Name: _____   Date: _____

| Learning Goal 4.1 | I can generalize a pattern using linear relations. |

Example An airplane is cruising at a height of 10 000 metres. It descends to land. This table show the height of the plan every minute after it began its descent. The height of the plan changes at a constant rate.

a. Write an **expression** for the height in terms of the time since the plane began its descent.

Time (t minutes)	Height (h metres)
0	10 000
1	9 700
2	9 400
3	9 100
4	8 800

$+1$ -300
$+1$ -300
$+1$ -300
$+1$ -300
$+1$ -300

→ a mathematical statement without an equal sign

$10000 - 300t$

↑ initial condition   ↑ descends $300\,m/min.$

b. Write an **equation** that relates the height of the plane to the time since it began its descent.

↳ 2 expressions connected by an equal sign

$$h = 10\,000 - 300t$$

c. What is the height of the plane after 15 minutes?

t value — replace t with 15 and simplify

$h = 10\,000 - \underline{300(15)}$
$= 10\,000 - 4500$
$= 5500\ m$ ← don't forget the units.

The height of the plane is 5500m after 15 min.

d. How long after beginning its descent does the plane land?

⇒ the height of the plane is 0m

$h = 10\,000 - 300t$
$0 = 10\,000 - 300t$
$-10000 \quad -10\,000$
$\dfrac{-10000}{-300} = \dfrac{-300t}{-300}$
$33.\overline{3} = t$

It lands after $33.\overline{3}$ min, or 33min and 20 seconds

↑ $\frac{1}{3}$ of 60

Assignment   p. 159 #11-16   Quiz Next Day!

Example I was out one night and needed to take a cab home. The company I called charges a flat fee of $4.50 and then $2.50 per kilometre.

a. Write an **expression** for the fare in terms of the fixed cost and the cost per kilometre.

no =

let k = the number of km travelled

flat fee → 4.50 + 2.50k ⤹ price per km

b. Write an **equation** that relates the fare to the distance travelled.

let f = the total fare of the cab ride

$$f = 4.50 + 2.50k$$

c. What is the fare for an 11 km ride?

k = 11   f = 4.50 + 2.50(11)
                    = 4.50 + 27.50
                    = $32

The fare will be $32.00.

d. How many kilometres would I have to travel before my fare was $50.00?

f = 50

$$50 = 4.50 + 2.50k$$
$$-4.50 \quad -4.50$$
$$\frac{45.50}{2.50} = \frac{2.50k}{2.50}$$
$$18.2 = k$$

You would need to travel 18.2 km for the fare to be $50.00