

# PRACTICE

Thu 17 JAN 2019

1. Given  $f(x) = 2(x-3)^2 - 1$ . Evaluate & simplify

$$a) f(3x) = 2(3x-3)^2 - 1 = 2[3(x-1)]^2 - 1 = \underline{18(x-1)^2 - 1}$$

$$b) f(\underline{x+3}) = 2(\underline{x+3-3})^2 - 1 = \underline{2x^2 - 1}$$

$$c) f(3x-3) = 2(3x-3-3)^2 - 1 = 2(3x-6)^2 - 1 = 2[3(x-2)]^2 - 1$$

$$d) f\left(\frac{3x+3}{\sqrt{2}}\right) = 2\left(\frac{3x+3}{\sqrt{2}} - 3\right)^2 - 1 = \underline{18(x-2)^2 - 1}$$

$$d) f\left(\frac{3x+3}{\sqrt{2}}\right) = 2\left(\frac{3x+3}{\sqrt{2}} - 3\right)^2 - 1 = 2\left(\frac{3x+3}{\sqrt{2}} - \frac{3\sqrt{2}}{\sqrt{2}}\right)^2 - 1$$

$$= 2\left(\frac{3x + 3 - 3\sqrt{2}}{\sqrt{2}}\right)^2 - 1 =$$

$$= \cancel{2} \frac{(3x + 3 - 3\sqrt{2})^2}{\cancel{2}} - 1 = [3(x + 1 - \sqrt{2})]^2 - 1$$

$$= \boxed{9(x + 1 - \sqrt{2})^2 - 1}$$

2. Given  $f(t) = 10 + 2t - 5t^2$ . Evaluate & simplify

a)  $f(x) = \underline{10 + 2x - 5x^2}$

we'll rewrite  
this later

b)  $f(x-1) = 10 + 2(x-1) - 5(x-1)^2 = \underline{8 + 2x - 5(x-1)^2}$

c)  $f(3x+1) = 10 + 2(3x+1) - 5(3x+1)^2 = 12 + 6x - 5(3x+1)^2$

d)  $f\left(\frac{x}{2} - 10\right) = 10 + 2\left(\frac{x}{2} - 10\right) - 5\left(\frac{x}{2} - 10\right)^2 = -10 + x - 5\left(\frac{x}{2} - 10\right)^2$

3) Given  $g(x) = \left(x - \frac{3}{2}\right)^2 - 1$ . Evaluate & simplify

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

$$b) g\left(5t + \frac{3}{2}\right) = \left(5t + \frac{3}{2} - \frac{3}{2}\right)^2 - 1 = (5t)^2 - 1 = 25t^2 - 1$$

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

# HOMEWORK FOR FRI, 18 JAN 2019

1) Given  $r(z) = 3(z+3)^2 + 3$ . Evaluate & Simplify.

a)  $r(35)$

b)  $r(x-3)$

c)  $r(3z+1)$

d)  $r(z-9)$

2) Given  $f(x) = x^2$ , Write the expression of the following functions

a)  $g(t) = f(3t)$

b)  $h(z) = \frac{1}{2} f(z-1)$

c)  $r(x) = 5 f\left(\frac{x}{5}\right)$

d)  $s(x) = \frac{2}{9} g\left(\frac{x}{2} + 3\right) + 1$