

Grade 8 Mathematics Worksheet

Functions and algebraic expressions

Questions:

1. The United Nations are very involved in Africa with relief projects. They usually fly over a UN base and then drop supplies from a plane.



As the supplies fall to the ground, the distance (d) in feet above the ground t seconds after it left the plane is given by the formula $d = 1000 - 12t^2$

- a) From what height above the ground are the supplies dropped?
- b) How long will it take for the supplies to reach the ground?
- c) At what rate are the supplies falling to earth? (Hint: draw up a table and look for a pattern).

Grade 8 Mathematics Worksheet

Solution

1. a) 1000ft.

b)

$$d = 1000 - 12t^2 \Rightarrow 1000 = 12t^2 \Rightarrow \frac{12t^2}{12} = \frac{1000}{12} \Rightarrow t^2 = 83\frac{1}{3} \Rightarrow t = \sqrt{83\frac{1}{3}} = 9.1287s$$

c) The rate at which the supplies fall:

t	1	2	3	4	5	6	7	8	9
D	988	952	892	808	700	568	412	232	28
Difference	36	60	84	108	132	156	180	204	
Second difference		24	24	24	24	24	24	24	

Each second the rate increases by 24m. So the rate is $24t$ where t is the amount of seconds that lapsed after the supplies have left the plane.

We find this height if $t = 0$ in $d = 1000 - 12t^2$.

This will eventually become the idea of the gradient or the derivative in later years of learning.