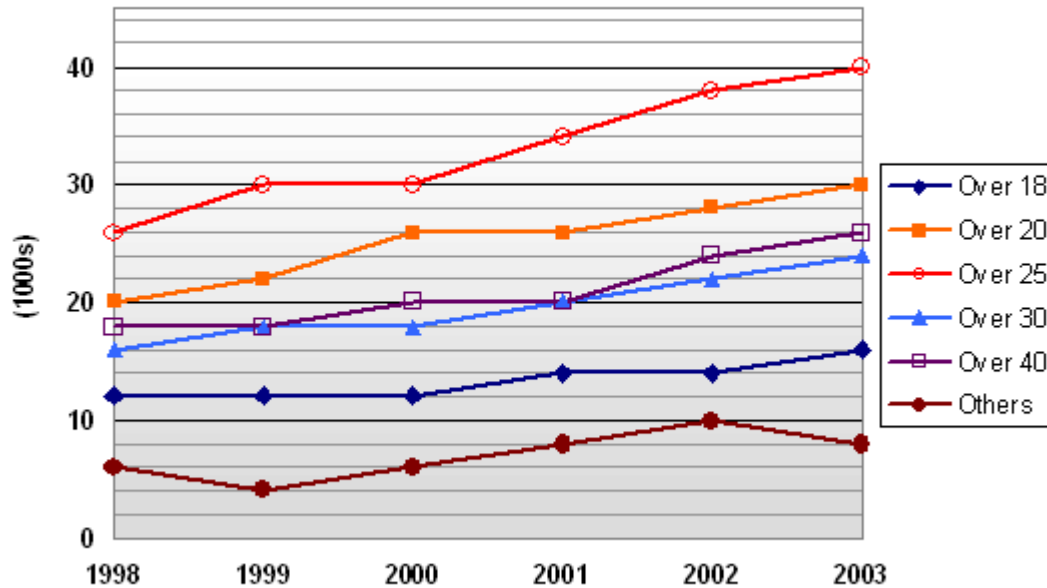




# Numerical Reasoning Practice Test 3

Solutions Booklet

Pregnancies amongst women of different age groups



**Q1** Of all pregnancies during 2001, what percentage was from women aged 30 and over?

12.8%      14.5%      **32.8%**      42.6%

For 2001, the number of pregnancies in women aged 30 and over is:

30-40 = 20,000

40+ = 20,000

Sum = 40,000.

And the number of pregnancies from all women was:

Others = 8,000

18-20 = 14,000

20-25 = 26,000

25-30 = 34,000

30-40 = 20,000

40+ = 20,000

Sum = 122,000.

So the percentage is simply  $40,000 \div 121,000 = 32.79\%$  (and to save time you can obviously just work out  $40 \div 121$  without the thousands).

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**Q2** During which period did the number of pregnancies in the Over 40s increase the most?

2000 – 2001    **2001 – 2002**    2002 – 2003    2003 – 2004

*By studying the graph for Over 40s, we can quickly see that between 2001 and 2002 pregnancies increased by two markers on the scale, whereas all the other years either stayed steady or increased by only one scale mark. We don't need to actually work out the numerical values to see this, although it is 4,000 for the period 2001-2002.*

**Q3** The number of pregnancies for 25-30 year olds was projected to rise by 9% every year between 2001 and 2003. If this had been the case, approximately how many more pregnancies would have occurred in 2003 for the 25-30 age bracket?

690                    **395**                    1,114                    1,160

*In 2001 we see that pregnancies for 25-30 year olds is 34,000. For an increase of 9% each year, this would mean in 2002 there would have been  $34,000 \times 1.09 = 37,060$ . In 2003 there would have been  $37,060 \times 1.09 = 40,395.4$ . This compares with the actual figure of 40,000. So the difference is 395.*

*It is good practice at this point to check that we have indeed calculated the projected figure to be higher than the actual, as suggested in the question. If we had not, we know we have made an error.*

2006 Data				1999 Data
City	Population (thousands)	Number of 18-28 year olds (thousands)	Number of offenders	Number of offenders
A	129.2	20.4	380	396
B	118.0	16.9	392	380
C	72.4	7.3	273	214
D	25.1	6.3	166	176

