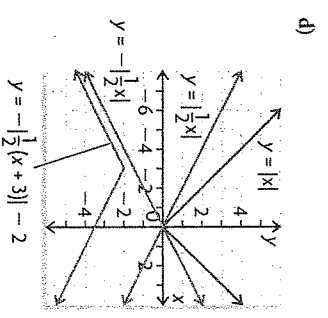
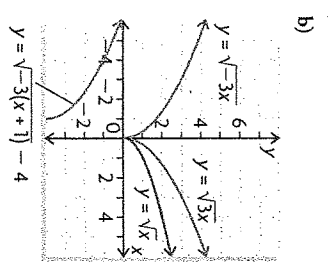
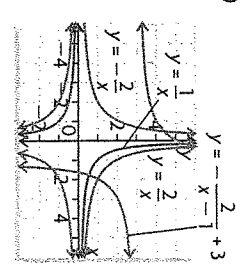
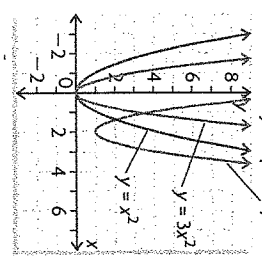


# 3.7B Answers

3.

$f(x)$	$f(3x)$	$f(-3x)$	$5f(-3x)$	$5f(-3(x-2)) + 4$
$(1, 1)$	$(\frac{1}{3}, 1)$	$(-\frac{1}{3}, 1)$	$(-\frac{1}{3}, 5)$	$(\frac{2}{3}, 9)$

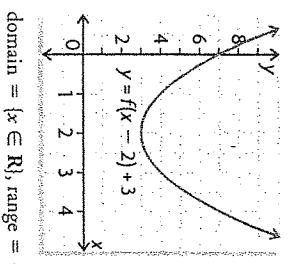
- 4.
- a) Vertical stretch, factor 3, then translation 1 unit down
  - b) Translation 2 units right and 3 units up
  - c) Horizontal compression, factor  $\frac{1}{2}$ , then translation 5 units down
  - d) Reflection in  $x$ -axis, horizontal stretch with factor 2, and then translation 2 units down
  - e) Vertical compression, factor  $\frac{2}{3}$ , then translation 3 units left and 1 unit up
  - f) Vertical stretch with factor 4, reflection in  $y$ -axis, and then translation 4 units down



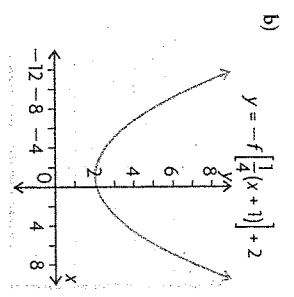
$y = \sqrt{-3(x+1)} - 4$

$y = -\frac{1}{2}|x+3| - 2$

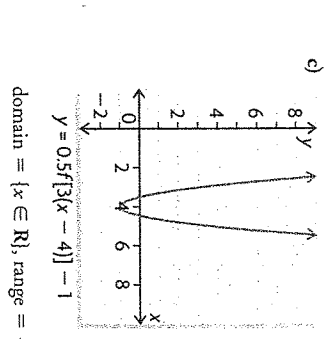
- 6.
- a) Horizontal stretch, factor 3, then translation 4 units left
  - b) Vertical stretch with factor 2, reflection in  $y$ -axis, and then translation 3 units right and 1 unit up
  - c) Reflection in  $x$ -axis, vertical stretch with factor 3, horizontal compression with factor  $\frac{1}{2}$ , then translation 1 unit right and 3 units down



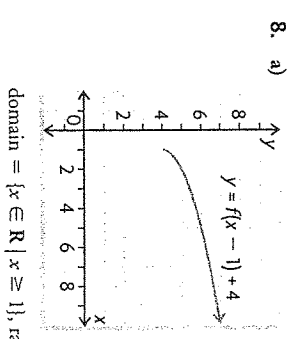
domain =  $\{x \in \mathbb{R} \mid \text{range} = \{y \in \mathbb{R} \mid y \geq 3\}\}$



