

# UNIVERSITY OF BRADFORD

# **BUSINESS ACCOUNTING - Accelerated**

#### MAN4055M

Friday 2<sup>nd</sup> May 2014

09:15 – 10:45 hours Plus 10 minutes reading time

Main

#### This is a **CLOSED BOOK** examination

Answer **ALL multiple choice questions** in Section A on the **ANSWER GRID** provided (Answersheet and questions to be handed in with the answerbook) All multiple choice questions carry equal marks

> Answer any **ONE question only** from Section B All questions in Section B carry equal weighting

> > Discount tables are provided

# Answer ALL questions. All questions carry equal marks.

# **Question 1**

The historical cost accounting rules specify that current assets should be stated at:

- A Lower of purchase price or production cost and net realisable value
- **B** Directors' valuation or current market value
- **C** Lower of purchase price and production cost
- **D** Historical cost as adjusted for revaluations

#### Question 2

Which of the following statements is false?

- A Liquidity is an assessment of how easily we can meet our short-term obligations
- **B** We can measure liquidity by seeing how much cash has been received or spent in a period
- **C** Not all our current assets may be liquid
- D Liquidity depends on how much of our assets can be quickly turned into cash

#### **Question 3**

Where sales are £174,000, fixed costs £42,000, and the profit £16,000, the variable cost and the contribution should be:

<u>Variable Cost</u>	<u>Contribution</u>	
116,000	58,000	
58,000	116,000	
158,000	132,000	
132,000	158,000	
	<u>Variable Cost</u> 116,000 58,000 158,000 132,000	

# **Question 4**

Reporting significant adverse variances to management is an example of:

- A fixed budgeting
- B flexible budgeting
- **C** management in action
- **D** management by exception

#### **Question 5**

Management have set a profit target of £80,000 for the period. The company has a single product which sells at £200 each with a variable cost of £150 for outputs up to 3,000 units. Any additional output in excess of 3,000 units has to be sold at £175 per unit. Fixed costs for the period are £90,000. The total number of units which have to be sold to achieve the profit target is:

U	n	İ	ts
	-	-	-

- A 1,600
- **B** 1,800
- **C** 3,800
- **D** 4,200

Using the same data as in the preceding question 5, the number of units which have to be sold in order to break even is:

- **A** 1,600
- **B** 1,800
- **C** 3,800
- **D** 4,200

# Question 7

Which of the following is **not** a relevant cost or revenue for capital investment appraisal purposes?

- **A** the expected residual or salvage value of fixed assets
- **B** depreciation on new fixed assets
- **C** the cost of any new fixed assets
- **D** expected future repair and renewal costs of any new fixed assets

#### **Question 8**

Setting up an allowance or provision for future bad debts relating to sales already made complies with:

- **A** The realisation concept
- **B** The prudence concept
- **C** The going concern concept
- **D** The consistency concept

#### **Question 9**

If a company's share price falls, what happens to its P/E ratio and dividend yield?

P/E ratio		Dividend yield	
Α	Increase	Increase	
В	Increase	Decrease	
С	Decrease	Increase	
D	Decrease	Decrease	

# **Question 10**

A company buys goods for £50 and sells them for £75. Its mark-up is:

- **B** 33.3%
- **C** 50.0%
- **D** 125.0%

Company Y buys goods for resale. When stock at the start of a period is  $\pounds$ 510, stock at the end is  $\pounds$ 640, sales are  $\pounds$ 4,610, and purchases are  $\pounds$ 3,060, the gross profit for the period is:

**A** £1,680

- **B** £1,550
- **C** £1,420
- **D** £1,040

#### **Question 12**

Company X has a gross profit margin of 40%, its return on sales (operating profit before interest and tax) is 8% and its asset turnover (sales/total assets less current liabilities) is 4. A new investment of £100,000, financed from the issue of new share capital, will deliver sales of £200,000 per annum and operating profits of £20,000. What will be the effect of the new investment?

	<u>Return on sales</u>	<u>Asset turnover</u>
Α	Decrease	Increase
В	Decrease	Decrease
С	Increase	Increase
D	Increase	Decrease

#### **Question 13**

In the preceding Question 12 before undertaking the new investment, the return on capital employed (ROCE) of Company X will be:

- **A** 2%
- **B** 10%
- **C** 32%
- **D** 48%

# **Question 14**

Beta Industries has an operating profit which exceeds its net cash inflow from operating activities. Which of the following changes over the year, if it had occurred, might have contributed to this difference?

- A Creditors increased
- B Stock decreased
- **C** Prepayments decreased
- D Debtors increased

Delta Associates shows the following in its balance sheet:

Fixed assets	£219,650
Current assets	£124,800
Current liabilities	£64,290
Long-term liabilities	£200,000

What are the values calculated for:

	<u>Current ratio</u>	<u>Working capital</u>
Α	1.94	£60,510
В	0.52	£80,160
С	1.94	£124,800
D	0.52	£280,160

#### **Question 16**

The following budgeted production overheads for the forthcoming period have been shared out between production cost centres, as follows:

	<u>Department Y</u>		<u>Department Z</u>
	£000		£000
Allocated and apportioned overheads - Apportioned service	560		120
department costs -	<u>80</u> 640		<u>80</u> 200
Budgeted machine hours	80,000	Budgeted direct labour	
		hours	20,000

The overhead absorption rates would be:

	<u>Department Y</u> Per machine hour	<u>Department Z</u> Per direct labour hour
	£	£
Α	7	6
В	8	10
С	7	10
D	8	6

# **Question 17**

The present value of  $\pounds 1$  in 5 years time is .621 at a discount rate of 10%. The present value of an annuity of  $\pounds 1$  for 5 years at a discount rate of 10% is 3.791.

