

PRACTICE

Tue 22 JAN 2019

1) Given $f(x) = -\frac{1}{3}(x-2)^2 - 5$. Write the expressions of

a) $g(t) = f(6t) = -\frac{1}{3}(\underline{6t} - 2)^2 - 5$

b) $h(t) = g(t+3)$

c) $r(t) = -5h(t) + 25$

$$(3.5)^2 = 3^2 \cdot 5^2$$
$$[2(1)]^2 = 2^2 (1)^2$$

Ans : a) $g(t) = f(\underbrace{ct}_{\text{that's 70\% of } t}) = -\frac{1}{3}(\underbrace{6t}_{\text{that's 70\% of } t} - 2)^2 - 5 =$

30% is simplifying $\Rightarrow -\frac{1}{3}[6 \cdot (t + a)]^2 - 5 = -\frac{1}{3}[6(t - \frac{1}{3})]^2 - 5$

We want a to be $= t$

$$6 \cdot (t + a) = 6t - 2 \quad \text{has to be}$$

$$\cancel{6t} + 6a = \cancel{6t} - 2 \Rightarrow 6a = -2 \Rightarrow a = \frac{-2}{6} = \underline{\underline{-\frac{1}{3}}}$$

$$= -\frac{1}{3} \cdot 6^2 \cdot (t - \frac{1}{3})^2 - 5 =$$

$$= -\frac{36}{3} (t - \frac{1}{3})^2 - 5 = \underline{\underline{-12(t - \frac{1}{3})^2 - 5}}$$

$$b) h(t) = g(t+3) = -12\left(t - \frac{1}{3} + 3\right)^2 - 5$$

From a)

$$g(t) = -12\left(t - \frac{1}{3}\right)^2 - 5$$



$$= -12\left(t+3 - \frac{1}{3}\right)^2 - 5$$

$$= -12\left(\frac{t+3}{1} - \frac{1}{3}\right)^2 - 5 = \underline{-12\left(t + \frac{8}{3}\right)^2 - 5}$$

$$t+3 - \frac{1}{3} = t + \left(\frac{3}{1} - \frac{1}{3}\right)$$

$$\therefore = t + \frac{3 \cdot 3}{3 \cdot 1} - \frac{1}{3} = t + \frac{9}{3} - \frac{1}{3} = t + \frac{9-1}{3} = t + \frac{8}{3}$$

$$c) \quad r(t) = -5h(t) + 25 = -5\left[-12\left(t + \frac{8}{3}\right)^2 - 5\right] + 25 =$$

It was

$$h(t) = -12\left(t + \frac{8}{3}\right)^2 - 5$$

$$\begin{aligned} &= +5 \cdot 12\left(t + \frac{8}{3}\right)^2 + 5 \cdot 5 + 25 \\ &= \boxed{60\left(t + \frac{8}{3}\right)^2 + 50} \end{aligned}$$

HOMEWORK (PRACTICE FOR TEST)

1) Given $f(x) = x^2 - 1$. Write the expressions of the following functions:

a) $g(t) = f(t-1)$

b) $h(x) = g(3t)$

c) $r(t) = -\frac{1}{9}h(t) + \frac{8}{9}$

Ans: a) $g(t) = (t-1)^2 - 1$

b) $h(x) = 9\left(t - \frac{1}{3}\right)^2 - 1$

c) $r(t) = -\left(t - \frac{1}{3}\right)^2 + 1$

(cont.)

2) Given $h(t) = (t-7)^2$, write the expressions of

a) $f(x) = h(7x) - 7$

b) $g(x) = f(3x-2)$

c) $r(x) = -\frac{5}{49}g(x) + 7$

Aus: a) $f(x) = 49(x-1)^2 - 7$

b) $g(x) = 541(x-1)^2 - 7$

c) $r(x) = -45(x-1)^2 + \frac{44}{7}$

...