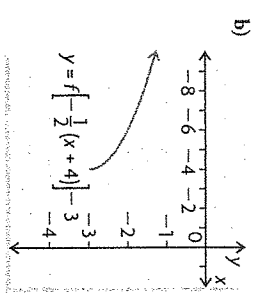
domain =  $\{x \in \mathbb{R} \mid \text{range} = \{y \in \mathbb{R} \mid y \geq 2\}\}$



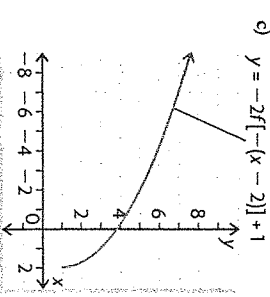
domain =  $\{x \in \mathbb{R} \mid \text{range} = \{y \in \mathbb{R} \mid y \leq -3\}\}$



domain =  $\{x \in \mathbb{R} \mid x \geq 1\}$ , range =  $\{y \in \mathbb{R} \mid y \geq 4\}$



domain =  $\{x \in \mathbb{R} \mid x \leq -4\}$ , range =  $\{y \in \mathbb{R} \mid y \geq -3\}$

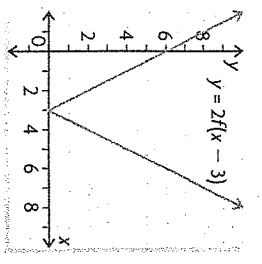


domain =  $\{x \in \mathbb{R} \mid x \leq 2\}$ , range =  $\{y \in \mathbb{R} \mid y \leq 1\}$

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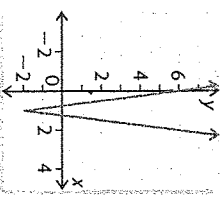
- A: vertical stretch, factor 5; B: reflection in  $y$ -axis; C: horizontal compression, factor 5; D: translation 2 units right; E: translation 4 units up
- Divide the  $x$ -coordinates by 3; C; Multiply the  $y$ -coordinates by 5; A; Multiply the  $x$ -coordinates by  $-1$ ; B; Add 4 to the  $y$ -coordinate; E; Add 2 to the  $x$ -coordinate; D

9. a)



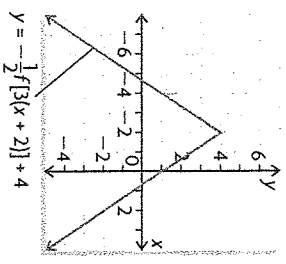
domain =  $\{x \in \mathbb{R} \mid x \geq 3\}$ , range =  $\{y \in \mathbb{R} \mid y \geq 0\}$

b)  $y = 4f[2(x - 1)] - 2$



domain =  $\{x \in \mathbb{R} \mid x \geq 1\}$ , range =  $\{y \in \mathbb{R} \mid y \geq -2\}$

c)

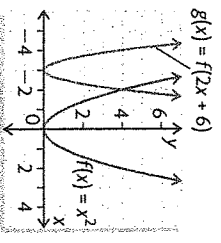


domain =  $\{x \in \mathbb{R} \mid x \geq -2\}$ , range =  $\{y \in \mathbb{R} \mid y \geq 4\}$

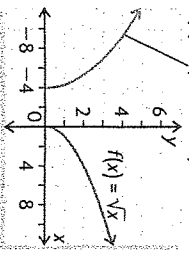
10.

- a) Translation right 2
- b) Translation up 2
- c) Vertical compression, factor 0.5
- d) Vertical stretch, factor 2
- e) Horizontal compression, factor 0.5
- f) Reflection in x-axis

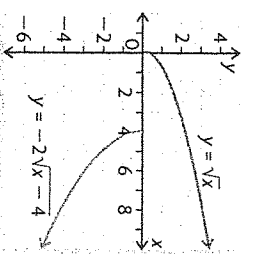
11.



12.

