HW: 4, 9b, 11b, 12, 13ac, 16ac, 18, 19

4.) a.) (0, 46), (1820, 0)

$\therefore m = \frac{46-0}{0-1820} = \frac{46}{-1820} = \boxed{\frac{-23}{910}}$

b.) $\boxed{y = \frac{-23}{910}x + 46}$ plug in gradient & y-int.

or $\boxed{23x + 910y = 41,860}$ in general form

9b.) $m = \frac{1}{2}$, $(3, -5)$

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

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

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

$y = \frac{1}{2}x - \frac{3}{2} - \frac{10}{2}$ when subtracting 5 on each side, convert to common denominator by multiplying 5 by $\frac{2}{2}$

$\boxed{y = \frac{1}{2}x - \frac{13}{2}}$

or $\Rightarrow$ $2y = x - 13$ $\Rightarrow$ $-x + 2y = -13$

$\Rightarrow$ $\boxed{x - 2y = 13}$

11b.) $(-4,2), (6,-1)$

$m = \frac{2+1}{-4-6} = \frac{3}{-10}$ $\therefore$ $3x + 10y = d$ (using $m = \frac{-a}{b}$ & a has to be positive)

$3(-4) + 10(2) = d$

$-12 + 20 = d$

$8 = d$

$\Rightarrow \boxed{3x+10y=8}$

12.) line 1: $y = \frac{3}{4}x + 1$ line 2 is parallel $\therefore$ $m = \frac{3}{4}$, $(3,1)$

$y = mx + c$

$y - 1 = \frac{3}{4}(x-3)$ or $1 = \frac{3}{4}(3) + c$

$y - 1 = \frac{3}{4}x - \frac{9}{4}$ $\quad$ $1 = \frac{9}{4} + c$

$y = \frac{3}{4}x - \frac{9}{4} + \frac{4}{4}$ $\quad$ $\frac{4}{4} - \frac{9}{4} = c$

$\boxed{y = \frac{3}{4}x - \frac{5}{4}}$ $\quad$ $\therefore c = \frac{-5}{4}$

b.) y-int of line 2 $\Rightarrow \boxed{\frac{-5}{4}}$

13a.) parallel to $y = 3x - 2$, $(1,4)$

$m = 3$, $4 = 3(1) + c$ or $y - 4 = 3(x-1)$

$4 = 3 + c$ $\quad$ $y - 4 = 3x - 3$

$\therefore c = 1$ $\quad$ $y = 3x + 1$

$\Rightarrow \boxed{y = 3x+1}$

13c.) perpendicular to $y = -2x + 1$, $(-1,5)$

$m = \frac{1}{2}$ (opposite reciprocal) $\quad$ $5 = \frac{1}{2}(-1) + c$

$\boxed{y = \frac{1}{2}x + \frac{11}{2}}$ $\quad$ $5 = -\frac{1}{2} + c$

$\therefore c = \frac{11}{2}$

19 cont.)

X-int of line 2 $= 0 = \frac{3}{4}x + \frac{57}{4}$

$\frac{4}{3} \cdot -\frac{57}{4} = \frac{3}{4}x \cdot \frac{4}{3}$

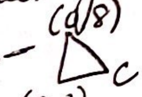
$\Rightarrow x = -19$

eq of line 1: $0 = -\frac{4}{3}(6) + c$

$0 = -8 + c$

$c = 8$

$\therefore y = \frac{-4}{3}x + 8$

Shaded region $= \triangle ABC -$ 



$AB = \sqrt{(-19+3)^2 + (0-12)^2}$
$= \sqrt{(-16)^2 + (-12)^2}$
$= \sqrt{256 + 144}$
$= \sqrt{400} = 20$

$BC = \sqrt{(-3-6)^2 + (12-0)^2}$
$= \sqrt{(-9)^2 + (12)^2} = \sqrt{81+144} = \sqrt{225} = 15$

16a.) $(2,15)$, $y = 4x + c$

$15 = 4(2) + c$

$15 = 8 + c$

$\therefore \boxed{c = 7}$

16c.) $(t,4)$, $y = \frac{2}{3}x - \frac{4}{3}$

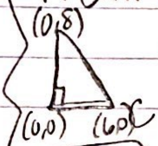
$4 = \frac{2}{3}t - \frac{4}{3}$ (multiply by 3 to get rid of the fractions)

$12 = 2t - 4$

$\Rightarrow 2t = 16$

$\therefore \boxed{t = 8}$

19 (cont.) $\triangle ABC = \frac{1}{2}bh = \frac{1}{2}(AB)(BC) = \frac{1}{2}(20)(15) = 150$





$= \frac{1}{2}(6)(8)$
$= 24$

$\therefore 150 - 24 = \boxed{126 \text{ units}^2}$

18.) a.) line 2 is perpendicular to line 1.

gradient of line 1 is $\frac{1+2}{2-5} = \frac{3}{-3} = -1$

$\therefore$ gradient of line 2 $= 1$ (opposite reciprocal)

$y - 4 = 1(x-2)$ plug in $(2,4)$ to point-gradient form

$y - 4 = x - 2$

$\therefore y = x + 2 \Rightarrow -x + y - 2 = 0 \Rightarrow \boxed{x - y + 2 = 0}$ (a must be +)

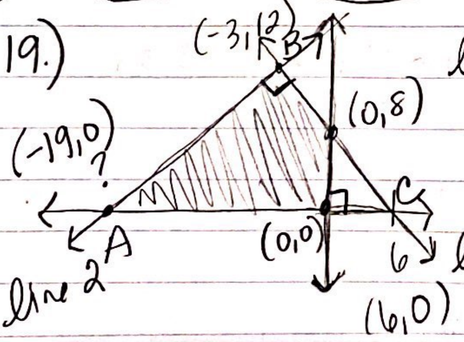
b.) x-int of line 2 (occurs when $y = 0$)

$x - 0 + 2 = 0$

$x + 2 = 0$

$\boxed{x = -2}$

19.)





line 1 $m = \frac{12-0}{-3-6} = \frac{12}{-9} = \frac{-4}{3}$ $\therefore$ line 2 $m = \frac{3}{4}$

line 2 eq: $y - 12 = \frac{3}{4}(x+3)$

$y - 12 = \frac{3}{4}x + \frac{9}{4}$

$y = \frac{3}{4}x + \frac{9}{4} + \frac{48}{4}$

$\Rightarrow y = \frac{3}{4}x + \frac{57}{4}$