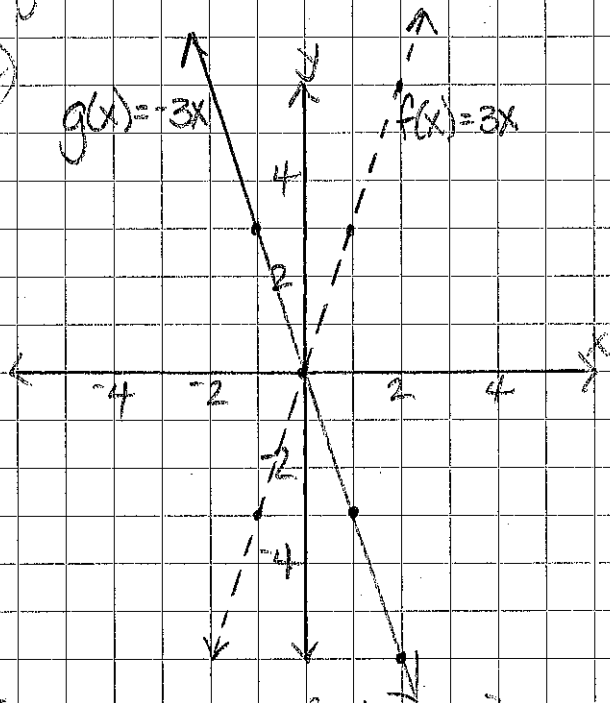


Pre-Calculus Math 12

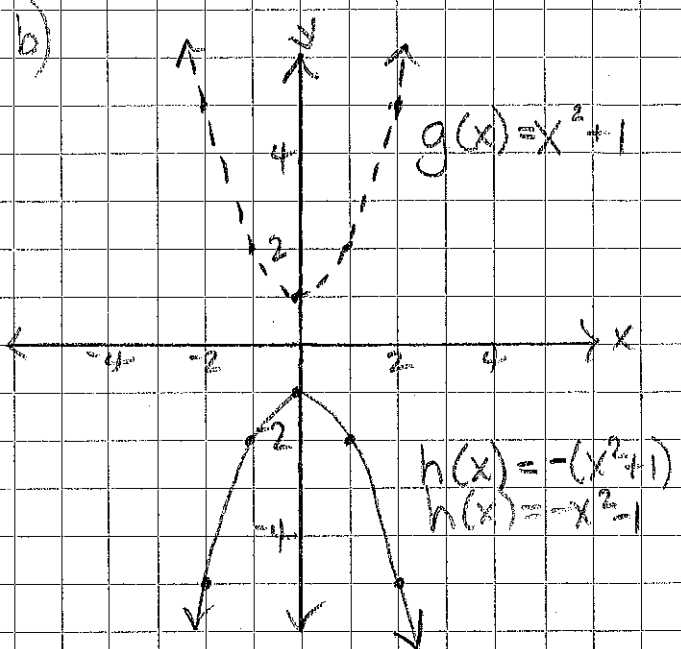
1.2
page 28 # 3-7, 9

3.a)



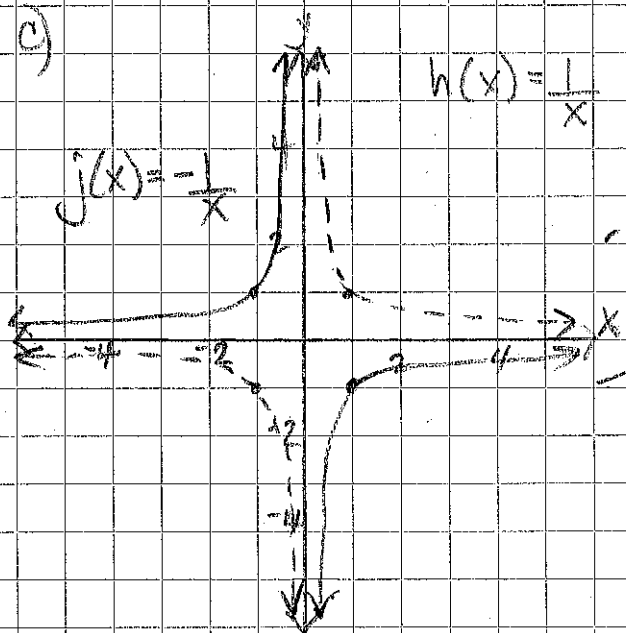
--- $f(x)$ domain $\{x | x \in \mathbb{R}\}$
 range $\{y | y \in \mathbb{R}\}$
 — $g(x)$ domain $\{x | x \in \mathbb{R}\}$
 range $\{y | y \in \mathbb{R}\}$

b)