**Q4** Which city's population had the highest percentage of 18-28 year olds in 2006?

A                      B                      C                      D

*There is no short-cut; you just have to work this out for each city.*

*City A:  $20.4 / 129.2 = 15.79\%$*

*City B:  $16.9 / 118.0 = 14.32\%$*

*City C:  $7.3 / 72.4 = 10.08\%$*

*City D:  $6.3 / 25.1 = 25.10\%$*

**Q5** Relative to population, which city had the lowest rate of offenders in 2006?

A                      B                      C                      D

*Work out the percentage (or ratio) of offenders to total population for each city.*

*City A:  $380 / 129.2 = 2.94$  – This city had the lowest ratio of offenders to population.*

*City B:  $392 / 118.0 = 3.32$*

*City C:  $273 / 72.4 = 3.77$*

*City D:  $166 / 25.1 = 6.61$*

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**Q6** Which city had the largest decrease in the number of offenders between 1999 and 2006?

A

B

C

D

*The question asks for the largest decrease in the number of offenders, not a percentage decrease or anything else, so simply find the absolute decrease for each city.*

*City A:  $380 - 396 = -16$*

*City B:  $392 - 380 = 12$  (increase)*

*City C:  $273 - 214 = 59$  (increase)*

*City D:  $166 - 176 = -10$*

<i>Accounts Data</i>					
	1999	2000	2001	2002	2003
Total Revenue (£ million)	56.1	61.4	60.5	60.8	61.8
Overall Costs per Sale (£)	12.6	12.6	12.4	12.3	12.6
Number of Sales (thousands)	4,100	4,300	4,600	4,500	4,700
Cash Balance (£ million)	1.2	2.1	2.0	1.8	1.6

**Q7** What was the overall profit as a percent of revenue for 2002?

4.28%      5.25%      6.51%      **8.96%**

Overall Revenue in 2002 = £60,800,000. Overall Costs = £12.3 x number of sales so £12.3 x 4,500,000 = £55,350,000. Now overall profit is costs deducted from revenue so £60,800,000 - £55,350,000 = £5,450,000. We're not quite done yet as the question asks for profit as a percentage of revenue, which is  $5,450,000 \div 60,800,000 = 8.96\%$ .

**Q8** What was the Cash Balance as a percentage of total costs for 2001?

**3.5%**      3.6%      3.7%      3.8%

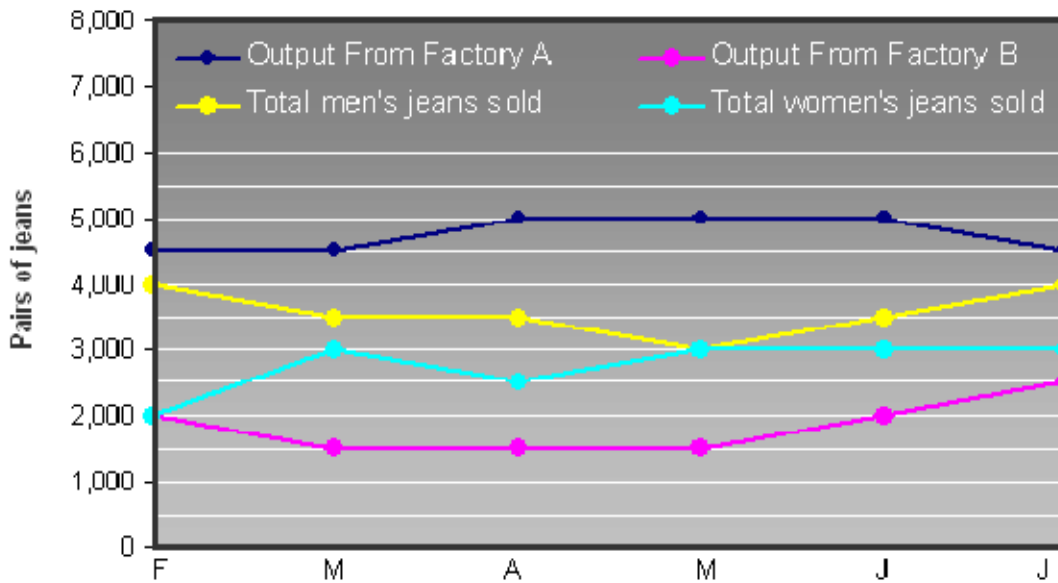
Cash Balance in 2001 = £2.0 million. Total costs = £12.4 x 4,600,000 = £57.04 million. So Cash balance as percent of total costs is  $2.0 \div 57.04 = 3.51\%$ . It is slightly faster to leave the data in millions for this calculation, as long as you don't confuse yourself.