A company wishes to know what the present value of buying some equipment would be, if it could be bought by paying a deposit of  $\pounds 10,000$  now, plus five instalments of  $\pounds 20,000$  for each of the next 5 years, plus a final amount of  $\pounds 30,000$  at the end of year 5.

The present value of buying the equipment in this way using 10% as the discount rate would be:

	£
Α	104,450
В	94,450
С	75,820
D	18,630

A budget which is designed to change with the 'level of activity' (level of output), is called a:

- A fixed budget
- B master budget
- C short-term budget
- D flexible budget

# **Question 19**

Company A undertakes a rights issue of shares. Cash flow from operating activities in the cash flow statement will show:

- A Increase equal to the new shares issued
- **B** Decrease equal to the new shares issued
- **C** Decrease equal to the dividend on shares including those newly issued
- D No effect

# **Question 20**

The amount often described as net working capital is:

- A Current assets
- **B** Total assets less current liabilities
- **C** Current assets less current liabilities
- **D** Total assets less long-term investments

# SECTION B – this section carries a 60% weighting. Answer ONE question only

# Question 1

Promotrend Ltd retails a product range which can conveniently be divided into three distinct lines S, P and D. Based on sales forecasts provided by the marketing department and costs prepared by various other departments, the following budgeted income statement has been prepared for the coming financial year:

	Variable £000	Fixed £000	Total £000
Sales gross Discounts Sales net Costs			6,202 _ <u>202</u> 6,000
Goods for resale Admin expenses Marketing expenses Total expenses	3156 420 <u>504</u> 4080	492 <u>828</u> 1320	3156 912 <u>1332</u> <u>5400</u>
Net Profit			<u>600</u>

However, the above provides only a summary of the performance and no detail about subsets of the organisation. An analysis of revenue and costs by product line reveals the following information:

Product line	Sales -	Fixed co	Variable costs		
	net £000	Specific £000	Other £000	£000	
S	2100	155	165	1160	
Ρ	2400	234	316	1900	
D	<u>1500</u> 6000	<u>111</u> 500	<u>339</u> 820	<u>1020</u> <u>4080</u>	

The accounting system provides a full allocation of all fixed costs to product lines but only some are specific to that product line, others are common to all lines.

# Required

a) Briefly compare and contrast the information which is prepared for periodic financial accounting with that which is prepared for management accounting.

(20% weighting)

b) Calculate the value of net sales at which each product line would cover

- i) its specific fixed costs
- ii) all costs assigned to it

Interpret and comment on the results, making reference to which is more significant. Answers to (b) may be expressed to the nearest £1000.

(50% weighting)

c) The product life cycle concept suggests that products proceed through different phases of introduction, growth, maturity and decline. Discuss how an appreciation of this concept provides additional insight into the results of the break-even calculations above.

(30% weighting)

Warren is starting up a new trading business on 1 January 20X9. He provides the following information:

Quarterly rent of promises, first payments due in arrears on	£		
25 March 20X9 and 25 June 20X9	1,500		
Cash outlay on equipment – payable on 25 January	180,000		
Monthly planned purchases of goods for re-sale			
January	78,000		
February	72,000		
March to June (per month)	60,000		
All goods are bought on one month's credit (January purchases are paid for in February)			

Monthly planned sales are:

January	30,000
February	48,000
March	84,000
April – June (per month)	90,000

Planned gross profit each month is on average 25% of sales. All sales are on two months' credit. Bad debts of 5% of sales are anticipated but otherwise no arrears of payments are expected.

Monthly cash outlay on general expenses is expected to be  $\pounds 2,250$ . Salaries are expected to be  $\pounds 3,750$  per month.

Depreciation of equipment in the first half-year is estimated at £9,000.

Warren will pay £150,000 cash into the business. He plans to withdraw £22,500 from the business in May. Any temporary excess of payments over receipts will be financed with a bank overdraft.

The closing stock as at 30 June 20X9 is budgeted to be £66,000.

#### Required

a) Prepare a cash flow forecast for the half-year to 30 June 20X9, identifying the maximum overdraft required –if any.

(25% weighting)

b) What recommendations would you make to Warren to improve his cash position during these first six months trading.

(20% weighting)

c) A budgeted income statement for the half-year and a projected balance sheet as at 30 June 20X9.

(30% weighting)

d) Why is the cash forecast and cash flow so important to business survival?

(25% weighting)

Over the past four years, Silicoplas Inc has spent \$2 million on developing a new specialised silicon chip. It is now faced with three mutually exclusive choices:

(i) It can manufacture the chip itself in which case the plant will cost \$5 million. This will be spent at the end of December 20X3. At the same time, additional working capital of \$2.1 million will be required before production commences at the start of 20X4. The company expects to recover this working capital at the end of the project life. Sales and selling prices are expected to be as follows:

Year ending December 31	20X4	20X5	20X6	20X7	20X8
No. sold (000s)	100	100	100	80	80
Sales price (\$ per unit)	120	120	120	100	90

Silicoplas usually depreciates plant of this type over five years using a straight line method and assumes a zero scrap value. Variable costs are expected to be \$65 per unit and additional fixed costs, including depreciation, \$3 million per year.

- (ii) Sell the know-how to a major international firm for a single payment of \$3.1 million, receivable at the end of December 20X3.
- (iii) Sell the know-how for a royalty of \$10 per unit. Anticipated sales of chips would be as shown above.

If choices (ii) or (iii) are taken, then the company will not manufacture the chips itself. Silicoplas estimates that its weighted average cost of capital is 12 per cent. You should assume that sales revenue and costs occur at the end of the year in which they arise. Ignore taxation.

#### **Required:**

a) Calculate the cash flows relevant to a decision whether or not to manufacture the chips. You can ignore choices (ii) and (iii) for this part of the answer.

(30% weighting)

b) Calculate the net present value of each option.

