



Numerical Reasoning Test 3

Solutions Booklet

	Exchange Rate (to the £)				
	Week 1	Week 2	Week 3	Week 4	Week 5
Euro €	1.2	1.26	1.3	1.34	1.28
US \$	1.64	1.69	1.74	1.84	1.76
Japanese Yen	123.2	128.6	134.8	135	128.4
South African Rand	13.4	13.8	13.2	13.6	14.2

Q1 How much is 5,000 South African Rand worth in Week 4 in US \$?

- (A) \$199.81
- (B) \$367.65
- (C) \$476.65
- (D) \$599.18
- (E) \$676.48

Step 1 – Convert from Rand in to £

$$5,000 / 13.6 = 367.65$$

Step 2 – Convert from £ in to US \$

$$367.65 \times 1.84 = \$676.48$$

Thus the correct answer is (E), \$676.48

	Exchange Rate (to the £)				
	Week 1	Week 2	Week 3	Week 4	Week 5
Euro €	1.2	1.26	1.3	1.34	1.28
US \$	1.64	1.69	1.74	1.84	1.76
Japanese Yen	123.2	128.6	134.8	135	128.4
South African Rand	13.4	13.8	13.2	13.6	14.2

Q2 In Week two 10,000 Japanese Yen is converted into £. In Week 5 this is converted into what value in Euros?

- (A) 110.00
- (B) 104.82
- (C) 99.53
- (D) 77.76
- (E) 60.75

Step 1 – Convert into £ (using Week 2 figures) $10,000 / 128.6 = £77.76$

Step 2 – Convert into Euros (using Week 5 figures) $£77.76 \times 1.28 = 99.53$

Thus the correct answer is (C), 99.53

	Exchange Rate (to the £)				
	Week 1	Week 2	Week 3	Week 4	Week 5
Euro €	1.2	1.26	1.3	1.34	1.28
US \$	1.64	1.69	1.74	1.84	1.76
Japanese Yen	123.2	128.6	134.8	135	128.4
South African Rand	13.4	13.8	13.2	13.6	14.2

Q3 During Week 1 a traveller splits £2,100 equally into US \$, Japanese Yen and South African Rand. How many £ does the traveller have on Week 3 if all the currencies are converted back into £ and he is charged a 5% fee for each transaction from one currency into another (to the nearest £100)?

- (A) £1,700
- (B) £1,800
- (C) £1,900
- (D) £2,000
- (E) £2,100

Step 1 - splits £2,100 equally into US \$, Japanese Yen and South African Rand
 $£2,100 / 3 = £700$

Step 2 – Calculate the amount of US \$, Japanese Yen and South African Rand (Week 1)
 US \$: $£700 \times 1.64 = \$1,148$

Japanese Yen: $£700 \times 123.2 = 86,240$ Yen

South African Rand: $£700 \times 13.4 = 9,380$ Rand

Step 3 – Deduct a 5% charge for each currency

$\$1,148 \times .95 = \$1,090.6$

$86,240 \text{ Yen} \times .95 = 81,928 \text{ Yen}$

$9,380 \text{ Rand} \times .95 = 8,911 \text{ Rand}$

Step 4 – Convert back into £ (Week 3)

$\$1,090.6 / 1.74 = £626.78$

$81,928 \text{ Yen} / 134.8 = £607.77$

$8,911 \text{ Rand} / 13.2 = £675.08$

Total = $£1,909.626$.

Deduct a second 5% for the transaction fee. $£1,909.63 \times 0.95 = £1,814 = £1,800$ (to the nearest £100)

Thus the correct answer is (B), £1,800

	Exchange Rate (to the £)				
	Week 1	Week 2	Week 3	Week 4	Week 5
Euro €	1.2	1.26	1.3	1.34	1.28
US \$	1.64	1.69	1.74	1.84	1.76
Japanese Yen	123.2	128.6	134.8	135	128.4
South African Rand	13.4	13.8	13.2	13.6	14.2

Q4 Which currency has shown the greatest proportionate change in value between Weeks 1 and 4?

- (A) Euro
- (B) US \$
- (C) Japanese Yen
- (D) South African Rand
- (E) Can't tell from data

