

Unit 3 lesson 8

Pg 240 # 7-10, 8-9 (100, sketch one from each), Pg 1 of 3

7a) $y = f(2(x-4))$
 ↑ shift right 4
 horizontal compression factor $\frac{1}{2}$ (OR HC by 2)

b) $y = f(-(x+1)) - 1$ ← shift down 1
 ↑ reflection in y-axis
 ← shift left one

c) $y = f(3(x+4)) + 5$ ← up 5
 ↑ shift left 4.
 horizontal compression factor $\frac{1}{3}$ (or HC by 3).

d) $y = -2f(4(x-2))$ horizontal shift right 2.
 ↓ reflect in x-axis
 ↗ vertical stretch factor 2.
 ↘ horizontal compression factor $\frac{1}{4}$ (or HC by 4)

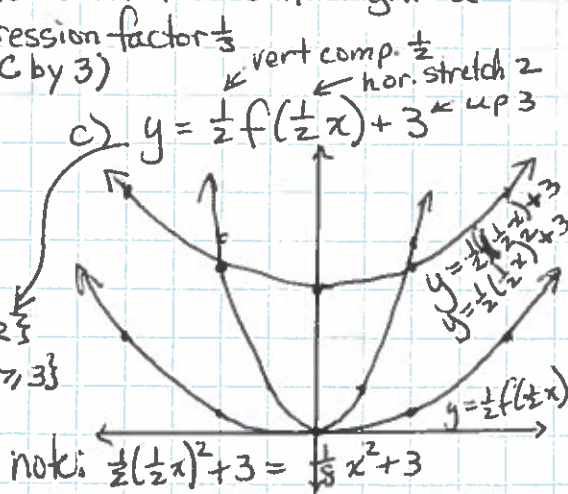
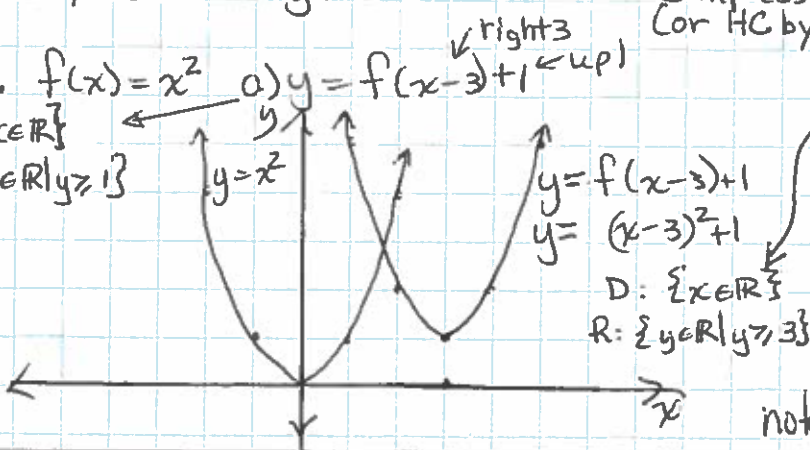
e) $y = f(-x+2)$
 $y = f(-(x-2))$
 ↑ reflection in y-axis
 ← shift right 2

f) $y = f(2x+8) - 4$
 $y = f(2(x+4)) - 4$ ← down 4
 horizontal compression factor $\frac{1}{2}$.
 (or HC by 2)

g) $y = f(4-x) + 5$
 $y = f(-(x-4)) + 5$ ← shift up 5.
 ↗ reflection in y-axis
 ↘ shift right 4

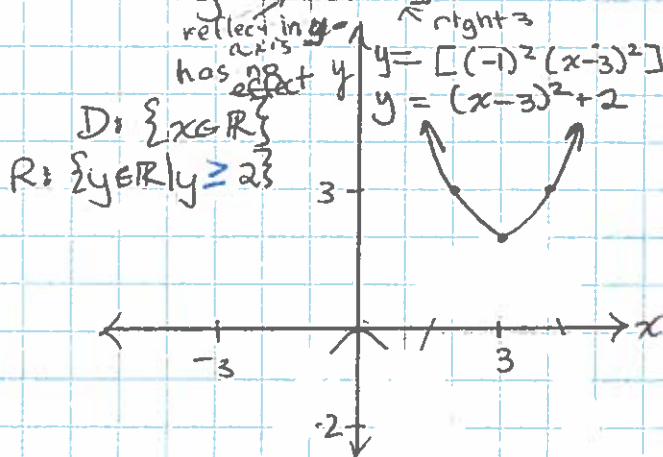
h) $y = f(3x-6) + 8$
 $= f(3(x-2)) + 8$ ← shift up 8.
 horizontal compression factor $\frac{1}{3}$ (or HC by 3)
 ↗ vert comp. $\frac{1}{3}$
 ↘ hor. stretch 2

8. $f(x) = x^2$
 D: $\{x \in \mathbb{R}\}$
 R: $\{y \in \mathbb{R} \mid y \geq 1\}$



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8e) $y = f(3-x) + 2$
 $y = f(-(x-3)) + 2$
 $y = [-1(x-3)]^2 + 2 \leftarrow \text{up } 2$
 reflect in y-axis
 has no effect
 right 3



