

Mark schemes

Q1.

$$\frac{20}{100} \times 50 \text{ or } 10$$

oe

M1

2

SC1 for 32

A1

[2]

Q2.

(a) $\frac{3}{4} \times \frac{3}{4} \times 15$

or

$$\frac{3}{4} \times 15 \text{ or } 11.25$$

and $\frac{3}{4} \times$ their 11.25

oe

M1

8.4(375) or 8.44 or 8.438

or $\frac{135}{16}$ or $8\frac{7}{16}$

A1

Additional Guidance

8.43 or 8.437

M1A1

8.4 seen, answer 8

M1A1

$\frac{3}{4}$ of 11.25 (unless correctly evaluated)

M0

$\frac{3}{4} \times 8.4375$, answer 6.328 (further work)

M1A0

11.25 + 8.4375, answer 19.6875 (further work)

M1A0

(b) **Alternative method 1**

Ticks second box and [7.425, 7.5375]

or

Ticks second box and correctly evaluates $\frac{2}{3} \times$ their 11.25

ft correct box ticked for comparing with their answer to (a)

B1ft [7.425, 7.5375]

with no or incorrect decision

or

Correctly evaluates

$\frac{2}{3} \times$ their 11.25

with no or incorrect decision

B2ft

Alternative method 2

Ticks second box and valid comparison

eg $\frac{8}{12}$ and $\frac{9}{12}$

0.66... or 0.67 and 0.75

66.(...)% or 67% and 75%

$8\frac{7}{16}$

clear diagrams showing $\frac{2}{3}$ and $\frac{3}{4}$

B1 Ticks second box and incomplete comparison

eg $\frac{8}{12}$ and $\frac{3}{4}$

two thirds is less than three quarters

$\frac{3}{4} \times \frac{3}{4} = \frac{9}{16}$ and $\frac{3}{4} \times \frac{2}{3} = \frac{6}{12}$

or

Valid comparison (that would score B2) with no or incorrect decision

B2

Additional Guidance

In Alt 1 only follow through their answer to (a) for the comparison, the working for $\frac{2}{3}$ of their 11.25 must be correct

(a) answer 6.5 (b) Ticks first box and 7.5 seen

B2ft

Accept 0.66... or 0.67 for $\frac{2}{3}$

Using 0.6 for $\frac{2}{3}$

B0

[4]

Q3.(a) **Alternative method 1**

1.015 seen
 or 4000×1.015
 or 4060

M1

$$4000 \times 1.015^2 = 4120.90$$

A1

Alternative method 2

0.015×4000 or 60
 or 4060
 or 0.015×4060 or 60.9

M1

$$4000 + 60 + 60.9 = 4120.90$$

A1

Additional Guidance

Allow £4120.90p

M1A1

(b) 4120.9×1.014
 or 4120.9×0.014 or 57.6926
 or 57.69 or 57.70

oe

M1

$4120.9 + \text{their } 57.6926$
 or 4178.5926

M1dep

their 4178.5926×0.0135

oe

M1dep

56.4110001 or 56.41 or 56.42
 and 57.6926 or 57.69 or 57.70
 and Less

A1

[6]**Q4.**(a) $\text{£}1500 \times 1.016^2$

B1

Alternative method 1

[1548.38, 1548.39]

ft their part (a)

B1ft

$$1500 \times 1.018 \text{ or } 1527$$

oe

M1

1500 × 1.018 × 1.013
or 1527 × 1.013
or [1546.85, 1546.86]

oe

M1dep

[1548.38, 1548.39]
and [1546.85, 1546.86] and Dev's

oe

ft their part (a)

A1ft

Alternative method 2

1.016² or 1.032(256) or 1.0323

M1

1.018 or 1.013 seen

M1

1.018 × 1.013 or 1.031(234)

M1dep

1.032(256) and 1.031 and Dev's

A1

Additional Guidance

Note incorrect answers from part (a) for Alt 1

£1500 × 1.6 × 2 = £4800

£1500 × 1.6² = £3840

£1500 × 1.016 × 2 = £3048

[5]

Q5.

Alternative Method 1

1.032 seen

M1

5000 × 1.032³ oe

M1

5495.523...

May be implied

A1

5495.52

ft their answer rounded to 2 dp

SC1 5480

B1ft

Alternative method 2

$$5000 + 5000 \times 0.032 \text{ or } 5160 \text{ oe}$$

M1

$$\text{their } 5160 + \text{their } 5160 \times 0.032$$

$$\text{or } 5325.12$$

and

$$\text{their } 5325.12 + \text{their } 5325.12 \times 0.032$$

M1

$$5495.523\dots$$

May be implied

A1

$$5495.52$$

*ft their answer rounded to 2 dp
SC1 5480*

B1ft

[4]

Q6.

Alternative method 1

$$1.015$$

*oe e.g. 101.5% or $1 + \frac{1.5}{100}$
Implied by 6090*

M1

$$6000 \times 1.015^n$$

for any positive integer $n > 1$

*oe
Implied by 6181.(...)*

M1dep

$$11$$

*If showing trials for 10 and/or 11 years, must have
 $6000 \times 1.015^{10} = 6963.(...)$
and/or
 $6000 \times 1.015^{11} = 7067.(...) \text{ or } 7068$
If showing totals from year on year for 10 and/or 11 years,
must have
(Y10) [6963.21, 6963.30]
and/or
(Y11) [7067.65, 7067.75]*

A1

Alternative method 2

$$1.015$$

oe e.g. 101.5% or $1 + \frac{1.5}{100}$
Implied by 6090

M1

Evaluates 1.015^n for any positive integer $n > 1$
and
 $7000 \div 6000$ or 1.166... or 1.167 or 1.17