Step 1 – Calculate the % change in value for each currency between Weeks 1 and 4

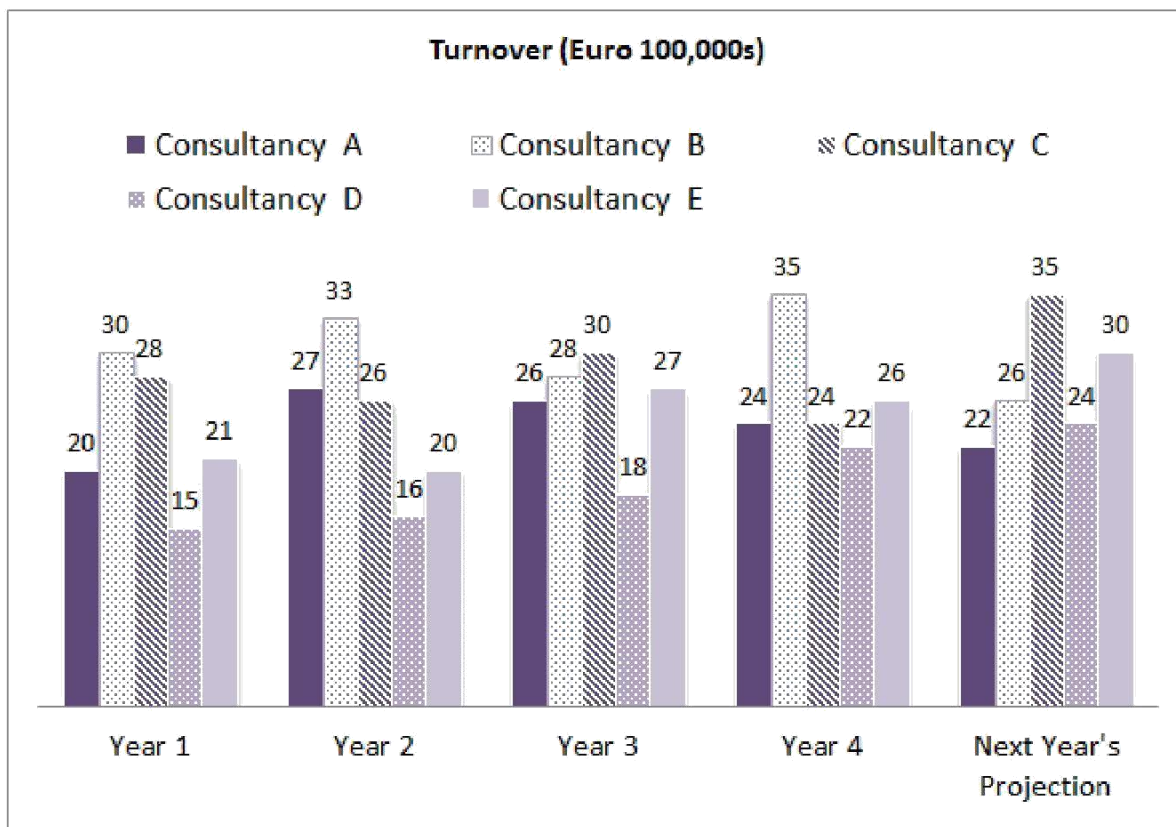
Euro: $(1.34 - 1.20) / 1.20 = 0.117$. Note: some people find it quicker to calculate $1.34 / 1.2$ but both methods produce the same answer.

US \$: $(1.84 - 1.64) / 1.64 = 0.122$

Japanese Yen: $(135.0 - 123.2) / 123.2 = 0.096$

South African Rand: $(13.6 - 13.4) / 13.4 = 0.015$

Thus the correct answer is (B), US \$



Q5 Next Year's turnover projection for Consultancies A-E combined represents what proportional change on Year 4's turnover for Consultancies A-E?