(40% weighting)

c) What other factors should be taken into account before a decision is made? What would your decision be?

(30% weighting)

# PRESENT VALUE TABLE

#### Present value of £1 at the end of year n at a discount rate rn: 1 - 25 years r: 1% - 30%

 $1/(1+r)^{n}$ 

F	Rate(r)														
Year (n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	0.812	0.797	0.783	0.769	0.756
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	0.731	0.712	0.693	0.675	0.658
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	0.659	0.636	0.613	0.592	0.572
5	0.951	0.906	0.005	0.022	0.764	0.747	0.715	0.001	0.650	0.021	0.595	0.567	0.545	0.519	0.497
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	0.535	0.507	0.480	0.456	0.432
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	0.482	0.452	0.425	0.400	0.376
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	0.434	0.404	0.376	0.351	0.327
9 10	0.914	0.837	0.700	0.703	0.640	0.592	0.544	0.500	0.400	0.424	0.391	0.301	0.333	0.308	0.284
10	0.905	0.020	0.744	0.070	0.014	0.000	0.500	0.405	0.422	0.500	0.552	0.522	0.295	0.270	0.247
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	0.317	0.287	0.261	0.237	0.215
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.300	0.319	0.280	0.257	0.231	0.208	0.187
13	0.879	0.775	0.001	0.001	0.530	0.409	0.415	0.300	0.320	0.290	0.200	0.229	0.204	0.162	0.103
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.200	0.239	0.202	0.183	0.160	0.100	0.123
16	0 853	0 728	0.623	0 534	0 458	0 304	0 330	0 202	0 252	0 218	0 188	0 163	0 1/1	0 123	0 107
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.232	0.231	0.198	0.170	0.146	0.125	0.120	0.093
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180	0.153	0.130	0.111	0.095	0.081
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164	0.138	0.116	0.098	0.083	0.070
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149	0.124	0.104	0.087	0.073	0.061
21	0.811	0.660	0.538	0.439	0.359	0.294	0.242	0.199	0.164	0.135	0.112	0.093	0.077	0.064	0.053
22	0.803	0.647	0.522	0.422	0.342	0.278	0.226	0.184	0.150	0.123	0.101	0.083	0.068	0.056	0.046
23	0.795	0.634	0.507	0.406	0.326	0.262	0.211	0.170	0.138	0.112	0.091	0.074	0.060	0.049	0.040
24	0.788	0.622	0.492	0.390	0.310	0.247	0.197	0.158	0.126	0.102	0.082	0.066	0.053	0.043	0.035
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092	0.074	0.059	0.047	0.038	0.030
F	Rate(r)														
F Year ( <i>n</i> )	Rate( <i>r</i> ) 16%	17%	18%	19%	20%	21%	22%	23%	24%	25%	26%	27%	28%	29%	30%
F Year ( <i>n</i> ) 1	Rate(r) 16% 0.862	<b>17%</b> 0.855	<b>18%</b> 0.847	<b>19%</b> 0.840	<b>20%</b> 0.833	<b>21%</b> 0.826	<b>22%</b> 0.820	<b>23%</b> 0.813	<b>24%</b> 0.806	<b>25%</b> 0.800	<b>26%</b> 0.794	<b>27%</b> 0.787	<b>28%</b> 0.781	<b>29%</b> 0.775	<b>30%</b> 0.769
F Year ( <i>n</i> ) 1 2	Rate(r) 16% 0.862 0.743	<b>17%</b> 0.855 0.731	<b>18%</b> 0.847 0.718	<b>19%</b> 0.840 0.706	<b>20%</b> 0.833 0.694	<b>21%</b> 0.826 0.683	<b>22%</b> 0.820 0.672	<b>23%</b> 0.813 0.661	<b>24%</b> 0.806 0.650	<b>25%</b> 0.800 0.640	<b>26%</b> 0.794 0.630	<b>27%</b> 0.787 0.620	<b>28%</b> 0.781 0.610	<b>29%</b> 0.775 0.601	<b>30%</b> 0.769 0.592
F Year ( <i>n</i> ) 1 2 3 4	Rate(r) 16% 0.862 0.743 0.641 0.552	<b>17%</b> 0.855 0.731 0.624 0.534	<b>18%</b> 0.847 0.718 0.609 0.516	<b>19%</b> 0.840 0.706 0.593 0.499	<b>20%</b> 0.833 0.694 0.579 0.482	<b>21%</b> 0.826 0.683 0.564 0.467	<b>22%</b> 0.820 0.672 0.551 0.451	<b>23%</b> 0.813 0.661 0.537 0.437	<b>24%</b> 0.806 0.650 0.524 0.423	<b>25%</b> 0.800 0.640 0.512 0.410	<b>26%</b> 0.794 0.630 0.500 0.397	<b>27%</b> 0.787 0.620 0.488 0.384	<b>28%</b> 0.781 0.610 0.477 0.373	<b>29%</b> 0.775 0.601 0.466 0.361	<b>30%</b> 0.769 0.592 0.455 0.350
F Year ( <i>n</i> ) 1 2 3 4 5	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476	<b>17%</b> 0.855 0.731 0.624 0.534 0.456	<b>18%</b> 0.847 0.718 0.609 0.516 0.437	<b>19%</b> 0.840 0.706 0.593 0.499 0.419	<b>20%</b> 0.833 0.694 0.579 0.482 0.402	<b>21%</b> 0.826 0.683 0.564 0.467 0.386	<b>22%</b> 0.820 0.672 0.551 0.451 0.370	<b>23%</b> 0.813 0.661 0.537 0.437 0.355	<b>24%</b> 0.806 0.650 0.524 0.423 0.341	<b>25%</b> 0.800 0.640 0.512 0.410 0.328	<b>26%</b> 0.794 0.630 0.500 0.397 0.315	<b>27%</b> 0.787 0.620 0.488 0.384 0.303	<b>28%</b> 0.781 0.610 0.477 0.373 0.291	<b>29%</b> 0.775 0.601 0.466 0.361 0.280	<b>30%</b> 0.769 0.592 0.455 0.350 0.269
F Year ( <i>n</i> ) 1 2 3 4 5	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476	<b>17%</b> 0.855 0.731 0.624 0.534 0.456	<b>18%</b> 0.847 0.718 0.609 0.516 0.437	<b>19%</b> 0.840 0.706 0.593 0.499 0.419	<b>20%</b> 0.833 0.694 0.579 0.482 0.402	<b>21%</b> 0.826 0.683 0.564 0.467 0.386	<b>22%</b> 0.820 0.672 0.551 0.451 0.370	<b>23%</b> 0.813 0.661 0.537 0.437 0.355	<b>24%</b> 0.806 0.650 0.524 0.423 0.341	<b>25%</b> 0.800 0.640 0.512 0.410 0.328	<b>26%</b> 0.794 0.630 0.500 0.397 0.315	<b>27%</b> 0.787 0.620 0.488 0.384 0.303	<b>28%</b> 0.781 0.610 0.477 0.373 0.291	<b>29%</b> 0.775 0.601 0.466 0.361 0.280	<b>30%</b> 0.769 0.592 0.455 0.350 0.269
F Year ( <i>n</i> ) 1 2 3 4 5 6 7	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354	<b>17%</b> 0.855 0.731 0.624 0.534 0.456 0.390 0.333	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296	<b>20%</b> 0.833 0.694 0.579 0.482 0.402 0.335 0.279	<b>21%</b> 0.826 0.683 0.564 0.467 0.386 0.319 0.263	<b>22%</b> 0.820 0.672 0.551 0.451 0.370 0.303 0.249	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222	25% 0.800 0.640 0.512 0.410 0.328 0.262 0.210	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.188	28% 0.781 0.610 0.477 0.373 0.291 0.227 0.178	<b>29%</b> 0.775 0.601 0.466 0.361 0.280 0.217 0.168	<b>30%</b> 0.769 0.592 0.455 0.350 0.269 0.207 0.159
