Review

① Given $f(x) = \begin{cases} -3 & \text{if } x < -2 \\ 2x+4 & \text{if } -2 \leq x < 2 \\ -(x-3)^2 + 1 & \text{if } x \geq 2 \end{cases}$

(a) Evaluate:

$$f(-2) + 3f(2) + \left[f(0)\right]^2$$

(b) Sketch $f(x)$

(a) $f(-2) = 2(-2) + 4$
$ = 0$

$f(2) = -(2-3)^2 + 1$
$ = -1 + 1$
$ = 0$
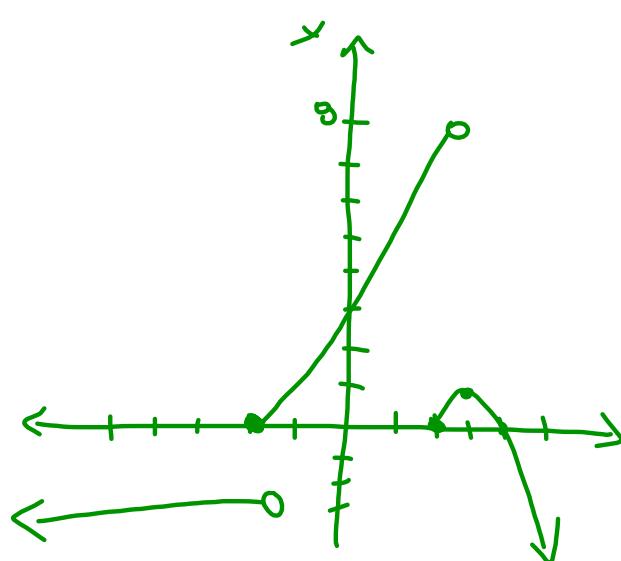
$f(0) = 2(0) + 4$
$ = 4$

$= 0 + 3(0) + (4)^2$

$\boxed{= 16}$

① $y = -3$ ② $y = 2x + 4$ ③ $y = -(x-3)^2 + 1$

x	y
-2	0
2	8

$V(3, 1)$

x	y
2	0

ex. 2/ $f(x) = x+3$　　$g(x) = 2-x^2$　　$h(x) = 4x^2$

(a) Evaluate $(f+g)(-1)$

(b) Evaluate $f_g(3w)$

(c) Evaluate $h[f(0)]$

(d) Evaluate $g \circ h \circ f(-1)$

(e) Express in simplest form: $g(-2y) + 3f(y^2+1) + h(y-2)$

(a) $(f+g)(-1)$
$= f(-1) + g(-1)$
$f(-1) = -1+3$
　　$= 2$　　$g(-1) = 2-(-1)^2$
　　　　　　　　　$= 1$
　　$= 2+1$
　　$\boxed{= 3}$

$h(x) = 4x^2$　$f(x) = x+3$
(c) $h[f(0)]$
　　$f(0) = 0+3$
　　　　　$= 3$
　$h(3) = 4(3)^2$
　　　　$= \underline{36}$

(b) $f_g(3w)$
$[f(3w)] \times [g(3w)]$
$f(3w) = 3w+3$
$g(3w) = 2-(3w)^2$
　　　$= 2-9w^2$
$(3w+3)(2-9w^2)$
$6w - 27w^3 + 6 - 27w^2$

(d) $g \circ h \circ f(-1)$
$f(-1) = -1+3 = 2$
$h(2) = 4(2)^2 = 16$
$g(16) = 2 - (16)^2$
　　　$= \underline{-254}$

e) $g(-2y) = 2-(-2y)^2$
　　　　$= 2-4y^2$

$f(y^2+1) = (y^2+1)+3$
　　　　　$= y^2+4$

$h(y-2) = 4(y-2)^2$
　　　$= 4(y^2-4y+4)$
　　　$= 4y^2 - 16y + 16$

$= (2-4y^2) + 3(y^2+4) + (4y^2-16y+16)$
$= 2 - 4y^2 + 3y^2 + 12 + 4y^2 - 16y + 16$
$\boxed{= 3y^2 - 16y + 30}$

3/ Given $f(x) = \sqrt{x}$ is

  — Stretched vertically by a factor of 3

  — Reflected in y-axis

  — Stretched horizontally by a factor of $\frac{3}{8}$

  — Shifted Left 7

  — Shifted up 3

What is new equation of $f(x)$??

$$f(x) = 3\sqrt{-\frac{8}{3}(x+7)} + 3$$

(b) If $(9, 3)$ is on $f(x)$, where is this point after transformations applied??

$$(x, y) \rightarrow \left(-\frac{3}{8}x - 7, \ 3y + 3\right)$$

$$(9, 3) \rightarrow \left(\overset{-\frac{27}{8} - \frac{56}{8}}{-\frac{3}{8}(9) - 7}, \ 3(3) + 3\right)$$

$$\left(-\frac{83}{8}, 12\right) \ .$$

3/ Given $\dfrac{3\left(h(x)-2\right)}{3} = \dfrac{-12}{3}f\left(4x-20\right)+\dfrac{6}{3}$

$h(x)$ is a transformation of $f(x)$ ...

- Reflection in x-axis? **yes** $h(x)-2 = -4f\left[4(x-5)\right]$
- "   " y-axis? **No** $h(x) = -4f\left[4(x-5)\right]+4$
- Ver. Stretch? **× 4**
- H. Stretch? **$\dfrac{1}{4}$**
- H. shift? **Rt. 5**
- V. shift? **Up 4**

Test is Tuesday!!

Attachments

Example - Squaring a Binomial.avi

Worksheet - Expanding.pdf