13. (2.75 points)

Given the following information about a home's propensity for loss:

Size of Loss			Loss Distribution
	X ≤	$400,000	50.0%
$400,000	< X ≤	$550,000	25.0%
$550,000	< X ≤	$700,000	10.0%
$700,000	< X ≤	$850,000	10.0%
$850,000	< X ≤	$1,000,000	2.5%
$1,000,000	< X ≤	$1,500,000	2.5%
	Total:		100.0%

• Expected claim frequency is 2%.
• Expected losses are uniformly distributed within each layer of loss.
• The home is valued at $1,500,000.

a. (1.25 points)

Calculate the rate per $1,000 of coverage for the home at the following amounts of insurance:
   i. $1,500,000
   ii. $800,000

b. (0.5 point)

Briefly discuss a problem associated with underinsurance from the following perspectives:
   i. Insured
   ii. Insurer

c. (1 point)

The home is insured for $1,000,000 with a coinsurance requirement of 80%. Calculate the indemnity payments and coinsurance penalties for the following losses:
   i. $800,000
   ii. $1,200,000

QUESTION 13	
TOTAL POINT VALUE: 2.75	**LEARNING OBJECTIVE: A10**
SAMPLE ANSWERS	

Part a: 1.25 points

i)

Avg Severity = .5(200K) + .25(475K) + .1(625K) + .1(775K) + .025(925K) + .025(1250K) = $413.125K

Rate per $1K AOI = $413.125K (.02)/(1500K/1K) = $5.51

ii)

Sample 1

Avg Severity = .5(200K) + .25(475K) + .1(625K) + .1(766.667K) + (.025 + .025)(800K) = $397.917K

Where 766.667K from above is calculated: 750K*(2/3)+800K(1/3)

Rate per $1K AOI = $397.917K (.02)/(800K/1K) = $9.95

Sample 2

Avg Severity = .5(200K) + .25(475K) + .1(625K) + .1(750K)(2/3) + (.1*(1/3)+.025 + .025)(800K) = $397.917K

Rate per $1K AOI = $397.917K (.02)/(800K/1K) = $9.95

Part b: 0.5 point

i.)
- Insureds will not have total losses or near total losses fully covered.
- Insured will suffer coinsurance penalties for losses below the coinsurance requirement.
- If the insured is underinsured, then in the case of a total loss, they will not get enough money to rebuild their home and they would need to come up with the difference.

ii.)
- If rates are calculated assuming all policies are fully insured-to-value then policies that are under-insured will be underpriced.
- Insurer will assume all policies a fully insured to replacement cost, which will make the rate for under-insured policies be inadequate.
- If insurer assumes all homes are insured to value they will not be collecting enough premium to cover expected losses. They may adjust by raising rates, but then the insureds at full value will be subsidizing those under-insured and rates will be inequitable.
- Insurer assumes homes are fully covered to their replacement cost when calculating rates, but premium charged for underinsured homes is not adequate to cover losses. Thus, rates are not equitable.

Part c: 1 point

i)

Coinsurance Apportionment Ratio:

a = min(1M/(1.5M*.8),1) = .8333

I = min(800K*.8333,1M) = $666.667K

e = 800K − 666.667K = 133.333K

ii)

<u>Sample 1</u>

I = min(1.2M*.8333,1M) = $1M

e = min(1.2M,1M) – 1M = $0

<u>Sample 2</u>

I = min(1.2M*.8333,1M) = $1M

Penalty = $0 because they have hit their limit

EXAMINER'S REPORT
Candidate were expected to calculate the rates per $1000 AOI given frequency and severity distribution, recognize issues for both insureds and insurers when insureds are underinsured, calculate indemnity payments and coinsurance penalties
Part a
i) Candidates were expected to calculate the rate per Amount of Insurance (AOI) by calculating the average severity using the midpoint of the range and supplied loss distribution then using this to get a pure premium for this level of coverage and divide by the AOI (in $000s).

Common mistakes include:
- Using the upper or lower bound of the range instead of the midpoint
- Not multiplying by frequency
- Not dividing by AOI

ii)

Candidates were expected to properly cap losses at $800K and adjust the loss distribution for the layer in which an $800K loss fell in addition to the elements for part (i.)

Common mistakes include:
- Incorrectly accounting for the capping of coverage at $800K by not using the correct average severity for the range 700K-850K
- Omitting all layers above 800K
- Using the upper or lower bound of the range instead of the midpoint
- Not multiplying by frequency
- Not dividing by AOI

Part b
i.) Candidates were expected to demonstrate an issue with underinsurance from the insureds' perspective.

Common mistakes include:
- Simply stating that the insured would not receive the full loss payment as the explanation would need to specify that it was a total or near-total loss

- Stating an issue of the insurer rather than the insured, such as the insured would not be charged adequate premium

ii.)

Candidates were expected to demonstrate an issue with underinsurance from the insurers' perspective.

Common mistakes include:

- Stating that the insurers' profitability would be impacted without directional justification
- Stating that rates would be inaccurate without specifying they would be inadequate
- Stating that rates would be skewed without specifying how they were skewed

Part c

Candidates were expected to calculate the appropriate apportionment ratio and apply it to the loss to determine the indemnity payment and coinsurance penalty.

Common mistakes include:

- Using an incorrect apportionment ratio calculation
- Including the loss amount in excess of the coverage in the coinsurance penalty