Name: _____

Instructions

1. Print this problem set and use the space provided under the statement of each question to write your own solution. Then scan and submit your hand-written solutions to Assignments on iCollege.

2. Clearly indicate the final answer in each of your solutions. You should work alone. You are permitted to use your textbook, notes, and a calculator.

3. Each of problems 1-5 counts for 1 point. Problems 6-10 count for 2 points each.

Problem 1

An insurance company sells a policy with a linearly disappearing deductible such that no payment is made on a claim of 250 or less and full payment is made on a claim of 1000 or more. Calculate the payment made by the insurance company for a loss of 700.

Problem 2

The random variable X represents the random loss, before any deductible is applied, covered by an insurance policy. The probability density function of X is

$$f(x) = 2x, \ 0 < x < 1.$$

Payments are made subject to a deductible, d, where $0 < d < 1$. The probability that a claim payment is less than 0.5 is equal to 0.64. Calculate the value of d.

Problem 3

You are given the following loss data:

Size of Loss	Number of Claims	Ground-up Total Losses
0-99	110	58,500
100-249	400	70,000
250-499	300	120,000
500-999	200	150,000
>999	100	200,000
Total	2100	598,500

Calculate the percentage reduction in loss costs by moving from a 100 deductible to a 250 deductible.

Problem 4

Mr. Orfanos purchases a homeowners policy with an 80% coinsurance clause. The home is insured for 150,000. The home was worth 180,000 on the day the policy was purchased. Lightning causes 20,000 worth of damage. On the day of the storm the home is worth 250,000. Calculate the benefit payment Mr. Orfanos receives from his policy.

Problem 5

A company purchases a commercial insurance policy with a property policy limit of 70,000. The actual value of the property at the time of a loss is 100,000. The insurance policy has a coinsurance provision of 80% and a 200 deductible, which is applied to the loss before the limit or coinsurance are applied. A storm causes damage in the amount of 20,000. Calculate the insurance company's payment.

Problem 6

You are given the following information on losses paid during each of 1996-1999:

Accident Year	1996	1997	1998	1999	Earned Premium	Expected Loss Ratio
1996	10,000	5,000	2,000	0	25,000	0.680
1997		12,050	6,025	2,400	29,750	0.688
1998			14,500	7,250	33,000	0.700
1999				17,465	38,000	0.700

Find the end-of-1999 estimated loss reserve using:

(i) The expected loss ratio technique

(ii) The chain ladder technique with arithmetic average loss development factors

Problem 7

You are given the following information on losses paid during each of 1996-1999:

Accident Year	1996	1997	1998	1999	Earned Premium	Expected Loss Ratio
1996	10,000	5,000	2,000	0	25,000	0.680
1997		12,050	6,025	2,400	29,750	0.688
1998			14,500	7,250	33,000	0.700
1999				17,465	38,000	0.700

Find the end-of-1999 estimated loss reserve using the Bornhuetter-Ferguson technique with geometric average loss development factors.

Problem 8

You are given the following information about cumulative loss payments:

Accident Year	12 months	24 months	36 months	48 months	Earned Premium	Expected Loss Ratio
2005	4,850	9,700	14,100	16,200	19,000	0.90
2006	5,150	10,300	14,900		20,000	0.85
2007	5,400	10,800			21,000	0.91
2008	7,200				22,000	0.88

There is no development past 48 months.

Calculate the indicated actuarial reserve using the Bornhuetter-Ferguson method and volume-weighted average loss development factors.

Problem 9

You are given the following information about cumulative loss payments:

Accident Year	12 months	24 months	36 months	48 months
2005	27,000	49,000	65,000	72,000
2006	28,000	57,000	71,000	
2007	33,000	65,000		
2008	35,000			

Selected Age-to-Age Paid Loss Development Factors are: 2.00 for 12/24 months, 1.20 for 24/36 months, 1.15 for 36/48 months, and 1.00 for 48/∞ months.

The interest rate is 5.0% per annum effective.

Calculate the ratio of discounted reserves to undiscounted reserves as of December 31, 2008.

Problem 10

You are given the following information about cumulative loss payments:

Accident Year	Devel Year 0	Devel Year 1	Devel Year 2	Devel Year 3	Devel Year 4	Devel Year 5	Earned Premium
2004	1,400	5,200	7,300	8,800	9,800	9,800	18,000
2005	2,200	6,400	8,800	10,200	11,500		20,000
2006	2,500	7,500	10,700	12,600			25,000
2007	2,800	8,700	12,900				26,000
2008	2,500	7,900					27,000
2009	2,600						28,000

The expected loss ratio for each Accident Year is 0.55.

Calculate the total loss reserve using the Bornhuetter-Ferguson method and three-year arithmetic average paid loss development factors.