

HW 80

$$\textcircled{1} f(x) = x^2 + 9x$$
$$= x(x) + x(9)$$

$$\boxed{f(x) = x(x+9)} \rightarrow 0 = x(x+9)$$
$$\boxed{x=0} \text{ or } \boxed{x+9=0}$$
$$\boxed{x=-9}$$

$$\textcircled{2} g(x) = x^2 + 11x + 10 \quad \frac{10}{1 \cdot 10}$$
$$= x^2 + 1x + 10x + 10$$
$$x(x+1) + 10(x+1)$$

$$\boxed{g(x) = (x+1)(x+10)} \rightarrow 0 = (x+1)(x+10)$$
$$x+1=0 \text{ or } x+10=0$$
$$\boxed{x=-1} \quad \boxed{x=-10}$$

$$\textcircled{3} h(x) = x^2 + 14x + 48 \quad \frac{48}{6 \cdot 8}$$
$$= x^2 + 6x + 8x + 48$$

$$x(x+6) + 8(x+6)$$
$$\boxed{h(x) = (x+6)(x+8)} \rightarrow 0 = (x+6)(x+8)$$
$$x+6=0 \quad x+8=0$$
$$\boxed{x=-6} \quad \boxed{x=-8}$$

$$\textcircled{4} j(x) = h^2 + 5h$$

$$\boxed{j(x) = h(h+5)} \rightarrow 0 = h(h+5)$$
$$\boxed{h=0} \text{ or } \boxed{h+5=0}$$
$$\boxed{h=-5}$$

$$\textcircled{5} \quad h(t) = t^2 + 10t - 200 \quad \frac{-200}{20 \cdot 10} \quad 20-10$$

$$= \underbrace{t^2 + 20t}_{t(t+20)} - 10t - 200$$

$$t(t+20) - 10(t+20)$$

$$h(t) = (t+20)(t-10)$$

$$\rightarrow 0 = (t+20)(t-10)$$

$$t+20=0 \text{ or } t-10=0$$

$$\boxed{t=-20} \quad \boxed{t=10}$$

$$\textcircled{6} \quad d(t) = 3t^2 + 6t$$

$$\boxed{d(t) = 3t(t+2)}$$

$$\rightarrow 0 = 3t(t+2)$$

$$\boxed{t=0} \text{ or } t+2=0$$

$$\boxed{t=-2}$$

$$\textcircled{7} \quad h(d) = d^2 + 13d + 22 \quad \frac{22}{2 \cdot 11} \quad 2-11$$

$$= \underbrace{d^2 + 11d}_{d(d+11)} + 2d + 22$$

$$d(d+11) + 2(d+11)$$

$$h(d) = (d+11)(d+2)$$

$$\rightarrow 0 = (d+11)(d+2)$$

$$d+11=0 \text{ or } d+2=0$$

$$\boxed{d=-11}$$

$$\boxed{d=-2}$$

$$\textcircled{8} \quad P(g) = g^2 + 9g + 14 \quad \frac{14}{2 \cdot 7} \quad 7-2$$

