Section: 1.2

2. (i) $x + y = -20$, $-2x - y = 20$

$y = -x - 20$, $y = -2x - 20$

$m_1 = -1$ $m_2 = -2$

Ans: neither

(ii) $y = 0.1x + 9$ $0.5x - 5y + 0.25 = 0$

$y = 0.1x \quad 0.05$

$m_1 = 0.1$ $m_2 = 0.1$

$m_1 = m_2$ Ans: parallel.

(iii) $y = -5x - 5$ $y = 10x - 5$

$m_1 = -5$ $m_2 = 10$

Ans: neither

(iv) $y = 0.1x + 9$, $y = 0.1x - \frac{0.25}{6}$

$m_1 = 0.1$ $m_2 = 0.1$

Ans: parallel

(v) $y = 0.3x + 9$ $y = 0.3x + 0.25$

$m_1 = 0.3$ $m_2 = 0.3$

Ans: parallel

(vi) $y = 30x + 7$ $y = -\frac{1}{30}x - 1$

$m_1 = 30$ $m_2 = -1/30$ $m_1 m_2 = -1$

Ans: perpendicular

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$$8x + 6y = 25$$

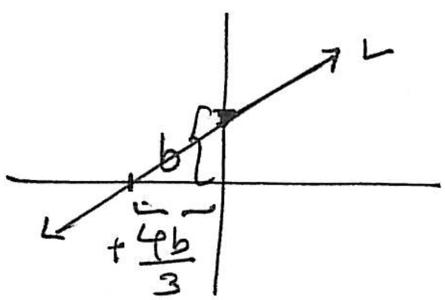
$$y = -\frac{8}{6}x + \frac{25}{6}$$

$$\text{slope} = -8/6 = -4/3$$

Hence the slope of the line L is $3/4$

L is given by

$$y = 3/4\,x + b$$



when $y = 0$, $x = -\frac{4b}{3}$

Hence $\frac{1}{2}\left[\frac{4b}{3} \times b\right] = 140$

$$\Rightarrow \quad +4b^2 = 840$$

$$\Rightarrow \quad b^2 = 210$$

$$\Rightarrow \quad b = \sqrt{210}$$ since b is positive

Hence eqn of L is

$$\boxed{y = \frac{3}{4}x + \sqrt{210}}$$

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The slope of ~~this~~ the line passing through $(2, -0.5)$ & $(8.5, 3.5)$

$$= \frac{3.5 + 0.5}{8.5 - 2} = \frac{4}{6.5}$$

Hence the slope of the line (in the question) is $-\frac{6.5}{4}$

Eq^n – $y = -\frac{6.5}{4}x + b$

It passes through $(1.5, 2.5)$

Hence $2.5 = \frac{-6.5}{4}(1.5) + b$

$$\Rightarrow \quad b = 2.5 + \frac{6.5}{4}(1.5)$$

$$= 4.9375$$

Eq^n $\boxed{y = -\frac{6.5}{4}x + 4.9375}$

1.3

3 We want (i) $4-\sqrt{x-6} \neq 0$

$\Rightarrow \sqrt{x-6} \neq 4 \quad \Rightarrow \quad x-6 \neq 16 \Rightarrow x \neq 22$

& (ii) $x-6 \geq 0$

$\Rightarrow x \geq 6.$

Ans : C

4 $f(-x) = 6(-x)^4 - 6(-x)^2$

$= 6x^4 - 6x^2 = f(x)$

Ans : even

1.4

1 $f(x) = 2x-7$

f is increasing & hence it satisfies the horizontal line test.

Ans : D

$y = 2x-7$

$x = \frac{y+7}{2}$

$y = \frac{x+7}{2}$ (interchanging x & y) $\Rightarrow \boxed{f^{-1}(x) = \frac{x}{2} + \frac{7}{2}}$

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$$
\begin{aligned}
g\circ f(x) &= g(f(x)) \\
&= g(\sqrt{7x+7}) \\
&= 5(\sqrt{7x+7})^2 + 8\sqrt{7x+7} + 3 \\
&= 5(7x+7) + 8\sqrt{7x+7} + 3 \\
&= 35x + 8\sqrt{7x+7} + 38
\end{aligned}
$$

domain of $g\circ f$ = all values of x such that $x \geq -1$ since we want $7x+7 \geq 0$.