F Year (n) 1 2 3 4 5 6 7 8	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305	<b>17%</b> 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233	<b>21%</b> 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179	25% 0.800 0.640 0.512 0.410 0.328 0.262 0.210 0.168	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.188 0.148	28% 0.781 0.610 0.477 0.373 0.291 0.227 0.178 0.139	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130	<b>30%</b> 0.769 0.592 0.455 0.350 0.269 0.207 0.159 0.123
F Year (n) 1 2 3 4 5 6 7 8 9	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263	<b>17%</b> 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.180	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144	25% 0.800 0.640 0.512 0.410 0.328 0.262 0.210 0.168 0.134	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.188 0.148 0.116	28% 0.781 0.610 0.477 0.373 0.291 0.227 0.178 0.139 0.108	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101	<b>30%</b> 0.769 0.592 0.455 0.350 0.269 0.207 0.159 0.123 0.094
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227	<b>17%</b> 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208	18% 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209 0.176	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.180 0.149	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116	25% 0.800 0.640 0.512 0.410 0.328 0.262 0.210 0.168 0.134 0.107	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.188 0.148 0.116 0.092	28% 0.781 0.610 0.477 0.373 0.291 0.227 0.178 0.139 0.108 0.085	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078	<b>30%</b> 0.769 0.592 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227 0.195	<b>17%</b> 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.208	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191 0.162	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209 0.176 0.148	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.180 0.149 0.123	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126 0.103	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094	25% 0.800 0.640 0.512 0.410 0.328 0.262 0.210 0.168 0.134 0.107 0.086	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.188 0.148 0.116 0.092 0.072	28% 0.781 0.610 0.477 0.373 0.291 0.227 0.178 0.139 0.108 0.085 0.066	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061	<b>30%</b> 0.769 0.592 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227 0.195 0.168	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.243 0.208 0.178 0.152	18% 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191 0.162 0.137	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209 0.176 0.148 0.124	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.180 0.149 0.123 0.102	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.076	25% 0.800 0.640 0.512 0.410 0.328 0.262 0.210 0.168 0.134 0.107 0.086 0.069	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.188 0.148 0.116 0.092 0.072 0.057	28% 0.781 0.610 0.477 0.373 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047	30% 0.769 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227 0.195 0.168 0.145	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.243 0.208 0.178 0.152 0.130	18% 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191 0.162 0.137 0.116	19% 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209 0.176 0.148 0.124 0.104	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.180 0.149 0.123 0.102 0.084	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.076 0.061	25% 0.800 0.640 0.512 0.210 0.262 0.210 0.168 0.134 0.107 0.086 0.069 0.055	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.188 0.148 0.116 0.092 0.072 0.057 0.045	28% 0.781 0.610 0.477 0.373 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037	30% 0.769 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227 0.195 0.168 0.145 0.125	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.243 0.208 0.178 0.152 0.130 0.111	18% 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191 0.162 0.137 0.116 0.099	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209 0.176 0.148 0.124 0.104 0.088	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.180 0.149 0.123 0.102 0.084 0.069	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075 0.062	23% 0.813 0.661 0.537 0.355 0.289 0.235 0.125 0.126 0.103 0.083 0.068 0.055	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.076 0.061 0.049	25% 0.800 0.640 0.512 0.210 0.262 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.188 0.148 0.116 0.092 0.072 0.057 0.045 0.035	28% 0.781 0.610 0.477 0.373 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.032	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028	30% 0.769 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033 0.025