$$= \underbrace{g^2 + 7g}_{g(g+7)} + 2g + 14$$

$$g(g+7) + 2(g+7)$$

$$P(g) = (g+7)(g+2)$$

$$0 = (g+7)(g+2)$$

$$g+7=0 \text{ or } g+2=0$$

$$\boxed{g=-7}$$

$$\boxed{g=-2}$$

$$\textcircled{9} f(x) = x^2 - 9x + 18 \quad \frac{18}{3 \cdot 6}$$

$$\underbrace{x^2 - 6x}_{x(x-6)} - \underbrace{3x + 18}_{3(x+6)}$$

$$x(x-6) - 3(x-6) \\ = \boxed{(x-6)(x-3)} \rightarrow 0 = (x-6)(x-3)$$

$$x-6=0$$

$$\boxed{x=6}$$

$$x-3=0$$

$$\boxed{x=3}$$

$$\textcircled{10} h(x) = x^2 + 5x + 4 \quad \frac{4}{4 \cdot 1}$$

$$\underbrace{x^2 + 4x}_{x(x+4)} + \underbrace{1x + 4}_{1(x+4)}$$

$$x(x+4) + 1(x+4) \\ = \boxed{(x+4)(x+1)} \rightarrow 0 = (x+4)(x+1)$$

$$x+4=0 \quad x+1=0$$

$$\boxed{x=-4}$$

$$\boxed{x=-1}$$

$$\textcircled{11} h(x) = x^2 - 5x + 4 \quad \frac{4}{1 \cdot 4}$$

$$\underbrace{x^2 - 4x}_{x(x-4)} - \underbrace{1x + 4}_{1(x+4)}$$

$$x(x-4) - 1(x-4) \\ = \boxed{(x-4)(x-1)} \rightarrow 0 = (x-4)(x-1)$$

$$x-4=0$$

$$\boxed{x=4}$$

$$x-1=0$$

$$\boxed{x=1}$$

$$(12) m(x) = x^2 - 64 \quad \frac{64}{8 \cdot 8}$$

$$x^2 + 8x - 8x - 64$$

$$x(x+8) - 8(x+8)$$

$$\boxed{= (x+8)(x-8)} \rightarrow 0 = (x+8)(x-8)$$

$$x+8=0$$

$$x-8=0$$

$$\boxed{x=-8}$$

$$\boxed{x=8}$$

$$(13) x^2 = 11x - 28$$

$$x^2 - 11x + 28 = 0 \quad \frac{28}{4 \cdot 7}$$

$$x^2 - 7x - 4x + 28 = 0$$

$$x(x-7) - 4(x-7)$$

$$(x-7)(x-4) = 0$$

$$x-7=0 \quad x-4=0$$

$$\boxed{x=7}$$

$$\boxed{x=4}$$

finds where a parabola

& line intersect

$$x^2: 7^2 = 49$$

$$x^2: 4^2 = 16$$

$$(7, 49) \neq (4, 16)$$

$$(14) k^2 + 15k = -56$$

$$k^2 + 15k + 56 = 0 \quad \frac{56}{7 \cdot 8}$$

$$k^2 + 8k + 7k + 56 = 0$$

$$k(k+8) + 7(k+8) = 0$$

$$(k+8)(k+7) = 0$$

$$k+8=0 \quad k+7=0$$

$$\boxed{k=-8}$$

$$\boxed{k=-7}$$

finds where a parabola

& constant (horizontal line) intersect

$$(-8, -56)$$

$$\neq (-7, -56)$$

15) $x^2 + 17x + 49 = 3x$ finds where a parabola & a line intersect
 $x^2 + 14x + 49 = 0$
 $(x+7)^2 = 0$ \leftarrow perf. sq. trin. $3x: 3(-7) = -21$ $(-7, -21)$
 $x+7=0$
 $x = -7$

16) $m^2 = 2m$ finds where a parabola & a line intersect
 $m^2 - 2m = 0$
 $m(m-2) = 0$
 $m = 0$ $m - 2 = 0$
 $m = 2$
 $m^2: 0^2 = 0$ $2^2 = 4$ $(0, 0)$ & $(2, 4)$

17) $\frac{x^2 - 7x - 8}{x^2 - 5x - 24} \Rightarrow \frac{(x+1)(x-8)}{(x+3)(x-8)} \Rightarrow \frac{x+1}{x+3}$

$$\begin{array}{r} x^2 - 7x - 8 \quad \frac{8}{8 \cdot 1} \\ x^2 - 8x + 1x - 8 \\ \hline \end{array}$$

$$\begin{array}{l} x(x-8) + 1(x-8) \\ (x+1)(x-8) \end{array}$$

$$\begin{array}{r} x^2 - 5x - 24 \quad \frac{24}{8 \cdot 3} \\ x^2 - 8x + 3x - 24 \\ \hline \end{array}$$

$$\begin{array}{l} x(x-8) + 3(x-8) \\ (x+3)(x-8) \end{array}$$

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$$\frac{x^2 + 3x - 10}{x^2 + 2x - 8} \Rightarrow \frac{\cancel{(x-2)}(x+5)}{\cancel{(x-2)}(x+4)} \Rightarrow \boxed{\frac{x+5}{x+4}}$$

$$x^2 + 3x - 10 \quad \frac{10}{5 \cdot 2}$$

$$x^2 + 5x - 2x - 10$$

$$x(x+5) - 2(x+5)$$
$$(x-2)(x+5)$$

$$x^2 + 2x - 8 \quad \frac{8}{4 \cdot 2}$$

$$x^2 + 4x - 2x - 8$$

$$x(x+4) - 2(x+4)$$
$$(x+4)(x-2)$$