Section 0.1 #6

$A = B \times H$, where A is area
B is the base
H is the height

6a. [15, 25]

$B = 5$, $H = 35$

$A_1 = (5)(35) = 175$ Rectangle 1
$+ \; A_2 = (5)(35) = 175$ Rectangle 2

$A_1 + A_2 = 175 + 175 = 350$

$\boxed{\text{Area from 15 Nov to 20 Nov is 350}}$

6b. Base = 5, Height = 35

6c. $A_1 = (5)(35) = 175$ Rectangle 1
$A_2 = (5)(35) = 175$ Rectangle 2
$A_3 = (5)(35) = 175$ Rectangle 3
$A_4 = (5)(35) = 175$ Rectangle 4

$A_1 + A_2 + A_3 + A_4$
$=$
$175 + 175 + 175 + 175$
$=$
$\boxed{\text{Area Over Curve} < 700}$

6d. Professionals that study weather such as meteorologists.

$y = mx + b$ Section 0.2 #18

18a. $(3, 10)$ for $y = 2x + A$

$$10 = 2(3) + A$$

$$10 = 6 + A$$

$$-6 \quad -6$$

$$\boxed{4 = A \quad \text{or} \quad A = 4}$$

$y = 2x + A \rightarrow y = 2x + 4$

18b. $(3, 10)$ for $y = Bx + 2$

$$10 = B(3) + 2$$

$$10 = 3B + 2$$

$$-2 \quad -2$$

$$\frac{8}{3} = \frac{3B}{3}$$

$$\boxed{\frac{8}{3} = B \quad \text{or} \quad B = \frac{8}{3}}$$

$y = Bx + 2 \rightarrow y = \frac{8}{3}x + 2$

18c. $y = Dx + 7$

$$4 = Dx + 7$$

$$-7 \quad -7$$

$$\frac{-3}{x} = \frac{Dx}{x}$$

$$\boxed{D = -\frac{3}{x}}$$

$y = -\left(\frac{3}{x}\right)x + 7$ Horizontal Line at $y = 4$ for any value of x

18a. $Ay = Bx + 1$ for $(1,3)$ $(5,13)$

$$m = \frac{13-3}{5-1} = \frac{10}{4} = \frac{5}{2}$$

$$\boxed{m = 5/2}$$

$(1,3)$, $m = 5/2$

$$y - y_1 = m(x - x_1)$$

$$y - 3 = \frac{5}{2}(x-1)$$

$$y - 3 = \frac{5}{2}x - \frac{5}{2}$$

$$+3 \qquad\qquad +3$$

$$\boxed{y = \frac{5}{2}x + \frac{1}{2}}$$

Equation of Line Going Through $(1,3)$ $(5,13)$

Bring Equation in Terms of A and B

$$y = \frac{5}{2}x + \frac{1}{2}$$

$$2y = \cancel{2}\left(\frac{5}{\cancel{2}}x\right) + \cancel{2}\left(\frac{1}{\cancel{2}}\right)$$

$$Ay = Bx + 1$$

$$2y = 5x + 1$$

$$\boxed{\begin{array}{c}\text{Set A and B} \\ A = 2,\ B = 5\end{array}}$$

Section 0.3 #20

20. $A = B \times H$, where A is area
B is base
H is height

20a.

$A(1)$
$\|$
$A(1) = 1 \cdot A(1)$
$\|$
$1 \cdot 2$
$\|$
$\boxed{A(1) = 2}$

$A(2)$
$A(2) = 2 \cdot A(2)$
$\|$
$2 \cdot 2$
$\|$
$\boxed{A(2) = 4}$

$A(5)$
$A(5) = 5 \cdot A(5)$
$\|$
$5 \cdot 2$
$\|$
$\boxed{A(5) = 10}$

20b. $\boxed{A(x) = x \cdot A(x) \text{ or } A(x) = A(x)x\text{, where } x = \text{base and } A(x) = \text{height}}$