--- $g(x)$ domain $\{x | x \in \mathbb{R}\}$
 range $\{y | y \geq 1, y \in \mathbb{R}\}$
 — $h(x)$ domain $\{x | x \in \mathbb{R}\}$
 range $\{y | y \leq -1, y \in \mathbb{R}\}$

c)

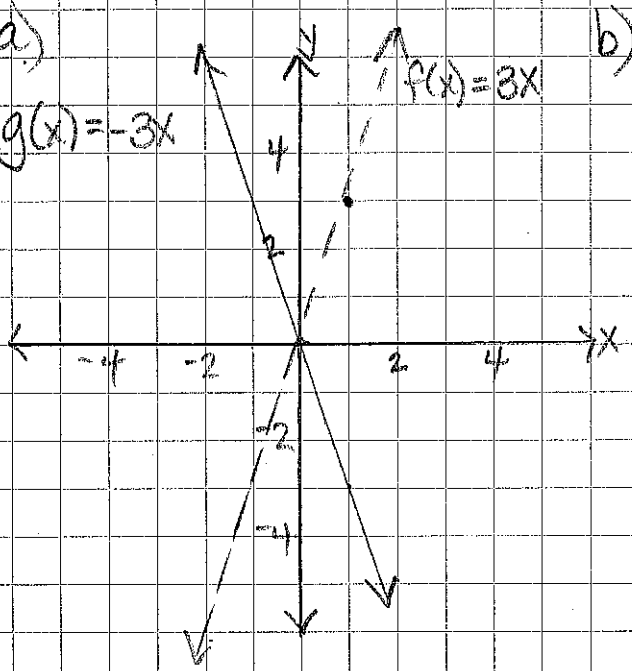


--- $h(x)$ domain $\{x | x \neq 0, x \in \mathbb{R}\}$
 range $\{y | y \neq 0, y \in \mathbb{R}\}$
 — $j(x)$ domain $\{x | x \neq 0, x \in \mathbb{R}\}$
 range $\{y | y \neq 0, y \in \mathbb{R}\}$

page 28 cont.

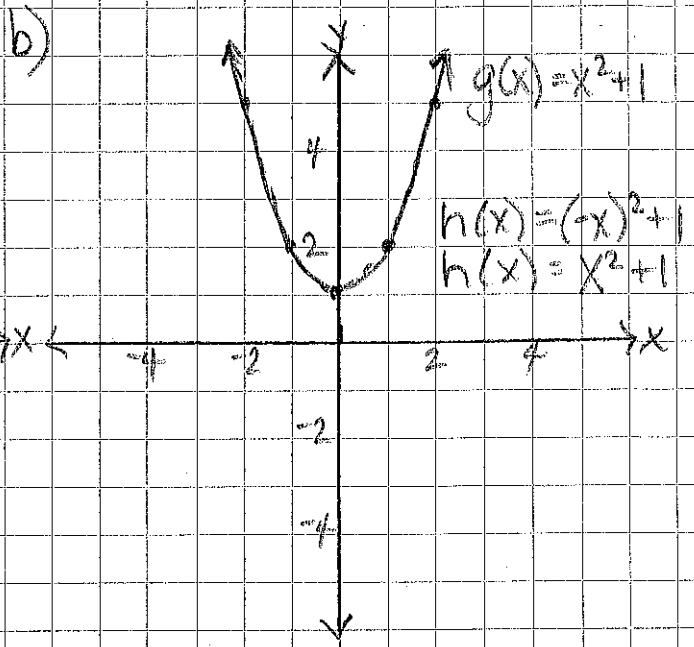
4. a)

$$g(x) = -3x$$



— $f(x)$ domain $\{x \mid x \in \mathbb{R}\}$
range $\{y \mid y \in \mathbb{R}\}$

— $g(x)$ domain $\{x \mid x \in \mathbb{R}\}$
range $\{y \mid y \in \mathbb{R}\}$

