answer: $F = \$5,000(F/A, 10\%, 6)(F/P, 10\%, 8)$

13. For the series of deposits shown below, how much would be in the account in year 24 if the account earns 12% per year? (Factor Notation only)

<u>Years</u>	<u>Deposit/Year</u>
1 - 4	\$2,000
5 - 9	\$0
10-15	\$3,000

Answer: $F_{24} = [\$2,000(F/A, 12\%, 4)(F/P, 12\%, 11) + \$3,000(F/A, 12\%, 6)](F/P, 12\%, 9)$

14. A series of payments of \$2,000 for three years beginning in year 5 would be equivalent to how much in year 14 at an interest rate of 12% per year? (Factor Notation only)

Answer: $F = \$2,000 (F/A, 12\%, 3) (F/P, 12\%, 7)$

15. What is the present worth in year 0 of a uniform series of payments of \$1,000 in years 2 thru 5 and another series of \$2,000 payments in years 8 thru 12 at an interest rate of 12% per year? (Factor Notation only)

Answer: $P = \$1,000 (P/A, 12\%, 4) (P/F, 12\%, 1) + \$2,000 (P/A, 12\%, 5) (P/F, 12\%, 7)$

16. Find the present worth of \$1,000 in year 1 and amounts increasing by 7% per year thru year 10. Use an interest rate of 12% per year. (Equation only)

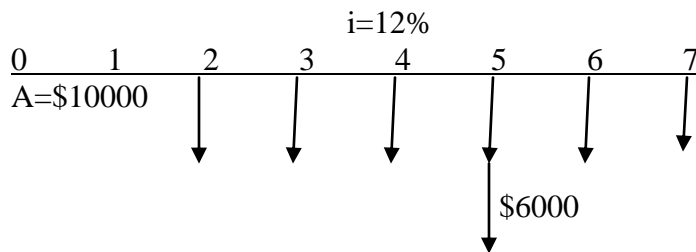
Answer: $P = 1000[1 - (1 + 0.07/1 + 0.12)^{10}] / (0.12 - 0.07)$

17. A contractor purchased equipment for \$60,000 which provided income of \$16,000 per year for 10 years. The annual rate of return that was between 22% and 24%. What would be the factor notation amount be if the notation was represented by A/P?

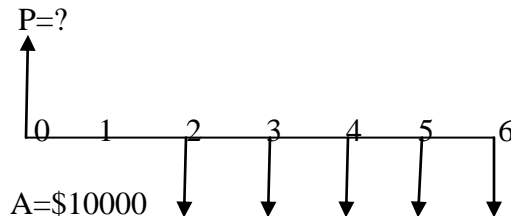
Answer: 0.2666

18. The equivalent annual worth in yrs 1-7 for the cash flow shown below at $i=12\%$ per year is how much? (Factor notation only)

Answer: $A = [10,000(F/A, 12\%, 6) + 6,000(F/P, 12\%, 2)](A/F, 12\%, 7)$



19. The present worth of the cash flow shown below at $i=10\%$ is how much? (Factor Notation only)



Answer: $P_0 = \$10,000(P/A, 10\%, 5)(P/F, 10\%, 1)$

20. Write the generic equation for geometric shifted gradients.

Answer: $P = A \{ 1 - [(1+g)/(1+i)]^n / (i-g) \}$