Section 0.4 #8

$$f(x) = \begin{cases} x+1, & x<1 \\ 1, & 1 \le x < 3 \\ 2-x, & 3 \le x \end{cases}$$

$$g(x) = \begin{cases} |x+1|, & x<0 \\ 2x, & 0 \le x \end{cases}$$

$h(x) = 3$

8a.

x	-1	0	1	2	3	4
$f(x)$	0	1	1	1	-1	-2
$g(x)$	0	0	2	4	6	8
$h(x)$	3	3	3	3	3	3

$\Rightarrow h(x) = 3$ for all x values

$f(-1) = -1+1 = 0$

$f(0) = 0+1 = 1$

$f(1) = 1$

$f(2) = 1$

$f(3) = 2-3 = -1$

$f(4) = 2-4 = -2$

$g(-1) = |-1+1| = |0| = 0$

$g(0) = 2(0) = 0$

$g(1) = 2(1) = 2$

$g(2) = 2(2) = 4$

$g(3) = 2(3) = 6$

$g(4) = 2(4) = 8$

8b. $g(1) = 2$ $\quad h(1) = 3$ $\quad f(1) = 1$ $\quad f(2) = 1$ $\quad f(3) = -1$

$g(3.5) = 2(3.5) = 7$

$g(3.5) = 7$

$f(g(1)) = f(2) = 1$

$\boxed{f(g(1)) = 1}$

$f(h(1)) = f(3) = -1$

$\boxed{f(h(1)) = -1}$

$h(f(1)) = h(1) = 3$

$\boxed{h(f(1)) = 3}$

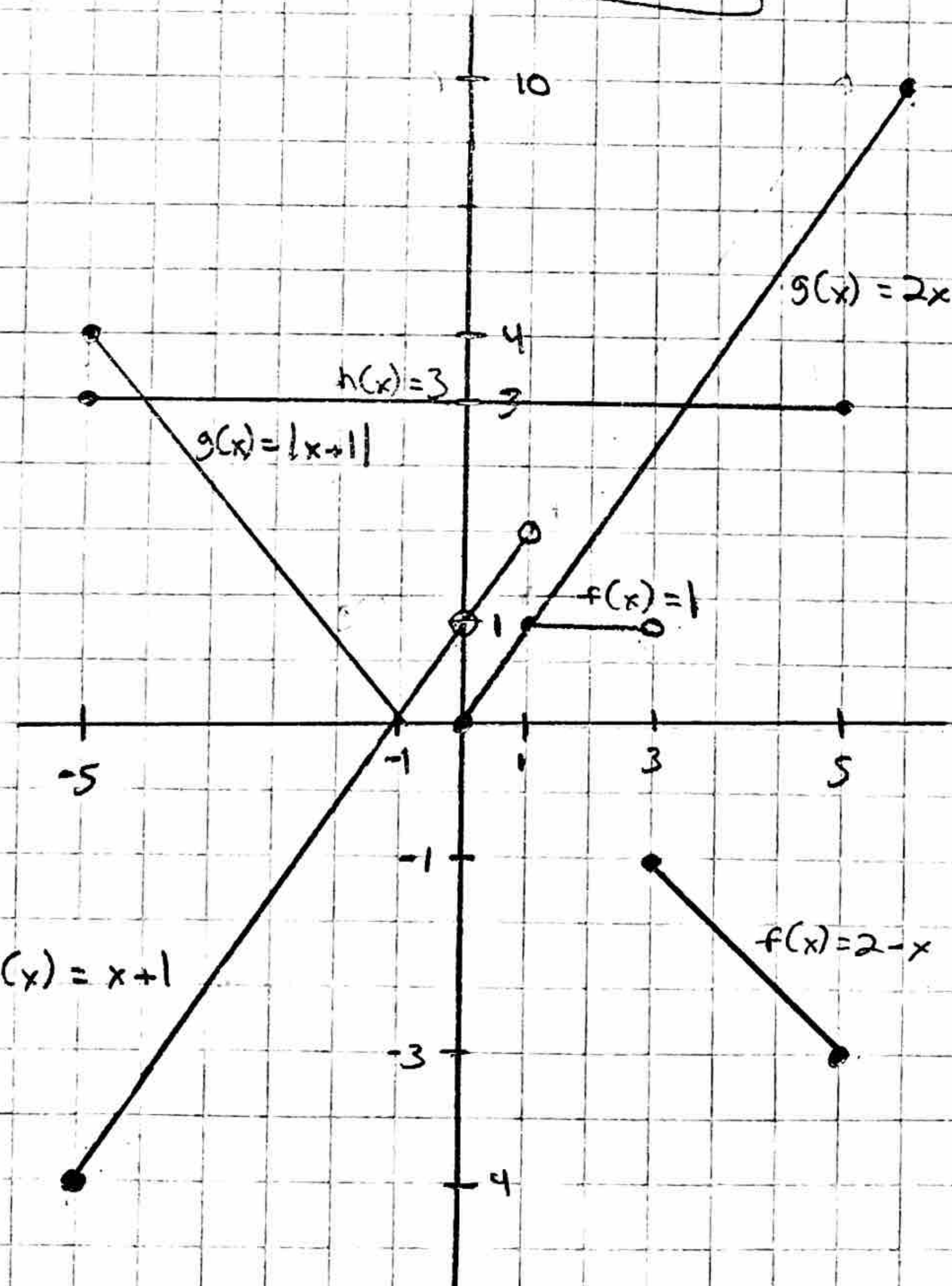
$f(f(2)) = f(1) = 1$

$\boxed{f(f(2)) = 1}$

$g(g(3.5)) = g(7) = 2(7) = 14$

$\boxed{g(g(3.5)) = 14}$

8c.



Section 0.5 #20

20a. Validate $|a+b| = |a| + |b|$

$a=1,\ b=2$

$$|1+2| = |1| + |2|$$

$$|3| = 1 + 2$$

$$\boxed{3 = 3}$$ True Statement