M1dep

11

If showing trials for $n = 10$ and/or 11 must have
 $1.015^{10} = [1.160, 1.161]$
and/or
 $1.015^{11} = [1.177, 1.178]$

A1

Additional Guidance

Values for working year on year

Y1 $6000 \times 1.015 = 6090$

Y2 $6090 \times 1.015 = 6181.35$

Y3 $6181.35 \times 1.015 = [6274.07, 6274.08]$

Y4 $[6274.07, 6274.08] \times 1.015 = [6368.18, 6368.20]$

Y5 $[6368.18, 6368.20] \times 1.015 = [6463.70, 6463.73]$

Y6 $[6463.70, 6463.73] \times 1.015 = [6560.65, 6560.69]$

Y7 $[6560.65, 6560.69] \times 1.015 = [6659.05, 6659.11]$

Y8 $[6659.05, 6659.11] \times 1.015 = [6758.93, 6759.00]$

Y9 $[6758.93, 6759.00] \times 1.015 = [6860.31, 6860.39]$

Y10 $[6860.31, 6860.39] \times 1.015 = [6963.21, 6963.30]$

Y11 $[6963.21, 6963.30] \times 1.015 = [7067.65, 7067.75]$

Answer 11 with no working

M2A1

$1000 \div 90 = 11.1$ Answer 11

Zero

[3]

Q7.

Alternative method 1

$\frac{25}{100} \times 18000$ or 4500

and 18 000 – their 4500

or $18\ 000 \times (1 - 0.25)$

or $18\ 000 \times 0.75$

or 13 500

or 0.88

oe

M1

Their $13\ 500 \times (1 - 0.12)^4$

or their $13\ 500 \times 0.88^4$

Their $13\,500 \times (1 - 0.12)^3$
or their $13\,500 \times 0.88^3$
or 9199.87 or 9199.88 or 9199.90
or 9200

oe

Complete method for at least 4 years

M1dep

8095.88 or 8095.89 or 8095.90
or 8096 or 8096.00
or 8100 or 8100.00

Correct money notation

A1

Alternative method 2

$\frac{25}{100} \times 18\,000$ or 4500

and 18 000 – their 4500
or 13 500
or 0.88

oe

M1

13 500, 11 880, 10 454.(...) 9199.(...)

oe

Complete method for at least 4 years

M1dep

8095.88 or 8095.89 or 8095.90
or 8096 or 8096.00
or 8100 or 8100.00

Correct money notation

A1

Additional Guidance

Condone e.g. £8095.88p

M1M1A1

8095.887...

M1M1A0

Note the values for successive calculations are 13 500, 11880, 10454.4, 9199.87(2), 8095.88(736)

The values for successive savings are 4500, 1620, 1425.6, 1254.52(8), 1103.98

For method marks allow rounding or truncating of their totals or savings

[3]

Q8.

100(%) – 20(%) or 80(%)

or 1 – 0.2 or 0.8

Implied by 6400

M1

$$8000 \times 0.8^5$$

oe

eg 8000×0.8 or 6400

and their 6400×0.8 or 5120

and their 5120×0.8 or 4096

and their 4096×0.8 or 3276(.80)

and their $3276(.80) \times 0.8$

M1

$$2621(.44)$$

Accept 2600 or 2620 with full method seen

A1

[3]

Q9.

1.05 seen *oe*

B1

$$9\,000 \div 1.05^3$$

$9\,000 \div 1.05 (= 8571.(\dots))$

M1

their $8571.(\dots) \div 1.05 (= 8163.(\dots))$

their $8163.(\dots) \div 1.05 (= 7774.(\dots))$

M1

7774.54 or 7774.55 or 7775

A1

Alternative method

1.05 seen *oe*

B1

Two trials correctly evaluated of the form $n \times 1.05^3$ with second trial closer to £9000

M1

Two trials correctly evaluated of the form $n \times 1.05^3$ with second trial closer to £9000

and

both values of n in range [7700, 7800]

M1

7774.54 or 7774.55 or 7775

A1

[4]

Q10.

$$1800 \times 1.04 \text{ or } 1872 \text{ } *oe*$$

$$1800 \times 1.04^n = 2000$$

M1

1800×1.04^2 or 1946.88 or 1946 or 1947 oe
 Accept rounding [1946, 1947]
 $2000 \div 1800 = 1.04^n$

M1dep

1800×1.04^3 or 2024.7 ... oe
 Accept [2023, 2025]
 Between 2 and 3 years

M1dep

3

Must not come from simple interest

A1

[4]

Q11.

$100(\%) - 14(\%)$ or 86(%)
 or $1 - 0.14$ or 0.86

Implied by 87 139(.5)

M1

$101\,325 \times 0.86^4$

oe

eg $101\,325 \times 0.86$ or 87 139(.5)

and their $87\,139(.5) \times 0.86$ or 74 939(.97)

and their $74\,939(.97) \times 0.86$ or 64 448(.3742)

and their $64\,448(.3742) \times 0.86$

A1

55 425(...)

May be implied by 55 000 or 55 400 or 55 430 or 55 426

A1

55 000

ft their answer rounded to 2sf

B1ft

[4]

Q12.

(A =) 22 000

B1

$14\,080 = \text{their } 22\,000 \times k^{-2}$

oe

M1

$$\sqrt{\frac{\text{their } 22\,000}{14\,080}}$$

or $k^2 = \frac{\text{their } 22\,000}{14\,080}$

M1

(k =) 1.25 or $\frac{5}{4}$

ft their 22 000

A1ft
[4]

Q13.

(a) $2^0 = 1$

B1

(b) $2 = 2^{\frac{1}{4}}$ or $\frac{1}{4} = 1$

M1

4

A1

(c) $250 \times 2^{\frac{48}{4}}$

M1

1 024 000 and Yes

A1

[5]