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227 0.195 0.168 0.145 0.125 0.108	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.178 0.152 0.130 0.111 0.095	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191 0.162 0.137 0.116 0.099 0.084	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209 0.176 0.148 0.124 0.104 0.088 0.074	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078 0.065	21% 0.826 0.683 0.564 0.319 0.263 0.218 0.180 0.149 0.123 0.102 0.084 0.069 0.057	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075 0.062 0.051	23% 0.813 0.661 0.537 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068 0.055 0.045	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.076 0.061 0.049 0.040	25% 0.800 0.640 0.512 0.262 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044 0.035	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039 0.031	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.188 0.148 0.116 0.092 0.072 0.057 0.045 0.035 0.028	28% 0.781 0.610 0.477 0.733 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.032 0.025	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028 0.022	<b>30%</b> 0.769 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033 0.025 0.020
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227 0.195 0.168 0.145 0.125 0.108 0.093	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.178 0.152 0.130 0.111 0.095 0.081	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191 0.162 0.137 0.116 0.099 0.084 0.071	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209 0.176 0.148 0.124 0.104 0.088 0.074 0.062	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078 0.065	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.149 0.123 0.102 0.084 0.069 0.057 0.047	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075 0.062 0.051 0.042	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068 0.055 0.045 0.036	24% 0.806 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.076 0.061 0.049 0.040 0.032	25% 0.800 0.640 0.512 0.262 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044 0.035 0.028	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039 0.031 0.025	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.148 0.148 0.148 0.116 0.092 0.072 0.057 0.045 0.035 0.028 0.022	28% 0.781 0.610 0.477 0.273 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.032 0.025 0.019	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028 0.022 0.017	<b>30%</b> 0.769 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033 0.025 0.020 0.015
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227 0.195 0.168 0.145 0.125 0.108 0.093 0.080	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.178 0.152 0.130 0.111 0.095 0.081 0.069	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.225 0.191 0.162 0.137 0.116 0.099 0.084 0.071 0.060	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209 0.176 0.148 0.124 0.104 0.088 0.074 0.062 0.052	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078 0.065 0.054 0.045	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.149 0.123 0.102 0.084 0.069 0.057 0.047 0.039	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075 0.062 0.051 0.042 0.034	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068 0.055 0.045 0.036 0.030	24% 0.806 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.076 0.061 0.049 0.040 0.032 0.026	25% 0.800 0.640 0.512 0.262 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044 0.035 0.028 0.023	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039 0.031 0.025 0.020	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.148 0.148 0.116 0.092 0.072 0.057 0.045 0.035 0.028 0.022 0.017	28% 0.781 0.610 0.477 0.273 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.032 0.025 0.019 0.015	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028 0.022 0.017 0.013	<b>30%</b> 0.769 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033 0.025 0.020 0.015 0.012
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227 0.195 0.168 0.145 0.125 0.108 0.093 0.080 0.069	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.178 0.152 0.130 0.111 0.095 0.081 0.069 0.059	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191 0.162 0.137 0.116 0.099 0.084 0.071 0.060 0.051	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209 0.176 0.148 0.124 0.104 0.088 0.074 0.062 0.052 0.044	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078 0.065 0.054 0.038	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.149 0.123 0.102 0.084 0.069 0.057 0.047 0.039 0.032	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075 0.062 0.051 0.042 0.034 0.28	23% 0.813 0.661 0.537 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068 0.055 0.045 0.036 0.030 0.024	24% 0.806 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.076 0.061 0.049 0.040 0.032 0.026 0.021	25% 0.800 0.640 0.512 0.262 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044 0.035 0.028 0.023 0.018	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039 0.031 0.025 0.020 0.016	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.148 0.148 0.116 0.092 0.072 0.057 0.045 0.025 0.028 0.022 0.017 0.014	28% 0.781 0.610 0.477 0.273 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.032 0.025 0.019 0.015 0.012	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028 0.022 0.017 0.013 0.010	<b>30%</b> 0.769 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033 0.025 0.020 0.015 0.012 0.009
