

HOMEWORK SOLUTION

Fri 18 JAN 2018

$$1) r(2) = 3(2+3)^2 + 3$$

$$a) r(3s) = 3(\underline{3s} + 3)^2 + 3 = 3[3(s+1)]^2 + 3 =$$

$$b) r(\underline{x-3}) = 3(\underline{x-3} + 3)^2 + 3 = 3 \cdot 9(s+1)^2 + 3 = \underline{27(s+1)^2 + 3}$$
$$= \underline{3 \cdot x^2 + 3}$$

$$c) r(\underline{3z+1}) = 3(\underline{3z+1} + 3)^2 + 3 = 3(3z+4)^2 + 3 = \text{NOT VERTEX FORM!}$$

$$= 3 \left[3 \left(z + \frac{4}{3} \right) \right]^2 + 3 =$$

$$= 3 \cdot 9 \cdot \left(z + \frac{4}{3} \right)^2 + 3 = \boxed{27 \left(z + \frac{4}{3} \right)^2 + 3}$$

Goal of simplifying is writing it like $\rightarrow$

$$d) r(\underline{z-9}) = 3(\underline{z-9} + 3)^2 + 3 = \boxed{3(z-6)^2 + 3}$$

$\rightarrow$ No further simplification needed: It's already in VERTEX FORM

2) Given $f(x) = x^2$.

a) $g(t) = f(3t) = (3t)^2 = 9 \cdot t^2$

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

c) $r(x) = 5 f\left(\frac{x}{5}\right) = 5 \left(\frac{x}{5}\right)^2 = 5 \cdot \frac{x^2}{5^2} = \frac{x^2}{5} = \frac{1}{5} \cdot x^2$

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

Reminder: $g(t) = 9t^2$

$$= 2\left(\frac{x}{2} + 3\right)^2 + 1 = 2\left[\frac{1}{2}(x+6)\right]^2 + 1$$
$$= 2 \cdot \frac{1}{4} (x+6)^2 + 1 = \frac{1}{2} (x+6)^2 + 1$$