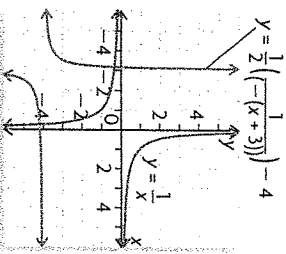


19. a)  $a = -2, k = 1, c = 0, d = 4$



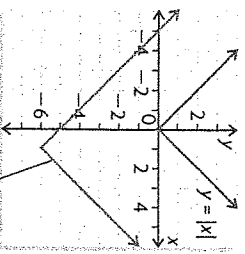
domain =  $\{x \in \mathbb{R} \mid x \geq 4\}$ , range =  $\{y \in \mathbb{R} \mid y \leq 0\}$

b)  $a = \frac{1}{2}, k = -1, c = -3, d = -4$



domain =  $\{x \in \mathbb{R} \mid x \neq -3\}$ , range =  $\{y \in \mathbb{R} \mid y \neq -4\}$

c)  $a = 3, k = \frac{1}{3}, c = -6, d = 1$



domain =  $\{x \in \mathbb{R} \mid x \geq 1\}$ , range =  $\{y \in \mathbb{R} \mid y \geq -6\}$

- a) 2, -5
- b) 2, -5
- c)  $-\frac{2}{3}, 1\frac{2}{3}$
- d) -4, 3

21.

A. Sketch parent function; B. Apply reflections in x-axis if  $a < 0$  and in y-axis if  $k < 0$ ; apply vertical stretch or compression with factor  $|k|$ ; D. factor  $|k|$ , and stretch or compression with factor  $\frac{1}{|k|}$ ; D.

Translate  $c$  units right (or  $-c$  units left if  $c < 0$ ) and  $d$  units up (or  $-d$  units down if  $d < 0$ ). Transformations in steps B and C can be done in any order, but must precede translation in step D.

22.

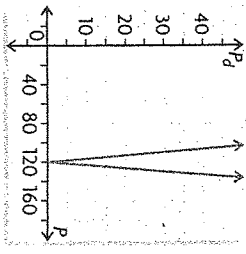
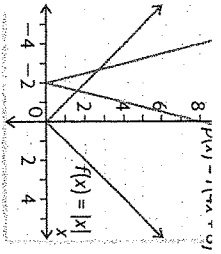
a) Reflection in x-axis, vertical compression factor  $\frac{1}{4}$  [or horizontal stretch factor 2], and then translation 3 units left and 1 unit up

b)  $y = -\frac{1}{4}(x + 3)^2 + 2$  [or  $y = -\left[\frac{1}{2}(x + 3)\right]^2 + 2$ ]

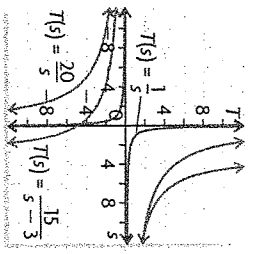
23.

Graphs are both based on a parabola, but open in different directions, and graph of  $g(x)$  is only an upper half-parabola. Reflect right half of

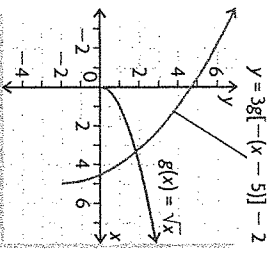
14.



15.



16.



17.

$y = 3\sqrt{-(x - 5)} - 2$   
 $g(x) = 3\sqrt{-(x + 1)} + 2$

18.

- a) C; parent graph is  $y = \frac{1}{x}$ , asymptotes are translated 2 units right and 1 unit up, and graph has been reflected in one of the axes
- b) E; parent graph is  $y = |x|$ , and vertex is translated 3 units right and 2 units down
- c) A; parent graph is  $y = \sqrt{x}$ , graph has been reflected in y-axis, and vertex is translated 3 units left and 2 units down
- d) G; parent graph is  $y = x^2$ , and vertex is translated 2 units right and 3 units down
- e) F; parent graph is  $y = \frac{1}{x}$ , asymptotes are translated 3 units down, and graph has been reflected in one of the axes
- f) D; parent graph is  $y = |kx|$ , graph has been reflected in y-axis, and vertex is translated 4 units left and 2 units up
- g) H; parent graph is  $y = \sqrt{x}$ , graph has been reflected in x- and y-axes, and vertex is translated 1 unit right and 1 unit up
- h) B; parent graph is  $y = x^2$ , graph has been reflected in y-axis, and