Mark schemes

Q1.

$\dfrac{20}{100}$ × 50 or 10

oe

M1

2

SC1 for 32

A1

[2]

Q2.

(a) $\dfrac{3}{4}$ × $\dfrac{3}{4}$ × 15

or

$\dfrac{3}{4}$ × 15 or 11.25

and $\dfrac{3}{4}$ × their 11.25

oe

M1

8.4(375) or 8.44 or 8.438

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

A1

Additional Guidance

8.43 or 8.437

M1A1

8.4 seen, answer 8

M1A1

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

M0

$\dfrac{3}{4}$ × 8.4375, answer 6.328 (further work)

M1A0

11.25 + 8.4375, answer 19.6875 (further work)

M1A0

(b) **Alternative method 1**

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Ticks second box and [7.425, 7.5375]

or

Ticks second box and correctly evaluates $\frac{2}{3}$ × 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*
> $\frac{2}{3}$ *× 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

$4000 × 1.015^2 = 4120.90$

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 + 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) $£1500 × 1.016^2$

B1

Alternative method 1

[1548.38, 1548.39]
ft their part (a)

B1ft

1500 × 1.018 or 1527

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

1.016^2 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 × 1.6^2 = £3840
£1500 × 1.016 × 2 = £3048

[5]

Q5.

Alternative Method 1

1.032 seen

M1

5000 × 1.032^3 *oe*

M1

5495.523…

May be implied

A1

5495.52

ft their answer rounded to 2 dp
SC1 5480

B1ft

Alternative method 2

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5000 + 5000 × 0.032 or 5160 *oe*

M1

their 5160 + their 5160 × 0.032

or 5325.12

and

their 5325.12 + their 5325.12 × 0.032

M1

5495.523…

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

6000×1.015^{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
$6000 \times 1.015^{11} = 7067.(…)$ 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

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

Implied by 6090

<div align="right">

M1

</div>

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

<div align="right">

M1dep

</div>

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]

<div align="right">

A1

</div>

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

<div align="right">

M2A1

</div>

$1000 \div 90 = 11.1$ Answer 11

<div align="right">

Zero

[3]

</div>

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

<div align="right">

M1

</div>

Their $13\,500 \times (1 - 0.12)^4$
or their $13\,500 \times 0.88^4$

Their 13 500 × (1 − 0.12)^3
or their 13 500 × 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

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

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

8000×0.8^5

> *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) × 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 ÷ 1.05 (= 8571.(…))*

                                                                                          M1

> *their 8571.(…) ÷ 1.05 (= 8163.(…))*
> *their 8163.(…) ÷ 1.05 (= 7774.(…))*

                                                                                          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 × 1.04 or 1872 *oe*

> *1800 × 1.04ⁿ = 2000*

                                                                                          M1

1800 × 1.04² or 1946.88 or 1946 or 1947   *oe*

> *Accept rounding [1946, 1947]*
>
> *2000 ÷ 1800 = 1.04ⁿ*

M1dep

1800 × 1.04³ 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 × 0.86⁴

> *oe*
>
> *eg 101 325 × 0.86 or 87 139(.5)*
>
> *and their 87 139(.5) × 0.86 or 74 939(.97)*
>
> *and their 74 939(.97) × 0.86 or 64 448(.3742)*
>
> *and their 64 448(.3742) × 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 = their 22 000 × k^{-2}

> *oe*

M1

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

M1

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

A1ft

[4]

Q13.

(a) $2^0 = 1$

B1

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

M1

4

A1

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

M1

1 024 000 and Yes

A1

[5]