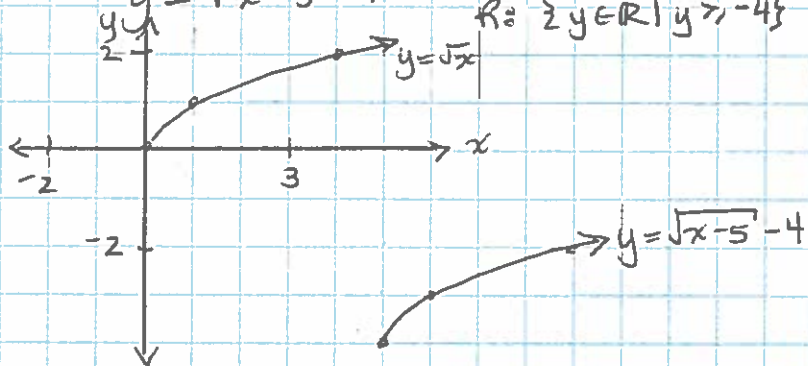
NOTE: 8b) $y = 2f(x+5) - 4$
 vert stretch factor 2
 shift left 5
 down 4

8d) $y = -f(2(x-2)) - 3$
 reflect in x-axis
 hor. comp. $\frac{1}{2}$, R2, D3

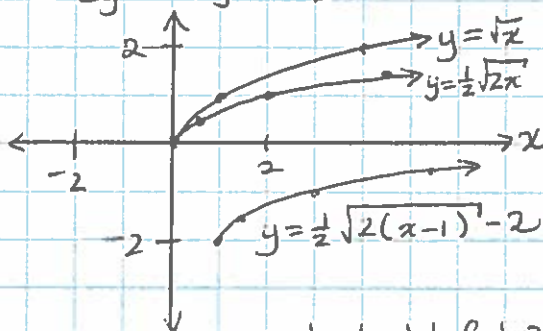
8f) $y = -\frac{1}{2}f(2(x+3)) - 2$
 reflect in x-axis
 vert comp. $\frac{1}{2}$
 hor. comp. $\frac{1}{2}$, left 3 down 2

9) $f(x) = \sqrt{x}$
 a) $y = f(x-5) - 4$
 $y = \sqrt{x-5} - 4$

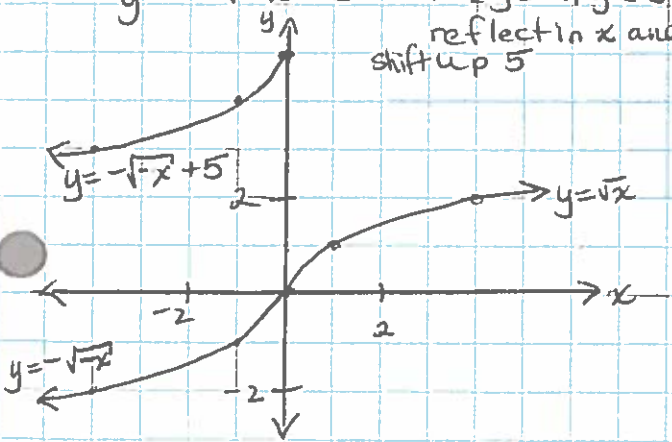
$x-5 \geq 0$
 $x \geq 5$
 D: $\{x \in \mathbb{R} \mid x \geq 5\}$
 R: $\{y \in \mathbb{R} \mid y \geq -4\}$



c) $y = \frac{1}{2}f(2(x-1)) - 2$
 $y = \frac{1}{2}\sqrt{2(x-1)} - 2$
 D: $\{x \in \mathbb{R} \mid x \geq 1\}$
 R: $\{y \in \mathbb{R} \mid y \geq -2\}$



e) $y = -f(x) + 5$ D: $\{x \in \mathbb{R} \mid x \leq 0\}$
 $y = -\sqrt{-x} + 5$ R: $\{y \in \mathbb{R} \mid y \leq 5\}$
 reflect in x and y axes,
 shift up 5



9b) $y = 3f(x+3) + 2$ - vert stretch factor 3
 - shift left 3, up 2
 D: $\{x \in \mathbb{R} \mid x \geq -3\}$
 R: $\{y \in \mathbb{R} \mid y \geq 2\}$

d) $y = 2f(3(x-3)) + 1$ vert str. factor 2
 hor. comp. factor $\frac{1}{3}$
 Right 3, up 1

D: $\{x \in \mathbb{R} \mid x \geq 3\}$ R: $\{y \in \mathbb{R} \mid y \geq 1\}$

f) $y = -2f(-(x-4)) - 3$
 reflect in x, y axes, vert stretch factor 2
 shift right 4, down 3.
 D: $\{x \in \mathbb{R} \mid x \leq 4\}$ R: $\{y \in \mathbb{R} \mid y \leq -3\}$

14. $y = -5(x-4)^2 + 80$

$y = -5f(x-4) + 80$, $f(x) = x^2$

a) reflect in x -axis, vertical stretch factor 5
shift right 4 and up 80 units

b) The maximum height of 80 is reached 4 seconds after the flare is fired upward.