Review 1.1–1.3 p50: 1–13

1.1 Interval and Set Notation

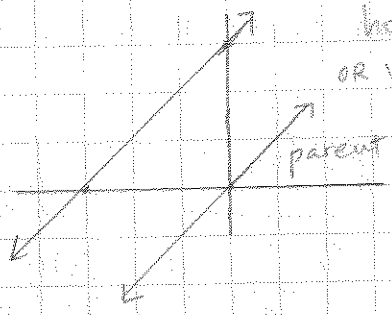
1. $(-\infty, 48]$ 2. $(6, \infty)$ 3. $[-8, 16]$

4. $\{x \mid x < -6 \text{ or } x > 21\}$ Interval Notation: $(-\infty, 6) \cup (21, \infty)$

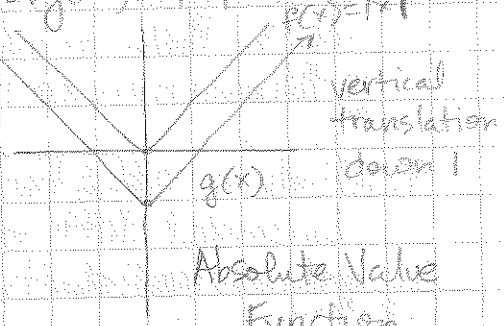
1.2 Parent Functions & Transformations

5. $f(x) = x + 3$ Linear Function

horizontal translation left 3 or vertical translation up 3



6. $g(x) = |x| - 1$

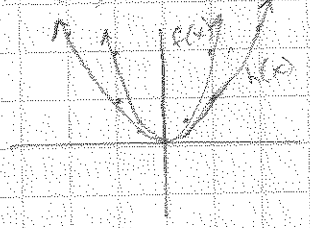


Absolute Value Function

7. $h(x) = \frac{1}{2}x^2$ Quadratic Function

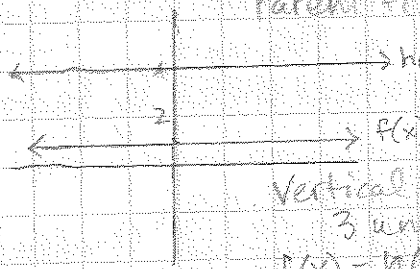
Parent $f(x) = x^2$

Vertical Shrink by factor of $\frac{1}{2}$



8. $h(x) = 4$ Constant Function

Parent $f(x) = 1$



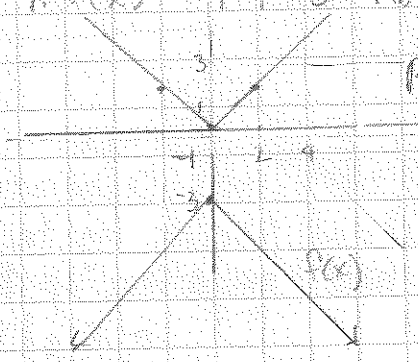
Vertical translation 3 units up

$f(x) = h(x) + 3$

OR $f(x) = 4 \cdot h(x)$

Vertical Stretch by factor of 4.

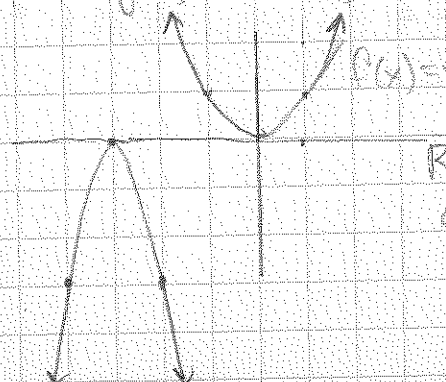
9. $f(x) = -|x| - 3$ Absolute Value



Reflect across x-axis

Then translate down 3 units

10. $g(x) = -3(x+3)^2$ Quadratic



Reflect across x-axis and stretch vertically by factor of 3. Then translate left 3 units

11. $f(x) = |x|$

$h(x) = -f(x)$ mult output by -1

$h(x) = -|x|$

$g(x) = h(x+4)$ $g(x) = h(x-h)$, $h = -4$

$\boxed{g(x) = -|x+4|}$

12. $f(x) = |x|$

$g(x) = \frac{1}{2}|x| + 2$

13. $f(x) = x$

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

$\boxed{g(x) = -x - 3}$

1-1.3 Quiz p26

1. $(8, \infty)$ 2. $[6, 12)$ 3. $[4, \infty)$

4. $\{x \mid -2 < x \leq 13\}$ 5. $\{x \mid x \leq 5 \text{ or } x \geq 8\}$

6. $\{x \mid x \in W \text{ and } x \neq 100\}$

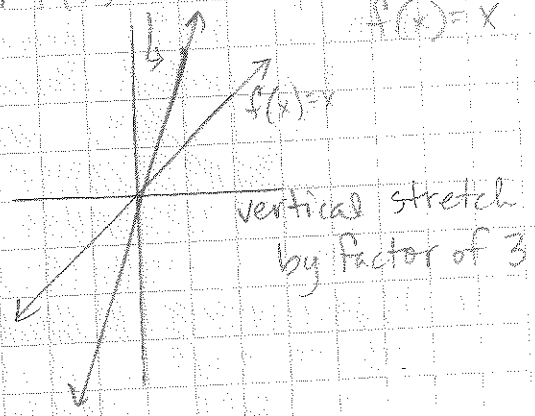
7. linear function
vertical shrink by factor of $\frac{1}{3}$, followed by a vertical translation down 1 unit