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227 0.195 0.168 0.145 0.125 0.108 0.093 0.080 0.069 0.060	17% 0.855 0.731 0.624 0.456 0.390 0.333 0.285 0.243 0.208 0.178 0.152 0.130 0.111 0.095 0.081 0.069 0.059 0.051 0.051	18% 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191 0.162 0.137 0.116 0.099 0.084 0.071 0.060 0.051 0.043	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.296 0.249 0.209 0.176 0.148 0.124 0.104 0.088 0.074 0.062 0.052 0.044 0.037	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078 0.065 0.054 0.038 0.031	21% 0.826 0.683 0.564 0.319 0.263 0.218 0.149 0.123 0.102 0.084 0.069 0.057 0.047 0.039 0.032 0.027	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075 0.062 0.051 0.042 0.034 0.28 0.023	23% 0.813 0.661 0.537 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068 0.055 0.045 0.036 0.030 0.024 0.020	24% 0.806 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.076 0.061 0.049 0.040 0.032 0.026 0.021 0.017	25% 0.800 0.640 0.512 0.262 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044 0.035 0.028 0.023 0.018 0.014	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039 0.031 0.025 0.020 0.016 0.012	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.148 0.148 0.116 0.092 0.072 0.057 0.045 0.028 0.022 0.017 0.014 0.011	28% 0.781 0.610 0.477 0.273 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.032 0.025 0.019 0.015 0.012 0.009	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028 0.022 0.017 0.013 0.010 0.008	30% 0.769 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033 0.025 0.020 0.015 0.012 0.009 0.007
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.410 0.354 0.305 0.263 0.227 0.195 0.168 0.145 0.125 0.108 0.093 0.080 0.069 0.060 0.051	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.178 0.152 0.130 0.111 0.095 0.081 0.059 0.051 0.043	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.225 0.191 0.162 0.137 0.116 0.099 0.084 0.071 0.060 0.051 0.043 0.037	<b>19%</b> 0.840 0.706 0.593 0.499 0.419 0.352 0.249 0.209 0.176 0.148 0.124 0.104 0.088 0.074 0.062 0.052 0.044 0.037 0.031	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078 0.065 0.054 0.045 0.038 0.031 0.026	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.149 0.123 0.102 0.084 0.069 0.057 0.047 0.039 0.032 0.027 0.022	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075 0.062 0.051 0.042 0.034 0.228 0.223 0.019	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068 0.055 0.045 0.036 0.030 0.024 0.020 0.016	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.076 0.061 0.049 0.040 0.032 0.026 0.021 0.017 0.014	25% 0.800 0.640 0.512 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044 0.035 0.028 0.023 0.018 0.014 0.012	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039 0.031 0.025 0.020 0.016 0.012 0.010	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.148 0.148 0.116 0.092 0.072 0.057 0.045 0.035 0.028 0.022 0.017 0.014 0.011 0.008	28% 0.781 0.610 0.477 0.273 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.032 0.025 0.040 0.032 0.025 0.019 0.015 0.012 0.009 0.007	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028 0.022 0.017 0.013 0.010 0.008 0.006	<b>30%</b> 0.769 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033 0.025 0.020 0.015 0.012 0.009 0.007 0.005
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.476 0.470 0.354 0.263 0.227 0.195 0.168 0.145 0.125 0.108 0.093 0.080 0.069 0.060 0.051 0.044	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.178 0.152 0.130 0.111 0.095 0.081 0.069 0.051 0.043 0.037	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.225 0.191 0.162 0.137 0.116 0.099 0.084 0.071 0.060 0.051 0.043 0.037 0.031	<b>19%</b> 0.840 0.706 0.593 0.499 0.296 0.249 0.209 0.176 0.148 0.124 0.104 0.088 0.074 0.062 0.052 0.044 0.037 0.031 0.026	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078 0.055 0.054 0.045 0.038 0.031 0.026 0.022	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.149 0.123 0.102 0.084 0.069 0.057 0.047 0.039 0.032 0.027 0.022 0.018	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075 0.062 0.051 0.042 0.034 0.028 0.023 0.019 0.015	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068 0.055 0.045 0.036 0.030 0.024 0.020 0.016 0.013	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.076 0.061 0.049 0.040 0.032 0.026 0.021 0.017 0.014 0.011	25% 0.800 0.640 0.512 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044 0.035 0.028 0.023 0.018 0.014 0.012 0.009	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039 0.031 0.025 0.020 0.016 0.012 0.010 0.008	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.148 0.148 0.116 0.092 0.072 0.057 0.045 0.035 0.028 0.022 0.017 0.014 0.011 0.008 0.007	28% 0.781 0.610 0.477 0.273 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.032 0.025 0.040 0.032 0.025 0.019 0.015 0.012 0.009 0.007 0.006	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028 0.022 0.017 0.013 0.010 0.008 0.006 0.005	30% 0.769 0.592 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033 0.025 0.020 0.015 0.012 0.009 0.007 0.005 0.004
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 22	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.476 0.470 0.354 0.263 0.227 0.195 0.195 0.108 0.125 0.108 0.093 0.080 0.069 0.060 0.051 0.044 0.032	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.178 0.152 0.130 0.111 0.095 0.081 0.059 0.051 0.043 0.037 0.032 0.032	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.225 0.191 0.162 0.137 0.116 0.099 0.084 0.071 0.060 0.051 0.043 0.037 0.031 0.022	<b>19%</b> 0.840 0.706 0.593 0.499 0.296 0.249 0.209 0.176 0.148 0.124 0.104 0.088 0.074 0.062 0.052 0.044 0.037 0.031 0.026 0.022	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078 0.055 0.054 0.045 0.038 0.031 0.026 0.022 0.015	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.149 0.123 0.102 0.084 0.669 0.057 0.047 0.039 0.032 0.027 0.022 0.018 0.015	