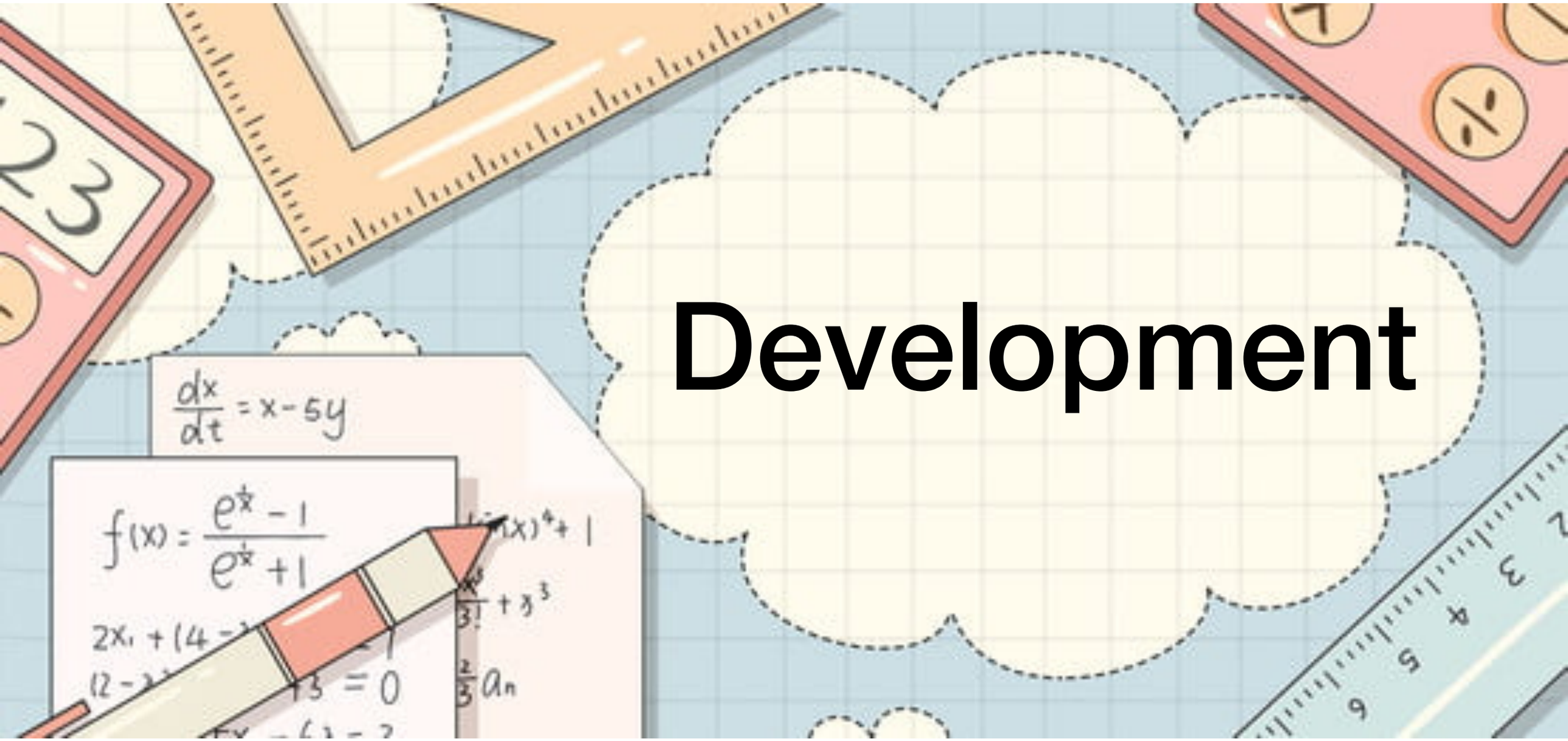