- (A) 3.6%
- (B) 4.2%
- (C) 4.6%
- (D) 5.2%
- (E) 5.6%

Step 1 – Calculate Year 4's total

$$24 + 35 + 24 + 22 + 26 = 131$$

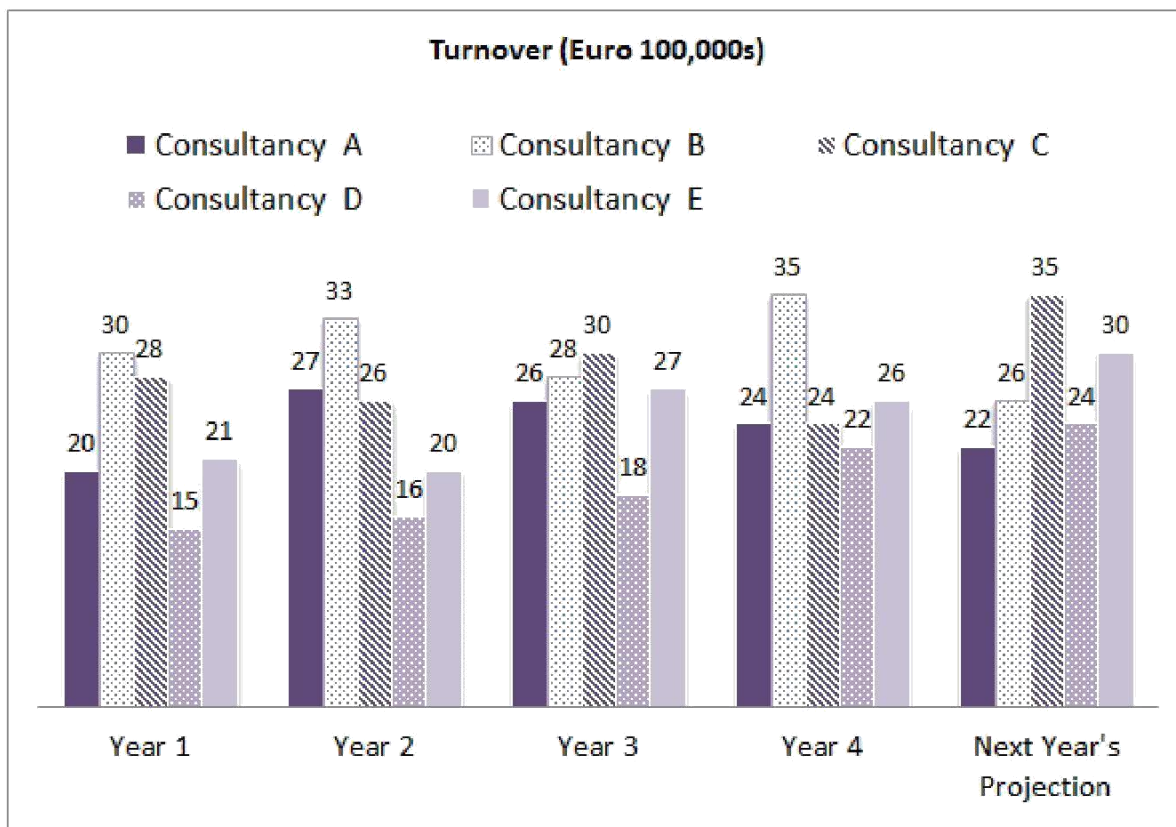
Step 2 – Calculate Next Year's Projected total turnover

$$22 + 26 + 35 + 24 + 30 = 137$$

Step 3 – Calculate the % increase

$$6 / 131 = 4.6\%$$

So the correct answer is (C) 4.6%



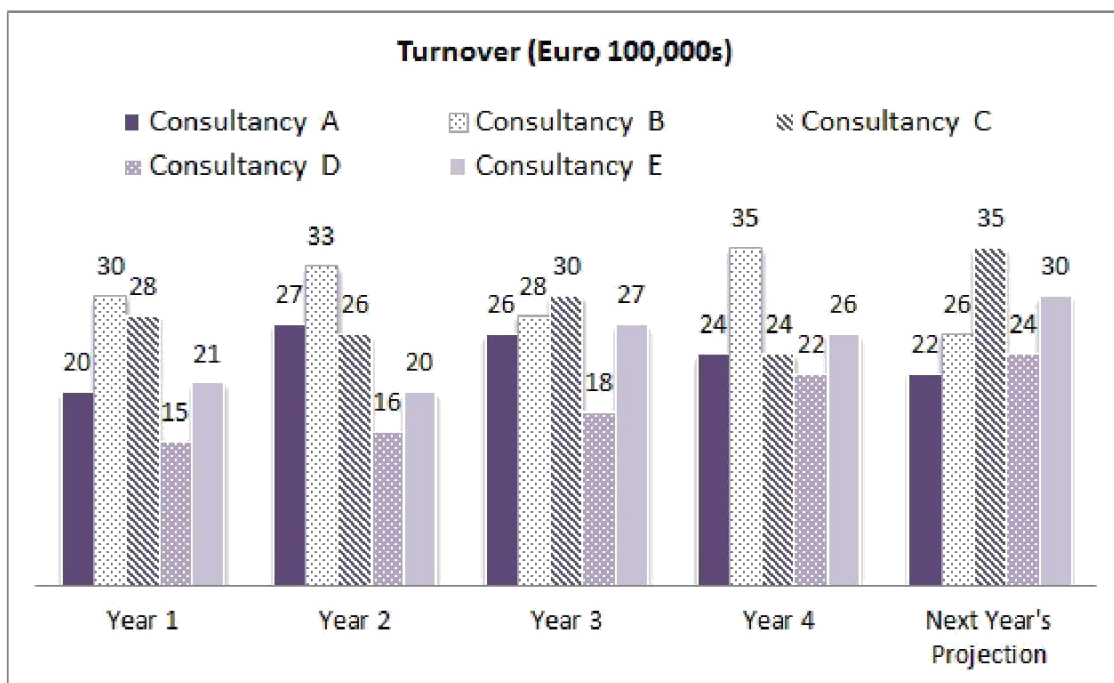
Q6 If, in Year 3, Consultancies A to D represent 60% of the marketplace by value of sales, what is the value of the marketplace excluding Consultancies A-E?

