XT - MATHS Grade 10

Subject: Finances **Date:** 2010/06/28

Total Marks: 55

1. FALSE 5

Explanation: Use the Compound Increase Formula.
Let $\mathbf{P} = x$, $\mathbf{A} = 2x$ and $n = 3$.

$$\mathbf{A} = \mathbf{P}\left(1 + \frac{r}{100}\right)^n$$

$$2x = x\left(1 + \frac{r}{100}\right)^3$$

$$\frac{2x}{x} = \left(1 + \frac{r}{100}\right)^3$$

$$2 = \left(1 + \frac{r}{100}\right)^3$$

Therefore …

$$\sqrt[3]{2} = \left(1 + \frac{r}{100}\right)$$

$$\sqrt[3]{2} - 1 = \frac{r}{100}$$

$$100\left(\sqrt[3]{2} - 1\right) = r$$

Now …

$$r = 25{,}99$$

Therefore, the annual growth rate is equal to $\mathbf{25{,}99}\%$.

2. FALSE 5

Explanation:

$$\mathbf{A} = \mathbf{P}\left(1 - \frac{r}{100}\right)^n$$

$$4\ 800 = \mathbf{P}\left(1 - \frac{10{,}5}{100}\right)^7$$

$$4\ 800 = \mathbf{P}\left(0{,}895\right)^7$$

Therefore …

$$4\ 800 = \mathbf{P}\left(0{,}46\right)$$

$$\frac{4\,800}{0{,}46} = \mathbf{P}$$

$$10\ 434{,}70 = \mathbf{P}$$

Therefore, he paid **R10 434,70** for the tractor.

3. FALSE 2

Explanation: The dollar to pound rate will be ***13,65 : 9,70 = 1,41 : 1***
Think of it this way: I need more rands to buy a pound (**£**) than to buy a dollar (***$***), which means the pound is more expensive.
Hence I need more dollars to buy a pound.

4. FALSE 2

Explanation: $\mathbf{A} = \mathbf{P}\left(1 + \frac{r}{100}\right)^n$:

$\mathbf{A}$ is the initial amount invested, plus the interest earned, i.e. it is the final amount of the investment, not just the interest.
$\mathbf{P}$ is the initial amount invested.
n is the number of years the interest is calculated over.
r is the interest rate per annum, expressed as a percentage.

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5. A 2

Explanation: ***$ 140 x R 8,60 = R 1 204***

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6. A 4

Explanation: ***$ 1 100 x R 9,75 = R 10 725***
R 10 725 ÷ R 17,23 = £ 622,46

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7. B 4

Explanation: Use the Compound Decrease Formula with ...
$\mathbf{P} = 9\,500;\quad r = 11;\quad n = 9$
Now …

$$\mathbf{A} = \mathbf{P}\left(1 - \frac{r}{100}\right)^n$$

$$= 9\ 500\left(1 - \frac{11}{100}\right)^9$$

$$= 9\ 500 \times (0,89)^9$$

$$= 3\ 328,39$$

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8. A 4

Explanation:

$$\mathbf{A} = \mathbf{P}\left(1 + \frac{r}{100}\right)^n$$

$$\therefore \mathbf{A} = 46\,000\,000\left(1 + \frac{1,2}{100}\right)^{10}$$

$$\therefore \mathbf{A} = 46\,000\,000\,(1,012)^{10}$$

$$\therefore \mathbf{A} = 46\,000\,000\,(1,126\ldots)$$

$$\therefore \mathbf{A} = 51\,827\,821,783\ldots$$

$$\therefore \mathbf{A} \approx 52\,000\,000$$

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9. C 2

Explanation: ***P 1 000 ÷ R 1 400 = 0,714***
Hence for every rand, I will get ***P 0,714***, that is, the exchange rate ***R : P = 1 : 0,714***
The exchnage rate cannot be ***0,714 : 1***, as this implies I will get more pula for rands, which is not the case a the pula is stronger than the rand.