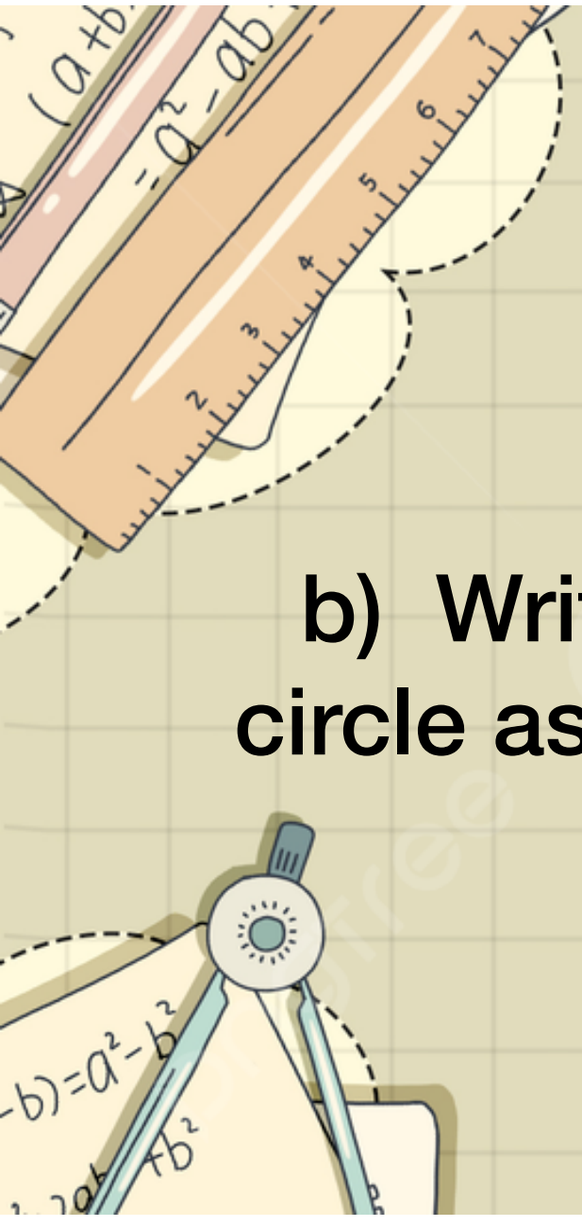
Problem