- (A) 4.0 million
- (B) 4.1 million
- (C) 4.2 million
- (D) 4.3 million
- (E) Can't tell from the data

Step 1 – Calculate the total sales for Consultancies A to D in Year 3
 $26 + 28 + 30 + 18 = 102$

Step 2 – Calculate the part of the market that excludes Consultancies A-E
 We are told that $102 = 60\%$
 So $100\% = 102/60 \times 100 = 170$
 Now $170 - (26 + 28 + 30 + 18 + 27) = 41$ (100,000s) = 4.1 million

Thus the correct answer is (B), 4.1 million



Q7 Next year, which company is projecting the smallest percentage change in its turnover?

- (A) Consultancy A
- (B) Consultancy B
- (C) Consultancy C
- (D) Consultancy D
- (E) Consultancy E

Step 1 – Calculate the % increase in turnover projected for each company

Consultancy A: $2 / 24 \times 100\% = 8.3\%$

Consultancy B: $9 / 35 \times 100\% = 25.7\%$

Consultancy C: $11 / 24 \times 100\% = 45.8\%$

Consultancy D: $2 / 22 \times 100\% = 9\%$

Consultancy E: $4 / 26 \times 100\% = 15.4\%$

Tip: just by inspecting the data you could probably see that the answer is going to be either Consultancy A or D, so you could save time by calculating just these.

Thus the correct answer is (A), Consultancy A

Q8 What is the ratio of Year 3's Consultancy C's turnover to Consultancy E's turnover?

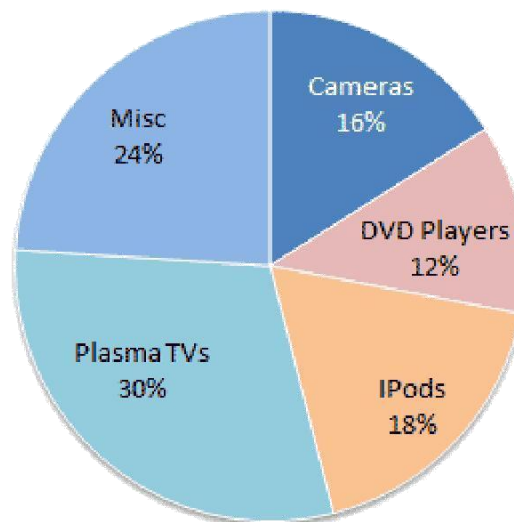
- (A) 2 : 5
- (B) 4 : 7
- (C) 5 : 7
- (D) 10 : 9
- (E) 5 : 2

Consultancy C : Consultancy E
 $= 30 : 27 = 10 : 9$

Thus the correct answer is (D), 10 : 9

Catalogue Sales (2011)

Total = £250,000



	Online Sales (2011)	High Street Sales (2011)
Cameras	£553,000	£336,000
DVD Players	£808,000	£483,000
iPods	£852,000	£644,000
Plasma TVs	£325,000	£456,000
Misc	£575,000	£678,000
Total	£3,113,000	£2,597,000

Q9 What is the difference in value between total sales for iPods compared to cameras?

- (A) £912,000
- (B) £812,000
- (C) £712,000
- (D) £612,000
- (E) £512,000

Step 1 – Calculate the total sales for iPods

$$£852,000 + £644,000 + (18\% \times £250,000) = £1,541,000$$

Step 2 – Calculate the total sales for cameras £336,000

$$+ £553,000 + (16\% \times £250,000) = £929,000$$

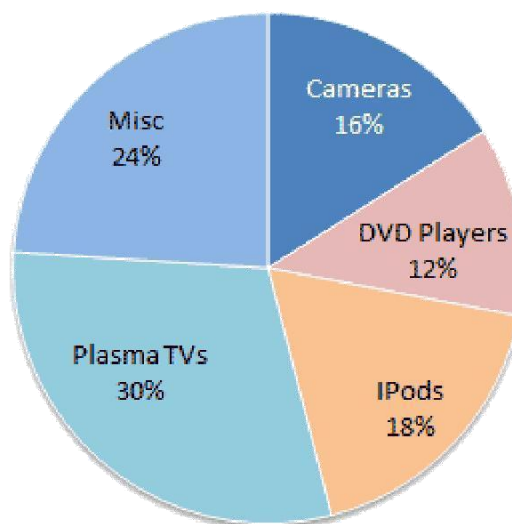
Step 3 – Calculate the difference

$$£1,541,000 - £929,000 = £612,000$$

Thus the correct answer is (D), £612,000

Catalogue Sales (2011)

Total = £250,000



	Online Sales (2011)	High Street Sales (2011)
Cameras	£553,000	£336,000
DVD Players	£808,000	£483,000
iPods	£852,000	£644,000
Plasma TVs	£325,000	£456,000
Misc	£575,000	£678,000
Total	£3,113,000	£2,597,000

Q10 If the High Street and Catalogue sales of DVD Players had been made online, what % of total Online sales would DVD Players represent?