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10. 7 200 3
R 7 200
7 200,00
R 7 200,00

Explanation: In $\mathbf{A} = \mathbf{P}\left(1 + ni\right)$: $\mathbf{P} = 4\ 500$

$n = 8$

$i = \frac{7{,}5}{100} = 0{,}075$

Now:

$$\mathbf{A} = 4\ 500\left(1 + \left(8\right)\left(0{,}075\right)\right)$$

$$\therefore \mathbf{A} = 7\ 200$$

R 7 200 can be drawn from the account after **8** years.

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11. 6 500
R 6 500
6 500,00
R 6 500,00 6

Explanation: Let $\mathbf{P} = x$, then $\mathbf{A} = \left(x + 2\ 990\right)$.

In $\mathbf{A} = \mathbf{P}\left(1 + ni\right)$: $\mathbf{P} = x$

$\mathbf{A} = x + 2\ 990$

$n = 10$

$i = \frac{4{,}6}{100} = 0{,}046$

Now:

$$x + 2\ 990 = x\left(1 + \left(10\right)\left(0{,}046\right)\right)$$

$$\therefore x + 2\ 990 = x\left(1{,}46\right)$$

$$\therefore x + 2\ 990 = 1{,}46x$$

$$\therefore 0{,}46x = 2\ 990$$ [x subtracted from both sides]

$$\therefore x = 6\ 500$$

The initial amount invested **10** years ago was **R 6 500**.

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12. 33 223 4

Explanation: The **23 688** residents increases annually at a rate of 7%.
This increase must be calculated over **5** years.
Therefore, the following values must be substituted
into the Compound Increase Formula:
$\mathbf{A} = 23\ 688;\ \ r = 7;\ \ n = 5$

Now …

$$\mathbf{A} = \mathbf{P}\left(1 + \frac{r}{100}\right)^n$$

$$= 23\ \ 688\left(1 + \frac{7}{100}\right)^5$$

$$= 23\ \ 688 \times (1{,}09)^5$$

$$= 33\ \ 223{,}65$$

$$\approx 33\ \ 223 \text{ people}$$

13. (1) $\mathbf{R\ 3\ 488{,}00}$ 4

(2) $\mathbf{R\ 145{,}33}$

Explanation: In $A = P\left(1 + in\right)$: $P = 3\ 200$

$n = 2$

$r = 4{,}5 \div 100 = 0{,}045$

(1) $A = P\left(1 + in\right)$

$= 3\ 200\left(1 + 0{,}045(2)\right)$

$= 3\ 200 \times 1{,}09$

$= 3\ 488{,}00$

The total amount of repayments is $\mathbf{R\ 3\ 488{,}00}$.

(2) Monthly instalments $= A \div$ number of months

$= R\ 3\ 488{,}00 \div 24$ [24 months in 2 years]

$= R\ 145{,}333\ldots$

$\approx R\ 145{,}33$

14. (1) $\mathbf{R\ 4\ 170{,}50}$ 4

(2) $\mathbf{R\ 231{,}69}$

Explanation: (1) $A = P\left(1 + in\right)$

$= 3\ 800\left(1 + 0{,}065(1{,}5)\right)$ [18 months is $1{,}5$ years]

$= 3\ 800 \times 1{,}0975$

$= 4\ 170{,}50$

The total amount of repayments is $\mathbf{R\ 4\ 170{,}50}$.

(2) Monthly instalments $= A \div$ number of months

$= R\ 4\ 170{,}50 \div 18$

$= R\ 231{,}694\ 444\ldots$

$\approx R\ 231{,}69$

15. (1) 18 4

(2) 3

(3) $\mathbf{R68\ 921}$

Explanation: $r = 18$, $n = 3$, $P = 125\ 000$ and A will be the value of the computer after 3 years.

Therefore …

$$A = P\left(1 - \frac{r}{100}\right)^{n}$$

$$= 125\ 000\left(1 - \frac{18}{100}\right)^{3}$$

$$= 125\ 000 \times (0{,}82)^{3}$$

$$= 68\ 921$$