Stretch and challenge Sequence tasks

Question 1:

The first three terms of an arithmetic sequence are $\frac{2}{3}$, $1\frac{1}{3}$, 2

1) Write an expression in terms of *n* for the *n*th term.
2) Is 15 a term in the sequence? Explain your answer.

Question 2:

Which of the sequences below will be the first to be greater than 250?

1) 10, 14, 18, 22 ….
2) 3, 11, 19, 27 .....
3) 2, 8, 14, 20 …..

Question 3:

You own a taxi company that charges the following:

- £3.50 for calling the cab
- 20p for every minute of journey time

1) Work out a formula for the cost of a journey that's *n* minutes long.
2) Use your formula to work out the price a journey that lasts 2 hours.

Stretch and challenge Sequence tasks - Solutions

Question 1:

The first three terms of an arithmetic sequence are ⅔, 1⅓, 2

1. Write an expression in terms of *n* for the *n*th term.
2. Is 15 a term in the sequence? Explain your answer.

1. Express as improper fractions: ⅔, 4/3, 6/3

   Adding ⅔ each time so ⅔n

   CHECK: n = 1, 2, 3 … Sequence = 2/3, 4/3, 6/3 ….

2. ⅔n = 15 Multiply both sides of the equation by 3 to elimiate the denominator
   2n = 15 x 3 = 45 Divide both sides of the equation by 2
   n = 22.5

So 15 is NOT a term in the sequence as n MUST be a whole number

Question 2:

Which term in the sequences below is the first to be greater than 250?

1) 10, 14, 18, 22 ….
2) 3, 11, 19, 27 .....
3) 2, 8, 14, 20 …..

1) Sequence is 4n + 6 = 250, 4n = 244, n = 61. So 61st term = 250
2) Sequence is 8n – 5 = 250, 8n = 255, n = 31.875. So 32nd term = 251. This is the first term greater than 250 for this sequence.
3) Sequence is 6n – 4 = 250, 6n = 254, n = 42.33. So 43rd term = 254. This is the first term greater than 250 for this sequence.

So (the 32nd term in) the second sequence is the first term to be greater than 250.

Question 3:

You own a taxi company that charges as follows:

- £3.50 for calling the cab
- 20p for every minute of journey time

1) Work out a formula for the cost of a journey that's ***n*** minutes long
2) Use your formula to cost a journey of 2 hours

1) Cost = 0.2n + £3.50 where n is the number of minutes.

2) n = 120 minutes, Price = £0.20 x 120 + £3.50
= £24 + £3.50
= £27.50