WORD PROBLEMS: LINEAR EQUATIONS.

1. Kate took 5 hours to travel the 250km from Auckland to Taupo.
   Her average speed for the 1st 3 hours is *v* km/h
   Her average speed for the last 2 hours was **10 km/h less** than for the 1st 3 hours.
   Find her average speed during the 1st 3 hours of the trip.

2. My son is 31 years younger than me.
   In 1 year's time, my son's age will be one quarter of my current age.
   How old am I now?

3. A field is length *x* m and the width is 12m less.
   If I add 30m to the length and the width, the perimeter doubles.
   Find the original dimensions of the field.

4. A chocolate shake costs $2 less than a smoothie.
   If 5 chocolate shakes and 3 fruit smoothies cost $30, find the cost of a smoothie.

5. If Jo walks 6km at *x* km/h and 10 km at (*2x*) km/hour her journey takes a total of 2 hours.
   Form an equation and solve it to find *x*.

<u>Applications. Linear equations</u> ANSWERS

1. Kate took 5 hours to travel the 250km from Auckland to Taupo.
   Her average speed for the 1st 3 hours is v km/h
   Her average speed for the last 2 hours was 10 km/h less than for the 1st 3 hours.
   Find her average speed during the 1st 3 hours of the trip.

Let speed for 1st 3 hours be v km/h so distance = speed × time = 3v
Distance for 2nd 2 hours = 2(v – 10)
Total dist = 2v – 20 + 3v = 250
*   5v   = 270*
*   v   = 54 km/h*

2. My son is 31 years younger than me. In 1 year's time, my son's age will be one quarter of my current age. How old am I now?

Let my age = x so son is x – 31
When I am x + 1 his age is x – 30 and is ¼ of my current age = x/4
$$\frac{x}{4} = x - 30$$
x = 4x – 120
120 = 3x
x = 40

3. A field is length *x* m and the width is 12m less. If I add 30m to the length and the width, the perimeter doubles. Find the original dimensions of the field.

Length = x width = x – 12   so perimeter = 2(2x – 12) = 4x – 24
If length = x + 30 and width = x + 18 perimeter = 2(2x + 48) = 4x + 96
If this is doubled then
4x + 96 = 2(4x – 24)
4x + 96 = 8x – 48
144   = 4x
*   x   = 36 m*
length = 36 m, width = 24 m

4. A chocolate shake costs $2 less than a smoothie. 5 chocolate shakes and 3 fruit smoothies cost $30. Find the cost of a smoothie.

Let choc shake costs x,   smoothie costs x + 2
5x + 3(x + 2) = 30
8x   + 6   = 30
*   8x = 24*
*   x = 3   choc shake = $3   smoothie = $5*

5. If Jo walks 6km at *x* km/h and 10 km at (*2x*) km/hour her journey takes a total of 2 hours. Form an equation and use it to solve it to find *x*.

Time = 6 + 10   = 2   so   6 + 5 = 2
*   x   2x   x   x*
*   so 11   = 2   so x =   11   = 5.5 km/h*
*   x   2*