- (A) 28%
- (B) 30%
- (C) 32%
- (D) 34%
- (E) 36%

Step 1 – Calculate the value of catalogue sales of DVDs
 $£250,000 \times 12\% = £30,000$

Step 2 – Sum the High Street and catalogue sales of DVD players
 $£30,000 + £483,000 = £513,000$

Step 3 – Calculate the % of DVD player sales that are online

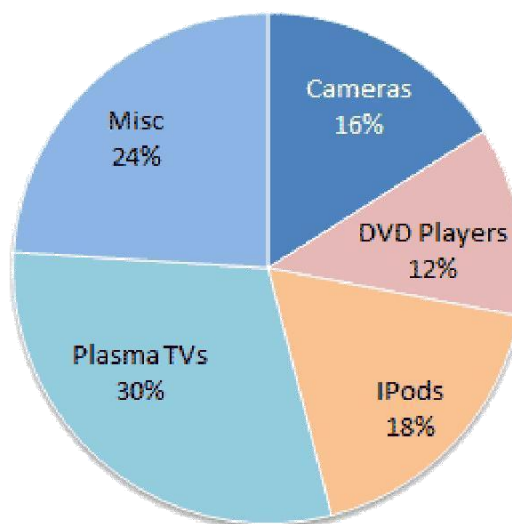
$$\frac{£808,000 + £513,000}{(£852,000 + £808,000 + £513,000 + £553,000 + £325,000 + £575,000)}$$

$$= \frac{£1,321,000}{£3,626,000}$$

Thus the correct answer is (E), 36%

Catalogue Sales (2011)

Total = £250,000



	Online Sales (2011)	High Street Sales (2011)
Cameras	£553,000	£336,000
DVD Players	£808,000	£483,000
iPods	£852,000	£644,000
Plasma TVs	£325,000	£456,000
Misc	£575,000	£678,000
Total	£3,113,000	£2,597,000

Q11 In 2012 total Catalogue sales are forecast to increase by 1/4, total Online sales to increase by a 1/5th, and High Street sales to decrease by 12%. What will be the 2012 sales for Catalogue, Online and High Street combined (to the nearest £1,000)?

- (A) £5,597,000
- (B) £6,285,000
- (C) £6,333,000
- (D) £6,433,000
- (E) £6,613,000

Step 1 – Calculate the total 2011 sales (Online and for the High Street)

Online: £852,000 + £808,000 + £553,000 + £325,000 + £575,000 = £3,113,000
 High Street: £644,000 + £483,000 + £336,000 + £456,000 + £678,000 = £2,597,000

Step 2 – Calculate the total 2012 sales (Online and for the High Street)

Online: £3,113,000 × 1.2 = £3,735,600
 High Street: £2,597,000 × 88% = £2,285,360

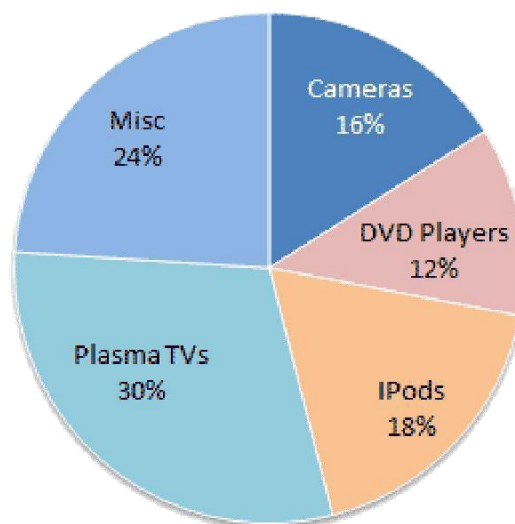
Step 3 – Calculate the total 2012 sales (Catalogue)
 £250,000 × 1.25 = £312,500

Step 4 – Sum the total January sales (Online, Catalogue and High Street)
 £3,735,600 + £2,285,360 + £312,500 = £6,333,460
 = £6,333,000 (to the nearest £1,000)

Thus the correct answer is (C), £6,333,000

Catalogue Sales (2011)

Total = £250,000



	Online Sales (2011)	High Street Sales (2011)
Cameras	£553,000	£336,000
DVD Players	£808,000	£483,000
iPods	£852,000	£644,000
Plasma TVs	£325,000	£456,000
Misc	£575,000	£678,000
Total	£3,113,000	£2,597,000

Q12 The profit made from selling cameras online compared to the High Street is in the ratio 9:7, and 15% of online camera sales is profit. What is the 2011 profit for High Street camera sales?

