Questions

Question 1 (4 points)
Textbook page 277 #11 g and h

G) $15,000,000 / $464,927,576 = 0.0322630895
0.0322630895 × $12,000,000 = $387,157.07 ✔

H) 0.92 × $464,927,576 = $427,733,369.92. ✔

Question 2 (2 points)
Textbook page 277 #12

To value a pass-through security, it is necessary to project its cash flow. The difficulty is that the cash flow is unknown because of prepayments. The only way to project a cash flow is to make some assumption about the prepayment rate over the life of the underlying mortgage pool. The prepayment rate assumed is called the prepayment speed. If the assumed prepayment rate is inaccurate, the resulting cash flow is not meaningful for valuing pass-throughs. ✔

Question 3 (3 points)
Textbook page 277 #13

$SMM = 1 - (1 - CPR)^{1/12}$
$SMM = 1 - (1 - 0.08)^{1/12} = 1 - (0.92)^{0.08333} = 1 - 0.9930756 = 0.0069244$ or 0.69244%.

An SMM of 0.69244% means that approximately 0.69244% of the remaining mortgage balance at the beginning of the month, less the scheduled principal payment, will prepay that month. ✔

Question 4 (6 points)
Textbook page 277 #15

A) With 100 PSA:

For month 1: CPR = 6%(1 / 30) = 0.2%; 100 PSA = 1.00(0.2%) = 0.2% or 0.002.

For month 4: CPR = 6%(4 / 30) = 0.8%; 100 PSA = 1.00(0.8%) = 0.8% or 0.008.

For month 9: CPR = 6%(9 / 30) = 1.8%; 100 PSA = 1.00(1.8%) = 1.8% or 0.018.

For month 27: CPR = 6%(27 / 30) = 5.4%; 100 PSA = 1.00(5.4%) = 5.4% or 0.054.

For months 40, 120, & 340: CPR = 6.0%; 100 PSA = 1.00(6.0%) = 6.0% or 0.060.

With 70 PSA:

For month 1: CPR = 6%(1 / 30) = 0.2%; 70 PSA = 0.70(0.2%) = 0.14% or 0.0014.

For month 4: CPR = 6%(4 / 30) = 0.8%; 70 PSA = 0.70(0.8%) = 0.56% or 0.0056.

For month 9: CPR = 6%(9 / 30) = 1.8%; 70 PSA = 0.70(0.1.8%) = 1.26% or 0.0126.

For month 27: CPR = 6%(27 / 30) = 5.4%; 70 PSA = 0.70(5.4%) = 3.78% or 0.0378.

For month 40, 120, & 340: CPR = 6.0%; 70 PSA = 0.70(6.0%) = 4.20% or 0.0420.

With 320 PSA:

For month 1: CPR = 6%(1 / 30) = 0.2%; 320 PSA = 3.20(0.2%) = 0.64% or 0.0064.

For month 4: CPR = 6%(4 / 30) = 0.8%; 320 PSA = 3.20(0.8%) = 2.56% or 0.0256.

For month 9: CPR = 6%(9 / 30) = 1.8%; 320 PSA = 3.20(1.8%) = 5.76% or 0.0576.

For month 27: CPR = 6%(27 / 30) = 5.4%; 320 PSA = 3.20(5.4%) = 17.28% or 0.1728.

For months 40, 120, & 340: CPR = 6%; 320 PSA = 3.20(6.0%) = 19.20% or 0.1920.

CPR Assuming: ✔

Month	100% PSA	70% PSA	320% PSA
1	0.2%	0.14%	0.64%
4	0.8%	0.56%	2.56%
9	1.8%	1.26%	5.76%
27	5.4%	3.78%	17.28%
40	6.0%	4.20%	19.20%
120	6.0%	4.20%	19.20%
340	6.0%	4.20%	19.20%

B) $SMM = 1 - (1 - CPR)^{1/12}$

With 100% PSA:

For month 1: CPR = 6%(1 / 30) = 0.2% = 0.002; 100 PSA = 1.00(0.002) = 0.002;

$SMM = 1 - (1 - 0.002)^{1/12} = 1 - (0.998)^{0.083333} = 0.0001668$ or 0.01668%.

For month 4: CPR = 6%(4 / 30) = 0.08% = 0.008; 100 PSA = 1.00(0.008) = 0.008;

$SMM = 1 - (1 - 0.008)^{1/12} = 1 - (0.992)^{0.083333} = 0.0006691$ or 0.06691%.

For month 9: CPR = 6%(9 / 30) = 1.8% = 0.018; 100 PSA = 1.00(0.018) = 0.018;

$SMM = 1 - (1 - 0.018)^{1/12} = 1 - (0.982)^{0.083333} = 0.0015125$ or 0.15125%.

For month 27: CPR = 6%(27 / 30) = 5.4% = 0.054; 100 PSA = 1.00(0.054) = 0.054;

$SMM = 1 - (1 - 0.054)^{1/12} = 1 - (0.946)^{0.083333} = 0.0046154$ or 0.46154%.

For month 40, 120, and 340: CPR = 6% = 0.06; 100 PSA = 1.00(0.06) = 0.06;

$SMM = 1 - (1 - 0.06)^{1/12} = 1 - (0.94)^{0.083333} = 0.0051430$ or 0.51430%.

With 70 PSA:

For month 1: CPR = 6%(1 / 30) = 0.2% = 0.002; 70 PSA = 0.70(0.002) = 0.0014.

$SMM = 1 - (1 - 0.0014)^{1/12} = 1 - (0.9986)^{0.083333} = 0.0001167$ or 0.01167%.

For month 4: CPR = 6%(4 / 30) = 0.8% = 0.008; 70 PSA = 0.70(0.008) = 0.0056.