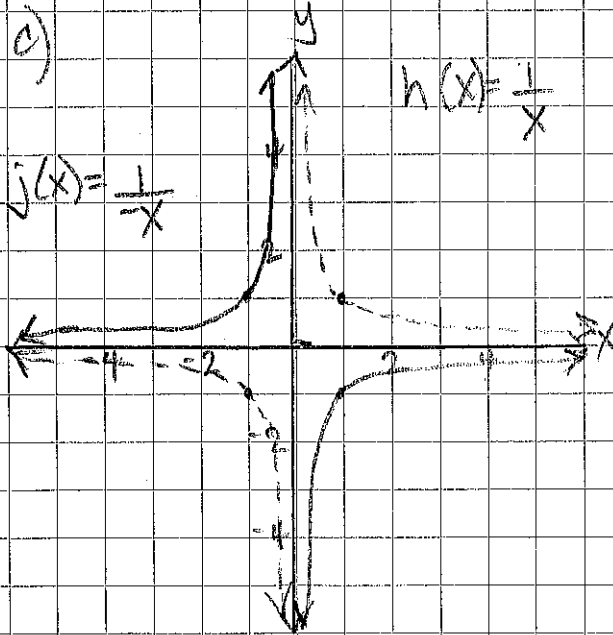


— $g(x)$ domain $\{x \mid x \in \mathbb{R}\}$
range $\{y \mid y \geq 1, y \in \mathbb{R}\}$

— $h(x)$ domain $\{x \mid x \in \mathbb{R}\}$
range $\{y \mid y \geq 1, y \in \mathbb{R}\}$

c)

$$j(x) = \frac{1}{x}$$



— $h(x)$ domain $\{x \mid x \neq 0, x \in \mathbb{R}\}$
range $\{y \mid y \neq 0, y \in \mathbb{R}\}$

— $j(x)$ domain $\{x \mid x \neq 0, x \in \mathbb{R}\}$
range $\{y \mid y \neq 0, y \in \mathbb{R}\}$

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5. a) $y = 4f(x)$

stretched vertically by factor 4
 $(x, y) \rightarrow (x, 4y)$

b) $y = f(3x)$

compressed horizontally by factor $\frac{1}{3}$
 $(x, y) \rightarrow (\frac{1}{3}x, y)$

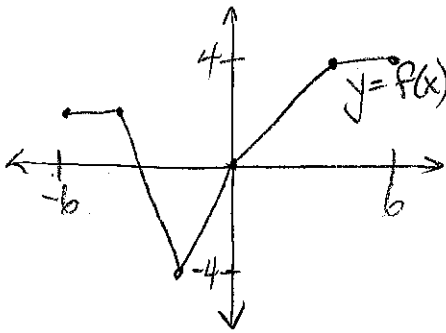
c) $y = -f(x)$

reflected across the x-axis
 $(x, y) \rightarrow (x, -y)$

d) $y = f(-x)$

reflected across the y-axis
 $(x, y) \rightarrow (-x, y)$

6.



a) Stretched vertically by a factor of 2 means that all the distances from the x-axis to the points will be doubled

- The top and bottom points of the graph will be 8 and -8.
- The points will not move horizontally

Domain: $\{x \mid -b \leq x \leq b, x \in \mathbb{R}\}$
Range: $\{y \mid -8 \leq y \leq 8, y \in \mathbb{R}\}$

b) A vertical stretch affects the range but not the domain

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7. a) the points of $f(x)$ have been stretched vertically by a factor of 4

$$y = 4f(x)$$

To find this pick one point and divide the y-values $\frac{g(x)}{f(x)} = \frac{8}{2} = 4$

- b) $f(x)$ has been reflected across the x-axis

$$y = -f(x)$$

- c) $f(x)$ has been horizontally compressed by a factor of $\frac{1}{3}$

$$y = f(3x)$$

$$\frac{g(x)}{f(x)} = \frac{2}{6} = \frac{1}{3}$$

remember: the factor is $\frac{1}{b}$ and b is $\frac{1}{3}$

$$\text{so } \frac{1}{\frac{1}{3}} = 1 \cdot \frac{3}{1} = 3$$

- d) $f(x)$ has been reflected across the y-axis

$$y = f(-x)$$

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9. a) Replace x with $4x$.

A horizontal compression by a factor of $\frac{1}{4}$

Remember: the factor is $\frac{1}{b} = \frac{1}{4}$

b) Replace x with $\frac{1}{4}x$.

A horizontal expansion by a factor of 4

Remember: the factor is $\frac{1}{b} = \frac{1}{\frac{1}{4}} = 1 \cdot \frac{4}{1} = 4$

c) Replace y with $2y$.

A vertical compression by a factor of $\frac{1}{2}$

Remember: vertical expansions/compressions follow the same pattern as horizontal when a is next to y !

d) Replace y with $\frac{1}{4}y$.

A vertical expansion by a factor of 4.

e) Replace x with $-3x$.

A horizontal compression by a factor of $\frac{1}{3}$ and a reflection across the y -axis.

Remember the x -values have change a sign so it is a horizontal reflection

f) Replace y with $-\frac{1}{3}y$.

A vertical expansion by a factor of 3 and a reflection across the x -axis