- (A) £36,291
- (B) £64,517
- (C) £66,980
- (D) £72,428
- (E) £82,950

Step 1 – Calculate the profit for online camera sales $15\% \times £553,000 = £82,950$

Step 2 – Calculate the profit for High Street camera sales $£82,950 \times 7 / 9 = £64,517$

Thus the correct answer is (B), £64,517

Expenses by Department (£)	Number of staff	Quarter				Annual Expense Budget
		1	2	3	4	
HR	3	1,053	1,680	1,305	1,346	6,500
Marketing	6	4,790	3,706	3,652	4,309	16,000
Sales	12	6,825	6,021	5,091	5,245	22,500
IT	5	1,160	1,042	938	956	4,500
Finance	7	4,257	4,830	4,545	4,463	20,000
R&D	4	1,169	1,009	1,755	1,821	6,000

Q13 If the annual expense budget was evenly allocated for each Quarter, which Department is under budget by the highest amount in Quarter 4?

- (A) HR
- (B) Marketing
- (C) Sales
- (D) Finance
- (E) R&D

Step 1 – Calculate the quarterly expense budgets for each Department (excluding IT which is not shown in the answer options)

HR: $6,500 / 4 = 1,625$

Marketing: $16,000 / 4 =$

4,000 Sales: $22,500 / 4 =$

5,625 Finance: $20,000 / 4 =$

5,000 R&D: $6,000 / 4 = 1,500$

Step 2 – Compare to the Quarter 4 figures for each Dept.

HR: $1,625 - 1,346 = £279$

Marketing is over budget

Sales: $5,625 - 5,245 = £380$

Finance: $5,000 - 4,463 = £537$

R&D is over budget

Thus the correct answer is (D), Finance

Expenses by Department (£)	Number of staff	Quarter				Annual Expense Budget
		1	2	3	4	
HR	3	1,053	1,680	1,305	1,346	6,500
Marketing	6	4,790	3,706	3,652	4,309	16,000
Sales	12	6,825	6,021	5,091	5,245	22,500
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Finance	7	4,257	4,830	4,545	4,463	20,000
R&D	4	1,169	1,009	1,755	1,821	6,000

Q14 60% of the Sales Department's budgets for Quarters 1 and 4 was for attending a Sales Conference. The remainder of the budget was split equally between accommodation and travel costs. What were the Sales Department's travel costs for Quarters 1 and 4 combined?

- (A) £2,414
- (B) £2,500
- (C) £3,500
- (D) £4,828
- (E) Can't tell from the data

Step 1 – Calculate the % of budget for travel costs $100\% - 60\% = 40\%$ $40\% / 2 = 20\%$

Step 2 – Calculate the figure that this % represents $20\% \times (6,825 + 5,245) = 20\% \times 12,070 = £2,414$

Thus the correct answer is (A), £2,414

Q15 The Finance Department has receipts for £14,476 of its annual expenses. What percentage of the Finance Department's annual expenses do not have receipts?

- (A) 5%
- (B) 10%
- (C) 15%
- (D) 20%
- (E) 25%

Step 1 – Total the Finance Department's expenses for all 4 quarters $4,257 + 4,830 + 4,545 + 4,463 = 18,095$

Step 2 – Calculate the % for which there are receipts $14,476 / 18,095 = 80\%$

Step 3 – Calculate the % for which there are no receipts $100 - 80 = 20\%$

Thus the correct answer is (D), 20%

Expenses by Department (£)	Number of staff	Quarter				Annual Expense Budget
		1	2	3	4	
HR	3	1,053	1,680	1,305	1,346	6,500
Marketing	6	4,790	3,706	3,652	4,309	16,000
Sales	12	6,825	6,021	5,091	5,245	22,500
IT	5	1,160	1,042	938	956	4,500
Finance	7	4,257	4,830	4,545	4,463	20,000
R&D	4	1,169	1,009	1,755	1,821	6,000

Q16 If the percentage changes in expenses that each Department exhibited between Quarters 3-4 continued into the first quarter of the next year, what would be that quarter's total expenses (to the nearest £100)?

