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1) On January 1, 2012, I took out a $40,000 student loan at 5% interest compounded monthly. I will make my first payment of $300 on January 1, 2017. Thereafter, I pay $300 per month at the beginning of the month .

   a. How much do I owe on January 1, 2017? Note: Even though I am not making payments between January 1, 2012 and January 1, 2017, the amount I owe increases over this period due to interest. *7 pts*

$40{,}000\left(1+\frac{.05}{12}\right)^{5\cdot 12} = 40{,}000\,(1.004167)^{60} = \boxed{\$51{,}334.35}$

   b. How much do I owe after my 100th payment? *5 pt*

$40{,}000\left(1+.05/12\right)^{100+60} - 300\left(\frac{\left[1+\frac{.05}{12}\right]^{100}-1}{\frac{.05}{12}}\right)\left(1+\frac{.05}{12}\right)$

$77{,}801.53 - 300\left(\frac{.51558}{.004167}\right)(1.00417)$

$77{,}801.53 - 300\,(123.7402)(1.00417)$

$77{,}801.53 - 37122.067\,(1.00417)$

$77{,}801.53 - 37{,}276.742 = \boxed{\$40{,}524.79}$

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2) I wish to buy a $1,000,000 house. What will be the monthly payments on a 40 year loan at 3% interest, compounded monthly? Assume that all payments are made at the beginning of the month. *7 pts*

$$1{,}000{,}000\left(1+\frac{.03}{12}\right)^{480} = x\left(\frac{\left[1+\frac{.03}{12}\right]^{480}-1}{\frac{.03}{12}}\right)\left(1+\frac{.03}{12}\right)$$

$$1{,}000{,}000\,(1.0025)^{479} = x\left(\frac{(1.0025)^{480}-1}{.0025}\right)$$

$$3306881.55 = x\left(\frac{2.315149}{.0025}\right)$$

$$= x\,(926.0595)$$

$$\boxed{x = \$3570.92}$$

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3) On January . 1, 2012, I won an award that pays X dollars every year for 20 years with the first payment immediately. At 5% annual interest, the present value of my award on January . 1, 2012 was $5,000,000. Find X. *7 pts*

$$X\left(\frac{[1.05]^{20}-1}{.05}\right)(1.05) = 5{,}000{,}000\,(1.05)^{20}$$

$$X\left(\frac{[1.05]^{20}-1}{.05}\right) = 5000{,}000\,(1.05)^{19}$$

$$X\left(\frac{1.65333}{.05}\right) = 5{,}000{,}000(2.52695)$$

$$33.06596X = 12634750.98$$

$$\boxed{X = \$382{,}107.56}$$

-D

5) Define

a. Insurable interest requirement . *3 pts*

In order to purchase an insurance policy on someone, you must have an insurable interest in them. This means you must suffer a loss or detriment if the insured against event, usually their death, occurs.

b. Retrocession. *3 pts*

Retrocession is when a reinsurer transfers some of their risk by purchasing reinsurance from another reinsurer.

c. Sub-standard risk. *3 pts*

The people in this category have a greater than average likelihood of risk

d. Anti-selection. *3 pts*

The likelihood that people with a greater than average likelihood of risk, preceived or actual, will be more likely to purchase insurance than those with an average or less than average likelihood of risk.

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6) Distinguish between a valued contract and a contract of indemnity in the context of insurance. Give an example of each.. *4 pts*

A valued contract is one in which the benefit paid at time of loss is a predetermined amount no matter the actual cost of the loss when it occurs. An example of this is life insurance; the death benefit is a specified amount paid when the insured dies.

A contract of indemnity is one in which the benefit paid is determined at the time of loss and valued at the cost of the loss. An example of this is car damage; the benefit paid to repair a vehicle is relative to the cost of repair.

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e. I had to stay in a hotel while my house was being repaired. Is this covered by my insurance? If so, which part? *3 pts*

Yes, this is covered under Section I, Part D.

f. Under what circumstances would Part II of my policy be used in the context of this claim? *3 pts*

Section II - Liability, would only be used if a third party was injured or a third party's property was damaged while on my property. For example, had a neighbor slipped on my floor which was wet from the leaky roof or if the damaged entertainment center was theirs, not mine.

8) Tam works at Sky High Construction doing steel work. He fell off of the top of a building Sky High was building and was seriously injured. Tam has submitted a claim for his medical benefits to Sky High under Workman's Compensation.

a. It turns out that Tam was high on drugs at the time. This almost certainly was the cause of the accident. Sky High has refused his claim because of this. In terms of current law, who is correct? Why? *3 pts*

In terms of current law, Workman's Compensation is a no-fault system. This means that no matter how much Tam contributed to his injury, since he was injured because of and in the course of doing his job, he should receive Workmans Compensation.

The worker being on drugs is an exception to the no-fault nature of workmans comp. Hence the refusal of his claim was correct.

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b. Sky High also claims that Tam understood the dangers of "high steel" work and was informed that it is their policy not to pay full damages for such workers since they already get paid a higher salary than other workers. In terms of current law, who is correct? Why? *3 pts*

There used to be a doctrine of assumed risk that would have allowed Sky High to do this; however, in current law, there is no such doctrine. This means Sky High must pay Tam full workman's compensation even though he knew the dangers of his job.

9) My house is currently worth $400,000 but I only have it insured for $300,000, with no deductible. My insurance company requires X% coinsurance. I had $60,000 fire damage for which the insurance company paid $55,000. Find X. *7 pts*

$$\frac{300{,}000}{X(400{,}000)}(60{,}000) = 55000$$

$$\frac{3}{4x} = \frac{11}{12}$$

$$36 = 44x$$

$$.81818 = x$$

81.8%

-0

10) Susan has a $300,000 fully insured house with a disappearing deductible. For losses of $1000 or less, the insurance company pays nothing while for losses $3,000 or more they pay everything. What would Susan have to pay for a $2,500 loss? *7 pts*

$$\left(\frac{3000-2500}{3000-1000}\right)(1000) = \frac{500}{2000}(1000) = .25(1000) = 250$$

$250 ✓

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11) Below you are given a table of losses evaluated at 1/1/2012 for Klunker Auto Insurance. Assume all losses are fully developed at 48 months. Fill in the corresponding paid loss development factors in the second table. Give answer accurate to at least two digits after the decimal. *7 pts*

Loss Reserves

Accident Year	Cumulative Paid Losses Development Stage in Months			
	12	24	36	48
2008	2,000	2,600	3,120	3,432
2009	3,000	3,600	3,960	
2010	2,500	3,000		
2011	1,000			

Development Stage in Months
Paid Loss Development Factors

Accident Year	Cumulative Paid Losses Development Stage in Months		
	12-24	24-36	36-48
2008	1.30	1.20	1.10
2009	1.20	1.10	
2010	1.20		
2011			

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12) Based on the data in problem 15, Klunker's actuaries decided to use the loss development factors given below. What would their estimated reserves be for each of 2008, 2009, 2010, and 2011? *6 pt*

Selected Loss Development Factors

12-24	24-36	36-48	48-Ult.
1.1	1.3	1.2	1

2008 Reserve = $0

2009 Reserve = $792

2010 Reserve = $1680

2011 Reserve = $716

12-Ult	24-Ult	36-Ult	48-Ult
1.716	1.56	1.2	1