8. quadratic function
vertical stretch by factor of 2
horizontal shift 1 unit left

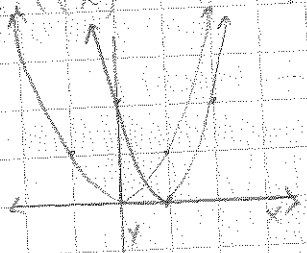
9. absolute value function
horizontal shift left 1
and vertical shift down 2

10. $f(x) = \frac{3}{2}$ [parent function $f(x) = 1$]
$f(x) = 1$
vertical translation up $\frac{1}{2}$ unit
or vertical stretch by factor of $\frac{3}{2}$
Constant Function

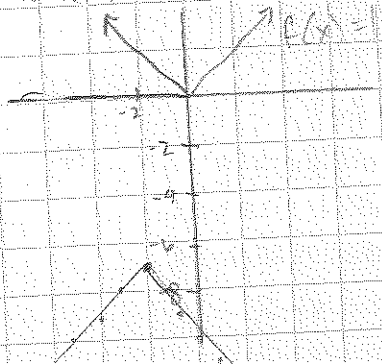
11. $f(x) = 3x$ parent $f(x) = x$



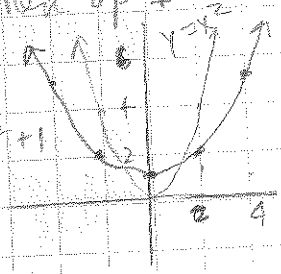
12. $f(x) = 2(x-1)^2$ Quadratic
vertical stretch by factor of 2
horizontal shift 1 unit right



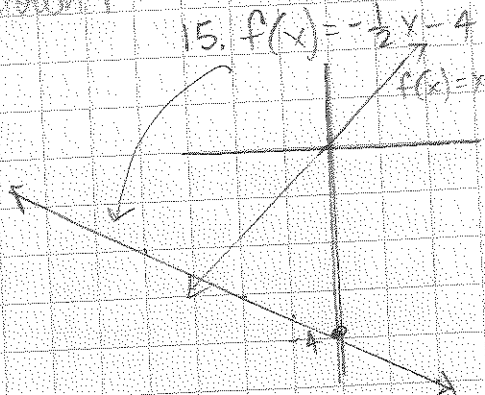
13. $f(x) = -|x+2| - 7$ absolute value
reflect across x-axis
horizontal translation left 2
and vertical translation down 7



14. $f(x) = \frac{1}{4}x^2 + 1$ Quadratic
vertical shrink by factor of $\frac{1}{4}$
vertical translation up 1



15. $f(x) = -\frac{1}{2}x - 4$



16. $f(x) = 2x+1$ translation 3 units up

$g(x) = f(x) + 3$

$= 2x+1+3$

$\boxed{g(x) = 2x+4}$

17. $f(x) = -3|x-4|$, vertical shrink by a factor of $\frac{1}{2}$

$g(x) = \frac{1}{2}(-3|x-4|)$

$\boxed{g(x) = -\frac{3}{2}|x-4|}$

18. $f(x) = 3|x+5|$ reflection in x-axis

$g(x) = -f(x)$

$\boxed{g(x) = -3|x+5|}$

20. $f(x) = x$ translation 2 units down

$h(x) = f(x) - 2$

$h(x) = x - 2$ horizontal shrink by factor of $\frac{3}{2}$ factor of $\frac{1}{a}$ $a = \frac{3}{2}$

$g(x) = h\left(\frac{3}{2}x\right)$

$\boxed{g(x) = \frac{3}{2}x - 2}$

19. $f(x) = \frac{1}{3}x - \frac{2}{3}$, translation 4 units left

$g(x) = f(x+4)$

$\boxed{g(x) = \frac{1}{3}(x+4) - \frac{2}{3}}$

$g(x) = \frac{1}{3}x + \frac{4}{3} - \frac{2}{3}$

$\boxed{g(x) = \frac{1}{3}x + \frac{2}{3}}$

21. $f(x) = x$, translation 9 units down followed by a reflection in the y-axis (mult. input by -1)

$h(x) = x - 9$

$g(x) = h(-x)$

$\boxed{g(x) = -x - 9}$

22. $f(x) = |x|$ reflection in x-axis and a vertical stretch by factor of 4 followed by a translation 1 units down + 1 unit right

$h(x) = -4 \cdot f(x)$

$h(x) = -4|x|$

$\boxed{g(x) = -4|x-1| - 7}$

23. $f(x) = |x|$ translation 1 unit down and 2 units left followed by vertical shrink by factor of $\frac{1}{2}$

$h(x) = |x+2| - 1$

$g(x) = \frac{1}{2}(|x+2| - 1)$

$\boxed{g(x) = \frac{1}{2}|x+2| - \frac{1}{2}}$

24.

x	0	2	5	6	9
y	0	2300	5750	6900	10,350

Check slope $\frac{2300-0}{2-0} = 1150$ $\frac{5750}{5} = 1150$

linear function

Mileage after 1 year

$y = 1150x$

$f(12) = 1150(12) = \boxed{13,800 \text{ miles}}$

25. $f(x) = 20x + 80$ Seniors pay $\frac{1}{2}$ this price and receive an additional \$30 discount

Transformations: vertical shrink by factor of $\frac{1}{2}$ followed by a downward shift of 30.

$g(x) = \frac{1}{2}(20x+80) - 30$

$g(x) = 10x + 40 - 30$

$g(x) = 10x + 10$

$g(3) = 10(3) + 10 = \boxed{\$40 \text{ for 3 days}}$