**Q9** Which year saw the largest percentage increase in number of sales over the previous year?

2000      **2001**      2002      2003

Work out the percentage increase from year to year:  
 2000:  $4300 \div 4100 = 104.9\%$   
 2001:  $4600 \div 4300 = 107.0\%$  - This is the largest.  
 2002:  $4500 \div 4600 = 97.8\%$   
 2003:  $4700 \div 4500 = 104.4\%$

**Sales and Production for Jeans Manufacturer**



**Q10** For the two factories combined, what was the excess production of jeans in April that were not sold?

500      1,000      1,500      2,000

You have to first work out that the letters at the bottom of the graph represent Feb, March, April, May, June, Jul. So in April, production from Factory A = 5,000. Production from Factory B = 1500; total production = 6,500 pairs of jeans. Total sales of both men's and women's = 3,500 + 2,500 = 6,000 pairs of jeans. So excess production = 500.

**Q11** In which month was total production from both factories combined the lowest?

March      April      May      June

Simply sum the output from both factories for each month. This is an easy question. The slight trick however is that to save time you should consider only the months that are available as an option.

March: 6,000 – This month was the lowest.  
 April: 6,500  
 May: 6,500  
 June: 7,000

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**Q12** The jeans that are produced but not sold each month are stored for when sales exceed production. From the period February to July inclusive, what was the net number of jeans put into storage?

500                      1,000                      **1,500**                      2,000

*For each month, the production minus sales (i.e. the number of pairs of jeans put to storage) is:*

*F:  $6500 - 6000 = 500$*

*M:  $6000 - 6500 = -500$  (i.e. 500 were taken out of storage)*

*A:  $6500 - 600 = 500$*

*M:  $6500 - 600 = 500$*

*J:  $7000 - 6500 = 500$*

*J:  $7000 - 7000 = 0$*

*The net number is then  $500 - 500 + 500 + 500 + 500 + 0 = 1,500$ .*

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**Q13** Of the jeans sales in June, what percentage were of men's jeans?

46.4%                      52.7%                      53.1%                      **53.8%**

*Total sales in June = 3,000 (women's) + 3,500 (men's) = 6,500. And men's jeans sold = 3,500. The percentage is then  $3,500 \div 6,500 = 53.846\%$ .*

## Qualifications held by employees of four different companies

Qualification	Company A	Company B	Company C	Company D
PhD	6%	1%	0%	1%
Masters Degree	23%	16%	12%	18%
Honors Degree	85%	78%	64%	61%
A Levels	99%	96%	95%	90%
GCSEs	100%	97%	98%	92%
Total number of employees	680	1,100	24,700	25,600

**Q14** What proportion of employees in Company B hold either an Honors Degree or a Masters Degree?

16%      78%      94%      **Cannot say**

*It is not possible to tell from the data whether a particular employee holds just an Honors Degree and not a Masters Degree, or vice versa, or both. Therefore it is not possible to determine. Don't be fooled into thinking you can add up 16% and 78% of 1,100.*

**Q15** How many more employees hold A-levels in Company C than in Company D?

320      **425**      615      785

*In Company D there are 25,600 employees, of which we are told 90% have A-levels. In Company C there are 24,700 employees, of which we are told 95% have A-levels. So Company D ( $25,600 \times 90\%$ ) = 23,040 and Company C ( $24,700 \times 95\%$ ) = 23,465.*

*This is a difference of 425 employees. And we can take comfort in the fact that we have worked out the answer to be a positive number (i.e. we have got the companies the right way round).*

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**Q16** What company has the highest ratio of employees who hold Masters Degrees to employees who hold A-levels?

**Company A**    Company B    Company C    Company D

We have to work out this ratio for each company.

Company A:  $23:99 = 23.23$  – This company has the highest ratio.