- (A) £17,100
- (B) £19,100
- (C) £19,600
- (D) £20,600
- (E) None of these

Step 1 – Calculate the % change by Department between Quarters 3-4

HR: $(1,346 - 1,305) / 1,305 = 3.14\%$. Note: some people find it quicker to calculate $1,346 / 1,305 = 1.0314$

Marketing: $(4,309 - 3,652) / 4,309 = 17.99\%$

Sales: $(5,245 - 5,091) / 5,245 = 3.02\%$

IT: $(956 - 938) / 956 = 1.92\%$

Finance: $(4,463 - 4,545) / 4,463 = -1.80\%$

R&D: $(1,821 - 1,755) / 1,821 = 3.76\%$

Step 2 – Calculate the next quarter's expenses for each department

HR: $103.14\% \times 1,346 = 1,388$

Marketing: $4,309 \times 117.99\% = 5,084$

Sales: $5,245 \times 103.02\% = 5,403.7$

IT: $956 \times 101.92\% = 974$

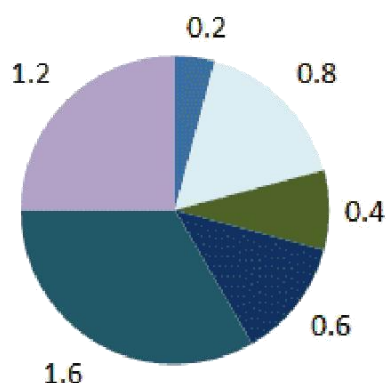
Finance: $4,463 \times 98.2\% = 4,383$

R&D: $1,821 \times 103.76\% = 1,889$

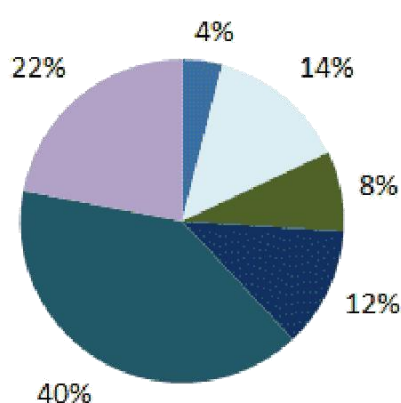
Step 3 - Calculate the next quarter's total expenses $1,388 + 5,084 + 5,404 + 974 + 4,383 + 1,889 = £19,122$

Thus the correct answer is (B), £19,100

Growth Fund Investments - Year 1
(\$millions)



Growth Fund Investments - Year 2
(\$millions) Total = \$4.5 million



■ Gilts ■ Fixed Interest ■ North American Equities
 ■ European Equities ■ UK Equities ■ Pacific Rim Equities

Q17 What was Year 2's decrease in the amount invested in North American and European Equities compared to Year 1?

- (A) \$10,000
- (B) \$100,000
- (C) \$110,000
- (D) \$111,000
- (E) \$111,100

Step 1 – Calculate Year 2's investments in North American and European

Equities North American: $\$4.5\text{million} \times 8\% = \$360,000$

European: $\$4.5\text{million} \times 12\% = \$540,000$

Step 2 - Calculate Year 2's decrease compared to Year 1

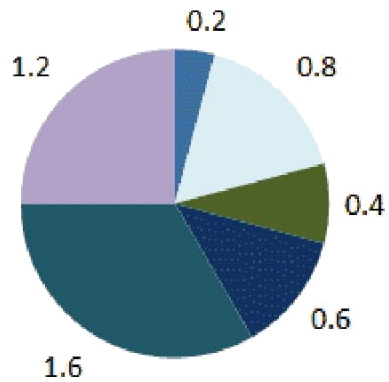
North American change + European change

$= (\$400,000 - \$360,000) + (\$600,000 - \$540,000)$

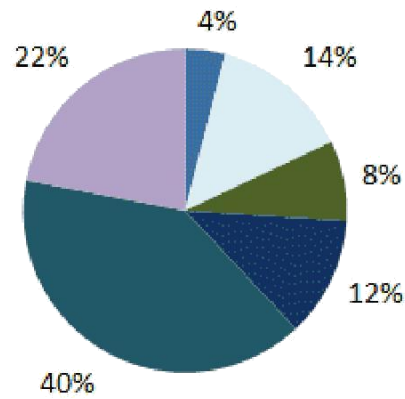
$= \$100,000$

Thus the correct answer is (A), \$100,000

Growth Fund Investments - Year 1
(\$millions)



Growth Fund Investments - Year 2
(\$millions) Total = \$4.5 million



■ Gilts ■ Fixed Interest ■ North American Equities
 ■ European Equities ■ UK Equities ■ Pacific Rim Equities

Q18 Which type of investment shows the largest difference between Year 1 and Year 2 in the proportion it contributed to the total Growth Fund?

- (A) Gilts
- (B) Fixed interest
- (C) North American Equities
- (D) UK Equities
- (E) Pacific Rim Equities

Step 1 – calculate the proportion of the fund that each investment made up in Year 1

Gilts = $0.2 / 4.8 = 4.17\%$

Fixed Interest = $0.8 / 4.8 = 16.67\%$

North American Equities = $0.4 / 4.8 = 8.33\%$

European Equities = $0.6 / 4.8 = 12.5\%$

UK Equities = $1.6 / 4.8 = 33.33\%$

Pacific Rim Equities = $1.2 / 4.8 = 25\%$

Step 2 – compare these figures to the % figures shown in Year 2's pie-chart

Gilts = 4.17% vs. 4%

Fixed Interest = 16.67% vs. 14%

North American Equities = 8.33% vs.

