Review Questions Finite Math – **Final Exam**

These questions just cover the new material - see the old review sheet and exams for the old material.

1. In a game of chance you pay \$5 and toss a coin eight times. If you get an equal number of heads and tails you win \$20, if you get six heads you win \$60 and if you get all heads you win \$100.
(a) If you play this game 1024 times how much would you anticipate winning or losing?

(b) How much would you pay to play the game if it was fair?

2. A certain population of adult horses has a mean height of 15 hands with a standard deviation of 2 hands. Assuming that the height is normally distributed find the probability that the height of a random horse is:
(a) Less than 13.5 hands.

(b) Between 13 and 16 hands.

(c) More than 16 hands.

(d) What height are the tallest 10% of the horses?

3. (a) Bob pays \$50 each quarter into an account paying 8% compounded quarterly. How much will be in the account after 10 years?

(b) How much should Valerie save each month in order to have \$10,000 three years from now if interest rates are 6% compounded monthly.

(c) You deposit your lottery winnings into an account paying 4% compounded monthly. You calculate that you can draw out \$1000 a month for the next two years. How much did you pay into the account.

(d) You plan to take out a 20 year mortgage. If the interest rate is 9% compounded monthly and you can afford to make monthly payments of \$350, how big a mortgage can you take out?

(e) What are the quarterly payments on a 10 year mortgage of \$1,000,000 at an interest rate of 8% compounded quarterly.

4. A box of 20 vases is dropped. Assume that the probability of a given vase breaking is 10%. What is the probability that the box contains:

(a) No broken vases?

(b) Exactly two broken vases?

(c) At least two broken vases?

(d) At most 18 broken vases?

(e) What is the expected number of broken vases and the standard deviation?

PG SCORE

Solutions

1. (a) Win \$7600. (b) \$12.42.

2. (a) $A(-0.75) = 0.2266$.
(b) $A(0.5) - A(-1) = 0.5328$.
(c) $1 - A(0.5) = 0.3085$.
(d) At least 17.6 hands (using $z_{90} \approx 1.30$).

3. (a) \$3020.10
(b) \$254.22
(c) \$23,028.25
(d) \$38,900.73
(e) \$36,555.75

4. (a) $(0.90)^{20} = 0.1216$.
(b) $P(X = 2) = \binom{20}{2}(0.10)^2(0.90)^{18} = 0.2852$.
(c) $P(X \geq 2) = 1 - P(X = 1) - P(X = 0) = 1 - 20(0.10)(0.90)^{19} - (0.90)^{20} = 0.6083$.
(d) $P(X \leq 18) = 1 - P(X = 19) - P(X = 20) = 1 - 20(0.10)^{19}(0.90) - (0.10)^{20} \approx 1$.
(e) $E(X) = np = 2$ vases, $\sigma = \sqrt{npq} = 1.3416$ vases.