Company B:  $16:96 = 16.67$

Company C:  $12:95 = 12.63$

Company D:  $18:90 = 20.00$

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**Q17** For all four companies combined, what is the average percentage of employees who are Honor Degree qualified?

58.9%                      **63.1%**                      67.2%                      72.4%

First work out how many from each company hold an Honors Degree.

Company A:  $680 \times 85\% = 578$

Company B:  $1,100 \times 78\% = 858$

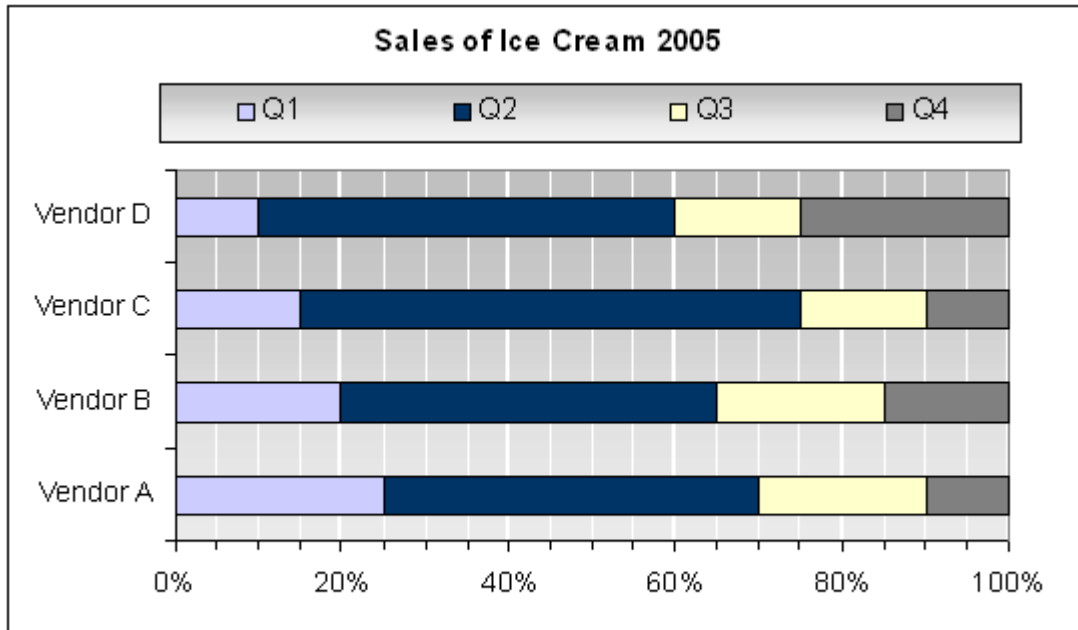
Company C:  $24,700 \times 64\% = 15,808$

Company D:  $25,600 \times 61\% = 15,616$

This totals  $(578 + 858 + 15808 + 15616) = 32,860$ .

And we can find the total number of all employees for these four companies as  $(680 + 1100 + 24,700 + 25,600) = 52,080$ .

So the combined average is  $32,860 \div 52,080 = 63.095\%$



**Q18** What was the percentage decrease in sales for Vendor C between the third and fourth quarter of 2005?

16.7%      25%      **33.3%**      36.7%

*For Vendor C we have Q3 = 15% and Q4 = 10%. Which is a 33.3% reduction ( $10 \div 15 = 0.666$ ).*