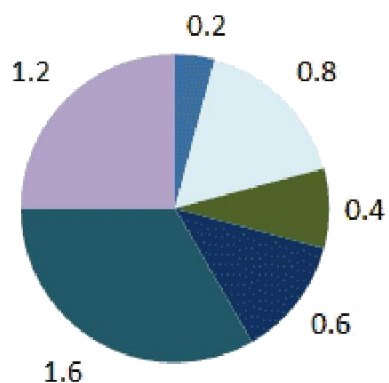
8% *European Equities* = 12.5% vs. 12%

UK Equities = 33.33% vs. 40%

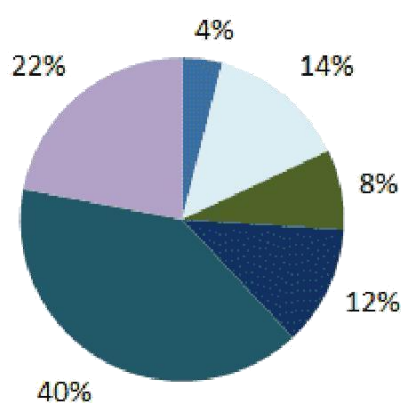
Pacific Rim Equities = 25% vs. 22%

Thus the correct answer is (D), UK Equities

Growth Fund Investments - Year 1
(\$millions)



Growth Fund Investments - Year 2
(\$millions) Total = \$4.5 million



■ Gilts ■ Fixed Interest ■ North American Equities
 ■ European Equities ■ UK Equities ■ Pacific Rim Equities

Q19 If the proportional change in the Growth Fund between Year 1 and Year 2 continued over subsequent years, what would be the projected Growth Fund value in Year 6?

- (A) \$3.48 million
- (B) \$3.51 million
- (C) \$3.71 million
- (D) \$5.73 million
- (E) \$5.95 million

Step 1 – Calculate the proportional change in the Growth Fund between Year 1 and 2 $(4.8 - 4.5) / 4.8 = -6.25\%$

Step 2 – Apply this % to calculate the growth Fund value each year up to Year

6 Year 3: $93.75\% \times 4.5 = 4.2188$

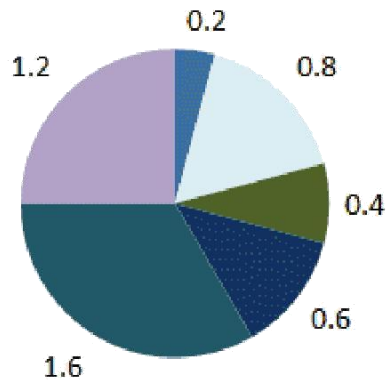
Year 4: $93.75\% \times 4.2188 = 3.955$

Year 5: $93.75\% \times 3.955 = 3.708$

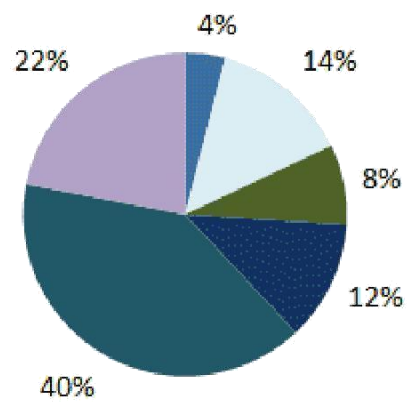
Year 6: $93.75\% \times 3.708 = \$3.476$ million

Thus the correct answer is (A), \$3.48 million

Growth Fund Investments - Year 1
(\$millions)



Growth Fund Investments - Year 2
(\$millions) Total = \$4.5 million



■ Gilts ■ Fixed Interest ■ North American Equities
 ■ European Equities ■ UK Equities ■ Pacific Rim Equities

Q20 If in Year 2 the amount invested in Year 1's Fixed Interest fund had been sold and converted into European Equity funds, what is the value of European Equity funds in Year 2? (Assume no charges are incurred).

- (A) \$540,000
- (B) \$700,000
- (C) \$800,000
- (D) \$1.24 million
- (E) \$1.34 million

Step 1 – Calculate the Year 2 amount of European Equity funds
 European Equity: $12\% \times \$4.5 \text{ million} = \$540,000$

Step 2 - Sum the Year 1 Fixed Interest and Year 2 European Equity investments
 $\$800,000 + \$540,000 = \$1,340,000$

Thus the correct answer is (E), \$1.34 million