A circular pizza, initially measuring 12 inches in radius, is taken out of the oven. As it cools down, it contracts, and its radius decreases at a rate of 0.3 inches per seconds.


Development

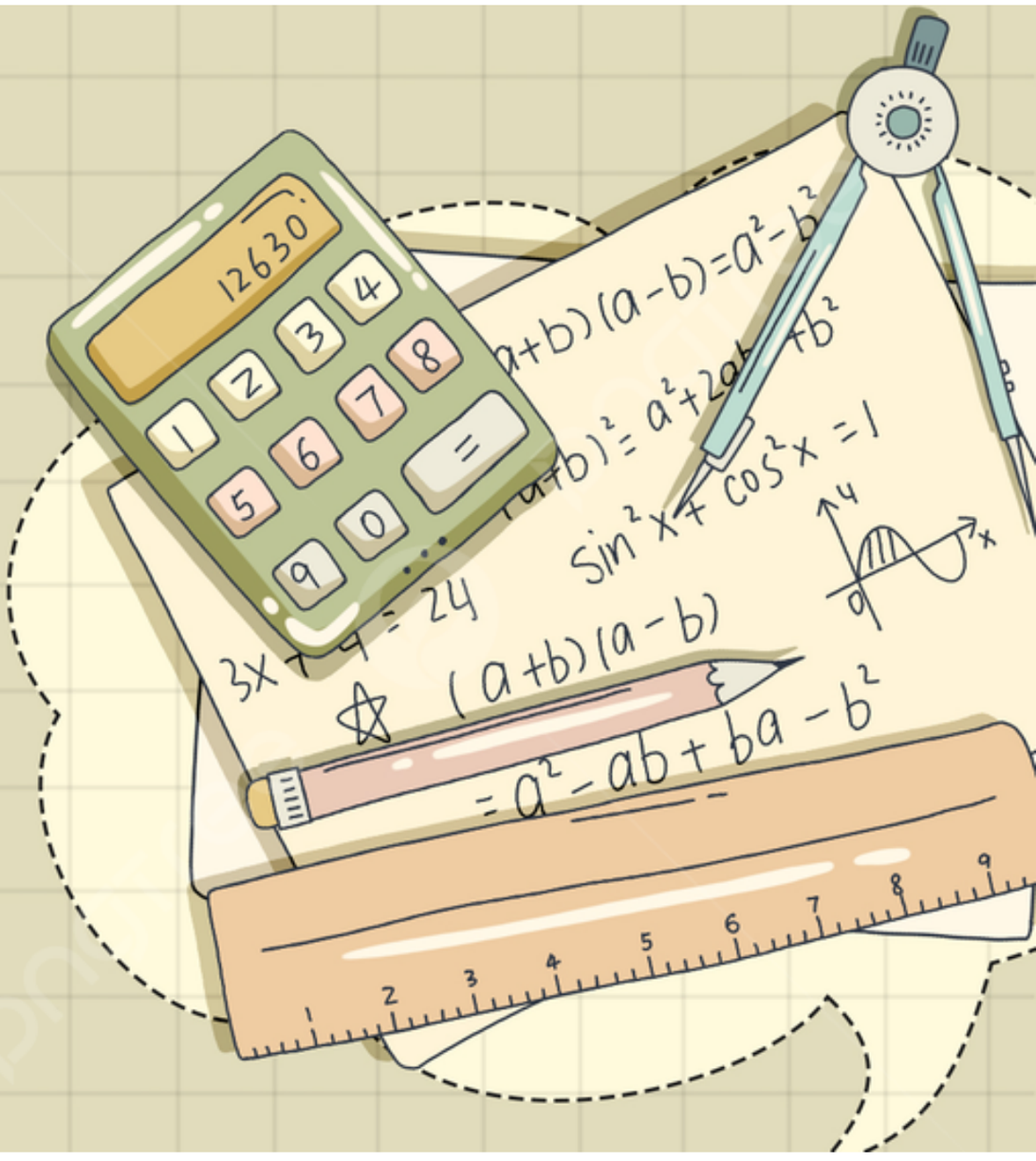
a) Write the area of the circle as a function of the radius r.

$$A(r) = \pi \times r^2$$



b) Write the radius of the circle as a function of time t.

$$r(t) = 12 - (0{,}3\ t)$$



C) What is the radius of the circle after 4 minutes? What is the radius of the circle after 3.5 minutes?

$r(t) = 12 - (0.3 \times 4)$

$= 10.8$

$r(t) = 12 - (0.3 \times 3.5)$

$= 10.95$

D) determine the area of the circle after 4 minutes and 3.5 minutes.

A(r)= π x 10.8^2

= 116.64 π

A(r)= π x 10.95^2

= 119.90 π

e) Determine a function that represents area as a function of time t.

$A(r(t))= \pi \times (12- (0.3 \times t))^2$

$A(r(t))= \pi \times (0.09x^2-7.2x+144)$

F) Use the result of part (e) to determine the area of the circle after4 minutes and 3.5 minutes.

4 $A(r(t))= \pi \times (0.09x^2-7.2x+144)$

$A(r(t))= \pi \times 116.64$

3.5 $A(r(t))= \pi \times (0.09x^2-7.2x+144)$

$A(r(t))= \pi \times 119.90$

G) Compute the average rate of change of the area of the circle from 4 minutes to 3.5 minutes.

$$\frac{116.64\pi-119.9\pi}{4-3.5} = -6.52\pi$$

H) Which values are possible in this problem ?

$0 < x < 12$