Math 1313
Test 3 Supplemental Review Solutions

1. Present Value of an Annuity

$$P = E\left[\frac{1-(1+i)^{-n}}{i}\right] = 350\left[\frac{\left[1-\left(1+\frac{.09}{12}\right)^{-48}\right]}{\frac{.09}{12}}\right] = \$14064.67$$

2. Amortization
Part I:

$$E = \frac{Pi}{1-(1+i)^{-n}} = \frac{12000(\frac{.18}{12})}{1-(1+\frac{.18}{12})^{-72}} = \$273.69$$

Part II:

273.69*72 = 19,705.93, so you will pay $19,705.93.

Recall the Cash Value of the tractor is: $12,000 so 19,705.93 – 12,000 = 7,705.93, so you will pay $7,705.93 in interest.

4. Future Value with Compound Interest

$$A = P(1+i)^n = 5000(1+.0225)^{68} = \$22,702.60$$

5. Present Value of an Annuity

$$P = E\left[\frac{1-(1+i)^{-n}}{i}\right] = 524.37\left[\frac{1-\left(1+\frac{.089}{12}\right)^{-60}}{.089/12}\right] = 25319.83$$

$$25{,}319.83 + 3{,}000 = \$28{,}319.83$$

6. Sinking Fund

$$E = \frac{Fi}{(1+i)^n - 1} = \frac{10000*.015}{(1+.015)^{20} - 1} = \$432.46$$

7. Present Value with compound interest

$$P = A(1+i)^{-n} = 2000\left(1+\frac{.1056}{12}\right)^{-24} = \$1{,}620.72$$

8. Future Value of an Annuity

$$F = E\left[\frac{(1+i)^n - 1}{i}\right] = 150\left[\frac{\left(1+\frac{.05}{12}\right)^{36} - 1}{.05/12}\right] = \$5{,}813.00$$

9. Amortization

The Amount financed is

$$P = 150000 - (150000 * .20) = 150000 - 30000 = 120000$$

$$R = \frac{Pi}{1-(1+i)^{-n}} = \frac{120000 * \left(\frac{.0625}{12}\right)}{1-\left[1+\left(\frac{.0625}{12}\right)\right]^{-360}} = \$738.86$$

10. Sinking Fund

$$E = \frac{Fi}{(1+i)^n - 1} = \frac{20000 * .012}{(1+.012)^{20} - 1} = \$890.75$$

11. Present Value of an Annuity

Part I: $P = E\left[\frac{1-(1+i)^{-n}}{i}\right] = \frac{36\left[1-(1+.015)^{-36}\right]}{.015} = \$995.78$

$995.78 + 50 = \$1{,}045.78$

Part II: 36*36 = 1,296 + 50 = 1,346, so the Club membership will cost you $1,346 after 3 years.

12. Part I: Future Value of an Annuity

$$F = E\left[\frac{(1+i)^n - 1}{i}\right] = 750\left[\frac{(1+.015)^{80} - 1}{.015}\right] = \$114{,}533.14$$

Part II: Future Value/Compound Interest

$$A = P(1+i)^n = 114533.14 * (1+.015)^{80} = \$376{,}889.94$$

13.
a. {1, 5, 9, 11, 13, 15, 17, 19}
b. Ø
c. {1, 3, 5, 7, 9, 13, 17}
d. {1, 19}
e. {3, 5, 7, 11, 13, 15, 19}

14. A:
a. III
b. I, II, IV
c. IV
d. I, III, IV

B:
a. I
b. I, III, IV, VII, VIII
c. IV
d. I, II, III, IV, V, VII, VIII
e. III, VI, VII
f. II, III, V, VI, VIII
g. I, II, III, IV, VI, VII, VIII
h. II, V
i. I, II, IV, V, VI, VII
j. I, VIII
k. I, II, III, VI, VII, VIII
l. I, IV

15. a. 26
b. 8
c. 4
d. 10
e. 14
f. 16
g. 48
h. 4
i. 23

16. a. 143
b. 184

17. a. 236
b. 195
c. 88
d. 64
e. 259

18. a. 306
b. 261
c. 362
d. 132
e. 438

f. 699
g. 529
h. 168
i. 111
j. 269
k. 63

19. 72
20. 37,125
21. 9.8415×10^{12}
22. 38,955,840
23. a. 151,200
    b. 7,560
    c. 45,360
24. 1.307674368×10^{12}
25. 715
26. 24,310
27. 3,628,800
28. 53,130
29. 658,008
30. 78,960,960
31. 410,269,860

32. a. 540
b. 180
c. 1,350

33. a. 6
b. 169

34. a. 1,090,959,309
b. 301,308,612
c. 301,308,612
d. 1,867,893,819

35.

Source	**Probability**
Newspaper	0.3
Television	0.5
Radio	0.125
Other	0.075

36. a.

Time Spent (in hours – x)	**Probability**
$0 \le x \le 1$	0.194
$1 < x \le 3$	0.233
$3 < x \le 6$	0.357
$x > 6$	0.216

b. 0.427
c. 0.806
d. 0.784

37. a. 0.0278
    b. 0.2778
    c. 0.0833
    d. 0.8333
38. a. 0.2
    b. 0.08
39. a. 0.35
    b. 0.85
    c. 0.7
40. a. 0.94
    b. 0.85
    c. 0.61
    d. 0.15
    e. 0.06
41. a. 0.75
    b. 0.7
    c. 0.31
    d. 0.14
    e. 0.69
    f. 0.14
42. a. 0.19
    b. 0.81
    c. 0.41
    d. 0.78
43. a. 0.1860
    b. 0.8140
44. a. 0.9999
    b. 0.0611
    c. 0.0898
    d. 0.9991
45. a. 0.3228
    b. 0.3874
    c. 0.0307
    d. 0.9986
46. a. 0.4196
    b. 0.7622
    c. 0.9720