**Q19** What was the ratio of Q4 sales to Q2 sales for Vendor B?

**1:3**      1:2      1:4      1:5

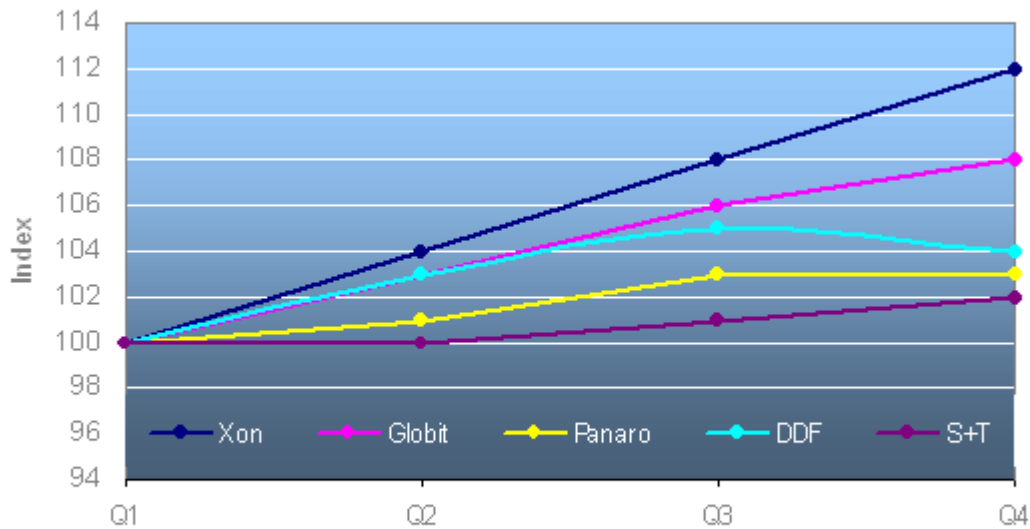
*For Vendor B we have Q4: 15% and Q2: 45%. So this is a ratio of 1:3.*

**Q20** Which quarter consistently had the highest number of sales for all four vendors?

Q1      **Q2**      Q3      Q4

*By inspection, the proportion of sales in Q2 was higher for all four vendors. No calculations are necessary, especially if you are looking to save time.*

Electricity Price Indices



**Q21** If the price of Panaro electricity was 12.14p in Q1, what would the price have been in Q4?

12.26p      12.38p      **12.50p**      12.61p

If 12.14p related to the indexed (or 'rebased') price of 100, which increases to the indexed price of 103 in Q4, the equivalent price would be  $12.14p \times 1.03 = 12.5042p$

**Q22** For the combined average of the five utility companies, which quarter experienced the largest increase in electricity price?

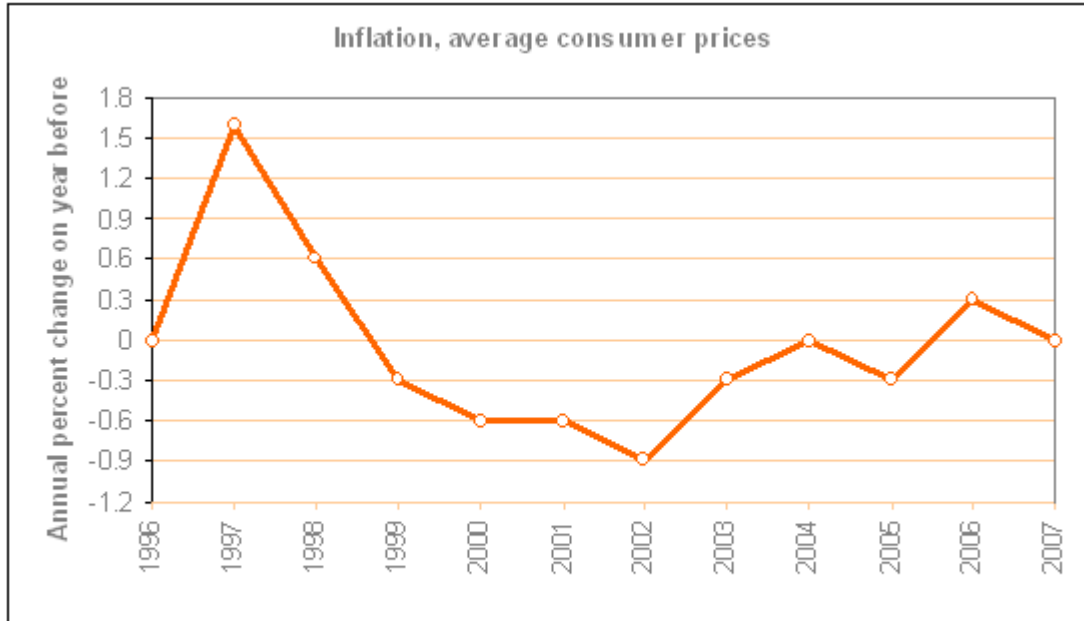
Q2      **Q3**      Q4      Cannot say

Q1:  $100 + 100 + 100 + 100 + 100 = 500$   
 Q2:  $100 + 101 + 103 + 103 + 104 = 511$ . Increase 2.2%  
 Q3:  $101 + 103 + 105 + 106 + 108 = 523$ . Increase 2.3% - this was the largest increase.  
 Q4:  $102 + 103 + 104 + 108 + 112 = 529$ . Increase 1.1%

**Q23** In the third quarter, the price of DDF electricity was 13.13p, and the price of S+T electricity was 11.98p. How much cheaper than DDF was S+T in the fourth quarter?