Show $|a+b| = |a| + |b|$ for all real numbers a and b.

Proof: Since $|a+b| = |a| + |b|$ is true.

$$|a+b| = |a| + |b|$$

$$a+b = a+b$$

$\therefore$ By Truth Table, $|a+b| = a+b$ is true.

20b. Validate $|a| + |b| = |a+b|$

$a=1,\ b=2$

$$|1| + |2| = |1+2|$$

$$1 + 2 = |3|$$

$$1 + 2 = 3$$

$$\boxed{3 = 3}$$ True Statement

Show $|a| + |b| = |a+b|$ for all real numbers a and b

Proof: Since $|a| + |b| = |a+b|$

$$|a| + |b| = |a+b|$$

$$a+b = a+b$$

$\therefore$ By Truth Table, $|a| + |b| = |a+b|$ is true.

20c. Validate If $f(x)$ and $g(x)$ are linear functions, then $f(g(x))$ is a linear function

$f(x) = x+1$ $\qquad$ $g(x) = x+2$

$$f(g(x)) = (x+2)+1$$
$$= x+2+1$$
$$\boxed{f(g(x)) = x+3}$$ Linear Function

Show If $f(g(x))$ is a linear function, then $f(x)$ and $g(x)$ are linear functions

Proof: Since $f(g(x))$ is a linear function is true.

$y = mx+b$
$f(x) = mx+b$, where $f(x) = y$
$g(x) = mx+b$, where $g(x) = y$

$$f(g(x)) = m(mx+b)+b$$
$$=$$
$$\boxed{f(g(x)) = m^2x + mb + b}$$ is a linear function where m and b are real numbers

∴ By Truth Table, $f(g(x))$ is a linear function is true.