The next sheet shows the result, as well as the formulas for computing the interest rate in each scenario.

	A	B	C	D	E	F	G	H
1	Year	28% of Monthly Income		Interest Rate			Monthly Payment	
2			Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
3	1	$1,866.67	4	4	4			
4	2	$1,941.33	4	4	4			
5	3	$2,018.99	4	4	4			
6	4	$2,099.75	4	4	4			
7	5	$2,183.74	4	4	4			
8	6	$2,271.09	9.25	9	15			
9	7	$2,361.93	=C8+0.25	=D8	=E8-0.25			
10	8	$2,456.41						
30	28	$5,382.29						
31	29	$5,597.58						
32	30	$5,821.48						

To compute the monthly payment, you decide to use the built-in function PMT, which has the format

$$PMT(i, n, PV, [FV], [type]),$$

where i = interest per period, n = total number of periods of the loan, PV = present value, FV = future value (optional); the *type*, also optional, is 0 or omitted if payments are at the end of each period, and 1 if at the start of each period. The present value will be the outstanding principal owed on the home each time the rate is changed and so that too will need to be known. During the first 5 years we can use as the present value the original cost of the home, but each year thereafter, the loan is re-amortized at the new interest rate, and so the outstanding principal will need to be computed. Although Excel has a built-in function that calculates payment on the principal, it returns only the payment for a single period (month), so without creating a month-by-month amortization table it would be difficult to use this function to track the outstanding principal. On the other hand, the total outstanding principal at any point in time can be computed using the future value formula FV. You decide to add three more columns to your Excel worksheet to show the principal outstanding at the start of each year. Here is the spreadsheet with the formulas for the payments and outstanding principal for the first 5 years.

	A	B	C	D	E	F	G	H	I	J	K
1	Year	28% of Monthly Income		Interest Rate		Monthly Payment			Balance on Principal		
2			Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
3	1	$1,866.67	4	4	4	=-PMT(C3/1200,360,I$3)			$380,000.00	$380,000.00	$380,000.00
4	2	$1,941.33	4	4	4				=FV(C3/1200,12*$A3,F3,-I$3)		
5	3	$2,018.99	4	4	4						
6	4	$2,099.75	4	4	4						
7	5	$2,183.74	4	4	4						
8	6	$2,271.09	9.25	9	15						
9	7	$2,361.93	9.5	9	14.75						
10	8	$2,456.41	9.75	9	14.5						

The two formulas will each be copied across to the adjacent two cells for the other scenarios. A few things to notice: The negative sign before *PMT* converts the negative quantity returned by *PMT* to a positive amount. The dollar sign in I$3 in the *PMT* formula fixes the present value for each year at the original cost of the home for the first 5 years, during which payments are computed as for a fixed rate loan. In the formula for the balance on principal at the start of each year, the number of periods is the total number of months up through the preceding year, and the present value is the same initial price of the home each year during the 5-year fixed rate period.

The next sheet shows the calculated results for the fixed-rate period, and the new formulas to be added for the adjustable rate period starting with the sixth year.

	C	D	E	F	G	H	I	J	K
1		Interest Rate			Monthly Payment			Balance on Principal	
2	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
3	4	4	4	$1,814.18	$1,814.18	$1,814.18	$380,000.00	$380,000.00	$380,000.00
4	4	4	4	$1,814.18	$1,814.18	$1,814.18	$373,308.06	$373,308.06	$373,308.06
5	4	4	4	$1,814.18	$1,814.18	$1,814.18	$366,343.48	$366,343.48	$366,343.48
6	4	4	4	$1,814.18	$1,814.18	$1,814.18	$359,095.16	$359,095.16	$359,095.16
7	4	4	4	$1,814.18	$1,814.18	$1,814.18	$351,551.52	$351,551.52	$351,551.52
8	9.25	9	15	=-PMT(C8/1200,360-12*$A7,I8)			=FV(C7/1200,12,F7,-I7)		
9	9.5	9	14.75						
10	9.75	9	14.5						

Notice the changes: The loan is re-amortized each year starting with year 6, and the payment calculation needs to take into account the reduced, remaining lifetime of the loan each time. You now copy these formulas across for the remaining two scenarios, and then copy all six formulas down the remaining rows to complete the calculation. Following is a portion of the complete worksheet showing, in red, those years during which the monthly payment will exceed 28% of the gross monthly income.

	A	B	C	D	E	F	G	H	I	J	K
1	Year	28% of Monthly Income		Interest Rate			Monthly Payment			Balance on Principal	
2			Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3	Scenario 1	Scenario 2	Scenario 3
3	1	$1,866.67	4	4	4	$1,814.18	$1,814.18	$1,814.18	$380,000.00	$380,000.00	$380,000.00
4	2	$1,941.33	4	4	4	$1,814.18	$1,814.18	$1,814.18	$373,308.06	$373,308.06	$373,308.06
5	3	$2,018.99	4	4	4	$1,814.18	$1,814.18	$1,814.18	$366,343.48	$366,343.48	$366,343.48
6	4	$2,099.75	4	4	4	$1,814.18	$1,814.18	$1,814.18	$359,095.16	$359,095.16	$359,095.16
7	5	$2,183.74	4	4	4	$1,814.18	$1,814.18	$1,814.18	$351,551.52	$351,551.52	$351,551.52
8	6	$2,271.09	9.25	9	15	$2,943.39	$2,884.32	$4,402.22	$343,700.55	$343,700.55	$343,700.55
9	7	$2,361.93	9.5	9	14.75	$3,001.60	$2,884.32	$4,336.46	$340,018.68	$339,866.12	$342,337.80
10	8	$2,456.41	9.75	9	14.5	$3,058.89	$2,884.32	$4,271.84	$336,135.05	$335,671.99	$340,686.40
11	9	$2,554.66	10	9	14.25	$3,115.17	$2,884.32	$4,208.48	$332,020.97	$331,084.43	$338,694.96
12	10	$2,656.85	10.25	9	14	$3,170.39	$2,884.32	$4,146.53	$327,643.98	$326,066.52	$336,305.10
13	11	$2,763.12	10.5	9	13.75	$3,224.44	$2,884.32	$4,086.13	$322,967.19	$320,577.89	$333,450.89
14	12	$2,873.65	10.75	9	13.5	$3,277.24	$2,884.32	$4,027.41	$317,948.51	$314,574.40	$330,058.36
15	13	$2,988.59	11	9	13.25	$3,328.70	$2,884.32	$3,970.53	$312,539.70	$308,007.73	$326,045.01
16	14	$3,108.14	11.25	9	13	$3,378.71	$2,884.32	$3,915.64	$306,685.30	$300,825.07	$321,319.42
17	15	$3,232.46	11.5	9	12.75	$3,427.16	$2,884.32	$3,862.89	$300,321.34	$292,968.62	$315,780.91
18	16	$3,361.76	11.75	9	12.5	$3,473.93	$2,884.32	$3,812.43	$293,373.72	$284,375.19	$309,319.29
19	17	$3,496.23	12	9	12.25	$3,518.89	$2,884.32	$3,764.40	$285,756.40	$274,975.63	$301,814.76
20	18	$3,636.08	12.25	9	12	$3,561.90	$2,884.32	$3,718.94	$277,369.15	$264,694.33	$293,137.86
21	19	$3,781.52	12.5	9	11.75	$3,602.81	$2,884.32	$3,676.20	$268,094.83	$253,448.57	$283,149.60
22	20	$3,932.79	12.75	9	11.5	$3,641.47	$2,884.32	$3,636.32	$257,796.15	$241,147.88	$271,701.73