0.68p      0.77p      **0.92p**      1.68p

DDF in 3<sup>rd</sup> quarter = 13.13p, and in 4<sup>th</sup> quarter =  $13.13 \times (104 \div 105) = 13.005p$   
 S&T in 3<sup>rd</sup> quarter = 11.97p, and in 4<sup>th</sup> quarter =  $11.97 \times (102 \div 101) = 12.0897p$ . Which is 0.92p cheaper than DDF's.



**Q24** If in 1998 inflation was 2.6%, what was it in 2003?

- 2.53%      2.56%      2.58%      2.62%

Starting with 2.6%, for each year multiply by the 'percentage change' to arrive at the subsequent year. So  $2.6\% \times 99.7\% \times 99.4\% \times 99.4\% \times 99.1\% \times 99.7\% = 2.53\%$

**Q25** Between 1997 and 2007, how many times did inflation not vary from the previous year?

- 1      2      3      Cannot say

Count how many times the graph is at 0%, since this is the 'Annual percent change'. Once in 2004 and once in 2007.

**Q26** Between 1999 and 2007, what year experienced the largest proportional increase in inflation?

- 2003      2004      2005      **2006**

There was only one year between 1999 and 2007 in which the inflation increased: 2006, which we can see because this is the only year between 1999 and 2007 that experienced a positive change.

	2004	2005
<b>Income</b>		
Turnover	24,500	26,050
<b>Cost of Sales</b>		
Materials	8,260	8,860
Consumables	1,400	1,760
Total cost of sales	9,660	10,620
<b>GROSS PROFIT</b>	<b>14,840</b>	<b>15,430</b>
<b>Operating Costs</b>		
Salaries	8,905	
Marketing	260	240
Insurance	190	200
Professional fees	180	180
Rent	4,665	4,668
<b>Total operating costs</b>	<b>14,200</b>	<b>14,538</b>
<b>NET PROFIT BEFORE TAX</b>	<b>640</b>	<b>892</b>

**Q27** What were Total Operating Costs as a percentage of Turnover in 2004?

49.8%      52.5%      **58.0%**      61.3%

Total Operating costs = 14,200. Turnover = 24,500. So  $14,200 \div 24,500 = 57.96\%$ .

**Q28** If the cost of Consumables rose by 21% between 2005 and 2006, with Material costs increasing at the same rate as they did for 2004 to 2005, what would the Total cost of sales be in 2006?

11,255      **11,633**      12,641      12,862

Rate of increase in Material costs between 2005 and 2004 =  $8,860 \div 8,260 = 7.26\%$ . So Material costs in 2006 would be  $8,860 \times 1.0726 = 9,503.6$ .

Rate of increase in Consumables we are told is 21%. So Consumables costs in 2006 would be  $1,760 \times 1.21 = \text{£}2,129.6$ . Total cost of sales therefore is  $9,503.6 + 2,129.6 = 11,633.2$

**Q29** For 2004 and 2005 combined, what was the average percent of Operating costs that was attributed to Marketing?

**1.7%**      2.9%      3.6%      5.1%

Total Marketing costs for both years:  $260 + 240 = 500$   
 Total Operating costs for both years:  $14,200 + 14,538 = 28,738$   
 So overall percentage:  $500 \div 28,738 = 1.74\%$

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**Q30** What was the cost of Salaries in 2005?

8,560

9,115

**9,250**

9,620

*We are told Total operating costs come to 14,538 in 2005. And we know all the components except Salaries, which can therefore be deduced.  
 $14,538 - 240 - 200 - 180 - 4,668 = 9,250$ .*

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- **End of Free Practice Test 3** -

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