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075 0.062 0.051 0.042 0.034 0.028 0.023 0.019 0.015 0.013	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068 0.055 0.045 0.036 0.030 0.024 0.020 0.016 0.013 0.011 0.011	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.061 0.049 0.040 0.032 0.026 0.021 0.017 0.014 0.011 0.011 0.097	25% 0.800 0.640 0.512 0.410 0.328 0.262 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044 0.035 0.028 0.023 0.018 0.014 0.012 0.009 0.007 0.007	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039 0.031 0.025 0.020 0.016 0.012 0.010 0.008 0.008	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.148 0.148 0.116 0.092 0.072 0.057 0.045 0.035 0.028 0.022 0.017 0.014 0.011 0.008 0.007 0.005	28% 0.781 0.610 0.477 0.273 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.032 0.025 0.019 0.015 0.012 0.009 0.007 0.006 0.004	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028 0.022 0.017 0.013 0.010 0.008 0.006 0.005 0.004	30% 0.769 0.592 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033 0.025 0.020 0.015 0.012 0.009 0.007 0.005 0.004 0.003
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.476 0.476 0.476 0.305 0.263 0.227 0.195 0.195 0.168 0.125 0.108 0.093 0.080 0.069 0.060 0.051 0.044 0.038 0.033 0.023	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.178 0.152 0.130 0.111 0.095 0.081 0.059 0.051 0.043 0.037 0.032 0.022	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191 0.162 0.137 0.162 0.137 0.162 0.099 0.084 0.071 0.060 0.051 0.043 0.037 0.031 0.022 0.022	<b>19%</b> 0.840 0.706 0.593 0.419 0.352 0.296 0.249 0.209 0.176 0.148 0.124 0.104 0.088 0.074 0.062 0.052 0.044 0.037 0.031 0.026 0.022 0.015	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078 0.055 0.054 0.045 0.038 0.031 0.026 0.022 0.018 0.012	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.149 0.123 0.102 0.084 0.669 0.057 0.047 0.039 0.032 0.027 0.022 0.018 0.015 0.012 0.012	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.204 0.167 0.137 0.112 0.092 0.075 0.062 0.051 0.042 0.034 0.028 0.023 0.019 0.015 0.013 0.010	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068 0.055 0.045 0.036 0.030 0.024 0.020 0.016 0.013 0.011 0.007	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.049 0.040 0.032 0.026 0.021 0.017 0.014 0.011 0.099 0.007 0.006	25% 0.800 0.640 0.512 0.410 0.328 0.262 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044 0.035 0.028 0.023 0.018 0.014 0.012 0.009 0.007 0.006	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039 0.031 0.025 0.020 0.016 0.012 0.010 0.008 0.006	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.148 0.148 0.116 0.092 0.072 0.057 0.045 0.028 0.022 0.017 0.014 0.011 0.008 0.007 0.005 0.005 0.005 0.005	28% 0.781 0.610 0.477 0.273 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.032 0.025 0.019 0.015 0.012 0.009 0.007 0.006 0.004 0.003	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028 0.022 0.017 0.013 0.008 0.006 0.005 0.004 0.005 0.004	30% 0.769 0.592 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.025 0.020 0.015 0.012 0.009 0.007 0.005 0.004 0.003 0.004 0.003 0.002
F Year ( <i>n</i> ) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	Rate(r) 16% 0.862 0.743 0.641 0.552 0.476 0.476 0.476 0.305 0.263 0.227 0.195 0.168 0.195 0.108 0.093 0.080 0.069 0.060 0.051 0.044 0.038 0.024	17% 0.855 0.731 0.624 0.534 0.456 0.390 0.333 0.285 0.243 0.208 0.178 0.178 0.178 0.172 0.130 0.111 0.095 0.081 0.095 0.059 0.051 0.043 0.037 0.032 0.027 0.020	<b>18%</b> 0.847 0.718 0.609 0.516 0.437 0.370 0.314 0.266 0.225 0.191 0.162 0.137 0.116 0.099 0.084 0.071 0.084 0.071 0.084 0.071 0.031 0.037 0.031 0.022 0.019 0.016	<b>19%</b> 0.840 0.706 0.593 0.419 0.352 0.296 0.249 0.209 0.176 0.148 0.124 0.124 0.148 0.074 0.062 0.052 0.044 0.037 0.031 0.026 0.022 0.013	20% 0.833 0.694 0.579 0.482 0.402 0.335 0.279 0.233 0.194 0.162 0.135 0.112 0.093 0.078 0.055 0.054 0.045 0.038 0.031 0.026 0.022 0.018 0.015 0.013 0.040	21% 0.826 0.683 0.564 0.467 0.386 0.319 0.263 0.218 0.149 0.123 0.102 0.084 0.069 0.057 0.047 0.039 0.032 0.027 0.022 0.018 0.015 0.012 0.010	22% 0.820 0.672 0.551 0.451 0.370 0.303 0.249 0.249 0.107 0.137 0.112 0.092 0.075 0.062 0.051 0.042 0.051 0.042 0.034 0.028 0.023 0.019 0.015 0.013 0.010 0.008 0.007	23% 0.813 0.661 0.537 0.437 0.355 0.289 0.235 0.191 0.155 0.126 0.103 0.083 0.068 0.055 0.045 0.036 0.030 0.024 0.020 0.016 0.013 0.011 0.009 0.007	24% 0.806 0.650 0.524 0.423 0.341 0.275 0.222 0.179 0.144 0.116 0.094 0.061 0.049 0.040 0.032 0.026 0.021 0.017 0.014 0.011 0.009 0.007 0.006	25% 0.800 0.640 0.512 0.410 0.328 0.262 0.210 0.168 0.134 0.107 0.086 0.069 0.055 0.044 0.035 0.028 0.023 0.018 0.014 0.012 0.009 0.007 0.006 0.005	26% 0.794 0.630 0.500 0.397 0.315 0.250 0.198 0.157 0.125 0.099 0.079 0.062 0.050 0.039 0.031 0.025 0.020 0.016 0.012 0.010 0.008 0.006 0.004 0.003	27% 0.787 0.620 0.488 0.384 0.303 0.238 0.188 0.148 0.116 0.092 0.072 0.057 0.045 0.028 0.022 0.017 0.014 0.011 0.008 0.007 0.005 0.004 0.003	28% 0.781 0.610 0.477 0.733 0.291 0.227 0.178 0.139 0.108 0.085 0.066 0.052 0.040 0.025 0.040 0.025 0.019 0.015 0.012 0.009 0.007 0.006 0.004 0.003 0.003 0.003	29% 0.775 0.601 0.466 0.361 0.280 0.217 0.168 0.130 0.101 0.078 0.061 0.047 0.037 0.028 0.022 0.017 0.013 0.008 0.006 0.005 0.004 0.003 0.002	30% 0.769 0.592 0.455 0.350 0.269 0.207 0.159 0.123 0.094 0.073 0.056 0.043 0.033 0.025 0.020 0.015 0.012 0.009 0.007 0.005 0.004 0.003 0.002 0.004

