# Unit 3 lesson 7

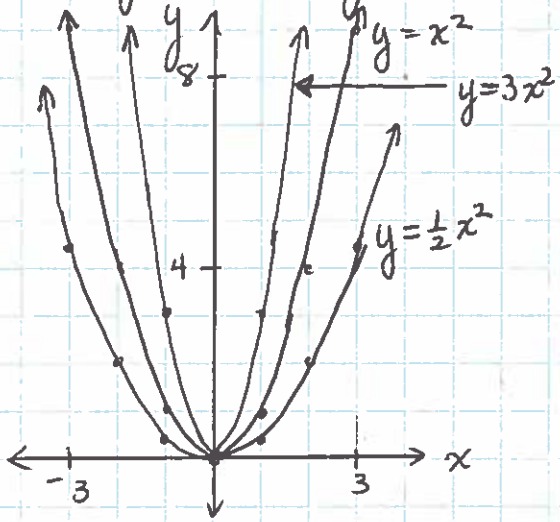
Pg 229 #3, 4ii, 5 e,o, 6 e,o, 7, 11 e,o

3a) $g(x) = 2f(x)$ $\quad h(x) = 3f(x)$

b) $g(x) = f(2x)$ $\quad h(x) = f(\frac{1}{4}x)$

4 ii) $y = x^2$, $y = 3x^2$, $y = \frac{1}{2}x^2$

a)




b) $y = 3x^2$ is a vertical stretch factor 3
$y = \frac{1}{2}x^2$ is a vertical compression factor $\frac{1}{2}$.

c) (0,0) is invariant

5 a) $y = 3f(x)$ vertical stretch factor 3

b) $y = \frac{1}{2}f(x)$ " compression factor $\frac{1}{2}$.

c) $y = 2f(x)$ " stretch factor 2.

d) $y = \frac{1}{3}f(x)$ " compression factor $\frac{1}{3}$.

e) $y = f(2x)$ horizontal compression factor $\frac{1}{2}$ [or horizontal compression by 2]

f) $y = f(\frac{1}{2}x)$ " stretch " 2

g) $y = f(4x)$ " compression " $\frac{1}{4}$.
↳ (or horizontal compression by 4).

6a)

| | transformation | vertical | horizontal |
|---|---|---|---|
| a) | $y = 3f(2x)$ | stretch factor 3 | compression factor $\frac{1}{2}$ (OR HC by 2) |
| b) | $y = \frac{1}{2}f(\frac{1}{3}x)$ | compression factor $\frac{1}{2}$ | stretch factor 3 |
| c) | $y = 4f(\frac{1}{2}x)$ | stretch factor 4 | stretch factor 2 |
| d) | $y = \frac{1}{3}f(3x)$ | compression factor $\frac{1}{3}$ | compression factor $\frac{1}{3}$ (OR HC by 3) |
| e) | $y = 2f(4x)$ | stretch factor 2 | compression factor $\frac{1}{4}$ (OR HC by 4) |
| f) | $y = 5f(\frac{1}{2}x)$ | " " 5 | stretch factor 2. |

Pg 229 # 7, 11 odd

7a) red $y = x^2$ blue $y = \frac{1}{2}f(x)$, $y = \frac{1}{2}x^2$ — vertical compression factor $\frac{1}{2}$

(note) error on scale in 7a graph

b) $f(x) = x+1$ $y = 2f(x)$, $y = 2(x+1)$, $y = 2x+2$ — vertical stretch factor 2

c) $f(x) = \sqrt{x}$ $y = 2f(x)$, $y = 2\sqrt{x}$ — vertical stretch factor 2

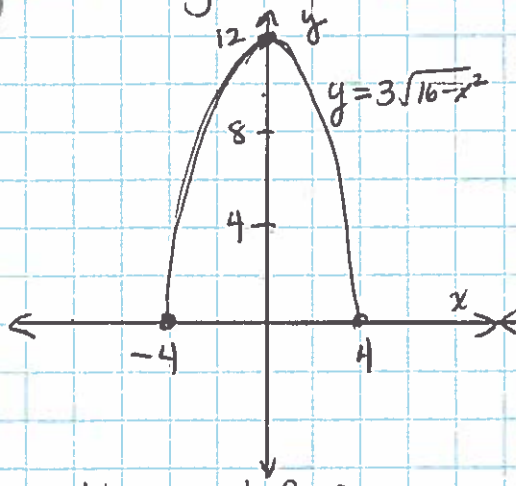
new function (image equation)

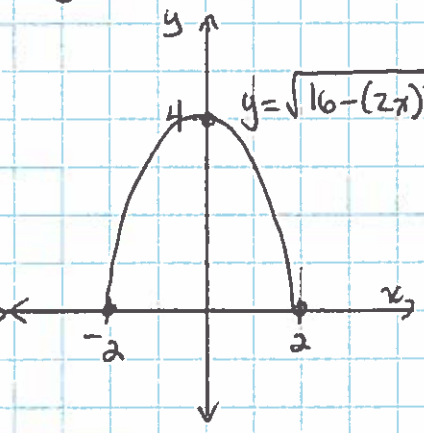
11. transformation.

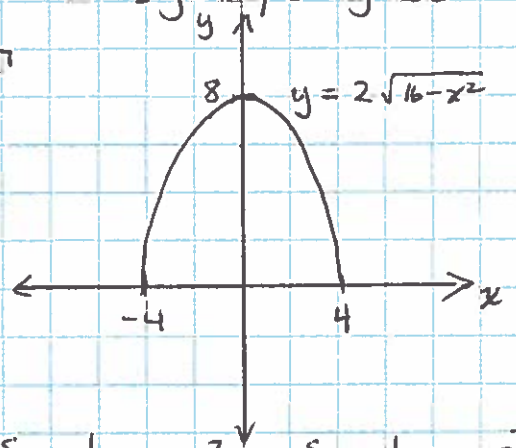
a) $y = 3f(x)$ $y = 3\sqrt{16-x^2}$ $D = \{x \in \mathbb{R} \mid -4 \le x \le 4\}$, $R = \{y \in \mathbb{R} \mid 0 \le y \le 12\}$

c) $y = f(2x)$ $y = \sqrt{16-(2x)^2}$ $D = \{x \in \mathbb{R} \mid -2 \le x \le 2\}$, $R = \{y \in \mathbb{R} \mid 0 \le y \le 4\}$

e) $y = 2f(x)$ $y = 2\sqrt{16-x^2}$ $D = \{x \in \mathbb{R} \mid -4 \le x \le 4\}$, $R = \{y \in \mathbb{R} \mid 0 \le y \le 8\}$




b) $y = \frac{1}{2}f(x)$ $y = \frac{1}{2}\sqrt{16-x^2}$ $D = \{x \in \mathbb{R} \mid -4 \le x \le 4\}$ $R = \{y \in \mathbb{R} \mid 0 \le y \le 2\}$

d) $y = f(\frac{1}{2}x)$ $y = \sqrt{16-(\frac{1}{2}x)^2}$ $D = \{x \in \mathbb{R} \mid -8 \le x \le 8\}$ $R = \{y \in \mathbb{R} \mid 0 \le y \le 4\}$

e) $y = f(4x)$ $y = \sqrt{16-(4x)^2}$ $D = \{x \in \mathbb{R} \mid -1 \le x \le 1\}$ $R = \{y \in \mathbb{R} \mid 0 \le y \le 4\}$