# **ANNUITY TABLE**

#### Present value of £1 at the end of each year for *n* years at a discount rate *r*

n: 1 - 25 years

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*r* : 1% - 30%

F	Rate(r)														
Year (n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	11%	12%	13%	14%	15%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870
2	1.970	1.942	1.913	1.886	1.859	1.833	1.808	1.783	1.759	1.736	1.713	1.690	1.668	1.647	1.626
3	2.941	2.884	2.829	2.775	2.723	2.673	2.624	2.577	2.531	2.487	2.444	2.402	2.361	2.322	2.283
4	3.902	3.808	3.717	3.630	3.546	3.465	3.387	3.312	3.240	3.170	3.102	3.037	2.974	2.914	2.855
5	4.853	4.713	4.580	4.452	4.329	4.212	4.100	3.993	3.890	3.791	3.696	3.605	3.517	3.433	3.352
6	5.795	5.601	5.417	5.242	5.076	4.917	4.767	4.623	4.486	4.355	4.231	4.111	3.998	3.889	3.784
7	6.728	6.472	6.230	6.002	5.786	5.582	5.389	5.206	5.033	4.868	4.712	4.564	4.423	4.288	4.160
8	7.652	7.325	7.020	6.733	6.463	6.210	5.971	5.747	5.535	5.335	5.146	4.968	4.799	4.639	4.487
9	8.566	8.162	7.786	7.435	7.108	6.802	6.515	6.247	5.995	5.759	5.537	5.328	5.132	4.946	4.772
10	9.471	8.983	8.530	8.111	7.722	7.360	7.024	6.710	6.418	6.145	5.889	5.650	5.426	5.216	5.019
11	10.368	9.787	9.253	8.760	8.306	7.887	7.499	7.139	6.805	6.495	6.207	5.938	5.687	5.453	5.234
12	11.255	10.575	9.954	9.385	8.863	8.384	7.943	7.536	7.161	6.814	6.492	6.194	5.918	5.660	5.421
13	12.134	11.348	10.635	9.986	9.394	8.853	8.358	7.904	7.487	7.103	6.750	6.424	6.122	5.842	5.583
14	13.004	12.106	11.296	10.563	9.899	9.295	8.745	8.244	7.786	7.367	6.982	6.628	6.302	6.002	5.724
15	13.865	12.849	11.938	11.118	10.380	9.712	9.108	8.559	8.061	7.606	7.191	6.811	6.462	6.142	5.847
16	14.718	13.578	12.561	11.652	10.838	10.106	9.447	8.851	8.313	7.824	7.379	6.974	6.604	6.265	5.954
17	15.562	14.292	13.166	12.166	11.274	10.477	9.763	9.122	8.544	8.022	7.549	7.120	6.729	6.373	6.047
18	16.398	14.992	13.754	12.659	11.690	10.828	10.059	9.372	8.756	8.201	7.702	7.250	6.840	6.467	6.128
19	17.226	15.678	14.324	13.134	12.085	11.158	10.336	9.604	8.950	8.365	7.839	7.366	6.938	6.550	6.198
20	18.046	16.351	14.877	13.590	12.462	11.470	10.594	9.818	9.129	8.514	7.963	7.469	7.025	6.623	6.259
21	18.857	17.011	15.415	14.029	12.821	11.764	10.836	10.017	9.292	8.649	8.075	7.562	7.102	6.687	6.312
22	19.660	17.658	15.937	14.451	13.163	12.042	11.061	10.201	9.442	8.772	8.176	7.645	7.170	6.743	6.359
23	20.456	18.292	16.444	14.857	13.489	12.303	11.272	10.371	9.580	8.883	8.266	7.718	7.230	6.792	6.399
24	21.243	18.914	16.936	15.247	13.799	12.550	11.469	10.529	9.707	8.985	8.348	7.784	7.283	6.835	6.434
25	22.023	19.523	17.413	15.622	14.094	12.783	11.654	10.675	9.823	9.077	8.422	7.843	7.330	6.873	6.464
F	Rate(r)														
Year (n)	16%	17%	18%	19%	20%	21%	22%	23%	24%	25%	26%	27%	28%	29%	30%
1	0.862	0.855	0.847	0.840	0.833	0.826	0.820	0.813	0.806	0.800	0.794	0.787	0.781	0.775	0.769
2	1.605	1.585	1.566	1.547	1.528	1.509	1.492	1.4/4	1.457	1.440	1.424	1.407	1.392	1.376	1.361
3	2.246	2.210	2.174	2.140	2.106	2.074	2.042	2.011	1.981	1.952	1.923	1.896	1.868	1.842	1.816
4	2.798	2.743	2.690	2.639	2.589	2.540	2.494	2.448	2.404	2.362	2.320	2.280	2.241	2.203	2.166
5	3.274	3.199	3.127	3.058	2.991	2.926	2.864	2.803	2.745	2.689	2.635	2.583	2.532	2.483	2.436
6	3.685	3.589	3.498	3.410	3.326	3.245	3.167	3.092	3.020	2.951	2.885	2.821	2.759	2.700	2.643
7	4.039	3.922	3.812	3.706	3.605	3.508	3.416	3.327	3.242	3.161	3.083	3.009	2.937	2.868	2.802
8	4.344	4.207	4.078	3.954	3.837	3.726	3.619	3.518	3.421	3.329	3.241	3.156	3.076	2.999	2.925
9	4.607	4.451	4.303	4.163	4.031	3.905	3.786	3.673	3.566	3.463	3.366	3.273	3.184	3.100	3.019
10	4.833	4.659	4.494	4.339	4.192	4.054	3.923	3.799	3.682	3.571	3.465	3.364	3.269	3.178	3.092
11	5.029	4.836	4.656	4.486	4.327	4.177	4.035	3.902	3.776	3.656	3.543	3.437	3.335	3.239	3.147

 $\Sigma^{1-n} 1/(1+r)^n$ 

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3.689

3.692

3.694

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3.656

3.695

3.726

3.751

3.771

3.786

3.799

3.808

3.816

3.822

3.827

3.831

3.834

3.725

3.780

3.824

3.859

3.887

3.910

3.928

3.942

3.954

3.963

3.970

3.976

3.981

3.985

3.387

3.427

3.459

3.483

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3.518

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3.539

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3.551

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3.564

3.286

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3.351

3.373

3.390

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3.223

3.249

3.268

3.283

3.295

3.304

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3.316

3.320

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