

$$6. d) (8x + 3x^2 - 12 + 13x^2) \div (x - \frac{2}{3})$$

$$\frac{2}{3} \overline{) \begin{array}{r} 3 \quad 13 \quad 8 \quad -12 \\ \underline{2 \quad 10 \quad 12} \\ 3 \quad 15 \quad 18 \quad 0 \end{array}}$$

$$3x^2 + 15x + 18 //$$

$$7. \begin{cases} x - y + 3z = 2 & \text{--- } \epsilon_1 \\ -2x + 3y - 8z = -1 & \text{--- } \epsilon_2 \\ 2x - 2y + 4z = 7 & \text{--- } \epsilon_3 \end{cases}$$

$$2 \cdot \begin{cases} x - y + 3z = 2 \\ -2x + 3y - 8z = -1 \end{cases}$$

$$\begin{array}{r} 2x - 2y + 6z = 4 \\ + \quad -2x + 3y - 8z = -1 \\ \hline \end{array}$$

$$y - 2z = 3 \quad \text{--- } \epsilon_4$$

ϵ_2 and ϵ_3

$$+ \begin{cases} -2x + 3y - 8z = -1 \\ 2x - 2y + 4z = 7 \end{cases}$$

$$y - 4z = 6 \quad \text{--- } \epsilon_5$$

ϵ_4 and ϵ_5

$$-1 \cdot \begin{cases} y - 2z = 3 \\ y - 4z = 6 \end{cases}$$

$$\begin{array}{r} -y + 2z = -3 \\ + \quad y - 4z = 6 \\ \hline \end{array}$$

$$\begin{array}{r} -2z = 3 \\ z = -\frac{3}{2} \end{array}$$

$$y - 2z = 3 \quad 2x - 2y + 4z = 7$$

$$y - 2(-\frac{3}{2}) = 3 \quad 2x - 2(0) + 4(-\frac{3}{2}) = 7$$

$$y + 3 = 3 \quad 2x - 6 = 7$$

$$y = 0 \quad 2x = 13$$

$$x = \frac{13}{2}$$

$$(\frac{13}{2}, 0, -\frac{3}{2})$$

$$\begin{aligned} 8. a) (f-g)(x) &= f(x) - g(x) \\ &= (-x^2 + 2x) - (4x - 3) \\ &= -x^2 - 2x + 3 // \end{aligned}$$

$$b) (\frac{f}{g})(x) = \frac{f(x)}{g(x)}$$

$$= \frac{-x^2 + 2x}{4x - 3}$$

$$= -\frac{1}{4}x + \frac{5}{16} + \frac{\frac{15}{16}}{4x-3}$$

$$-\frac{1}{4}x + \frac{5}{16}$$

side

$$4x-3 \overline{) -x^2 + 2x + 0}$$

$$-(\ominus x^2 + \frac{3}{4}x)$$

$$\frac{5}{4}x + 0$$

$$-(\ominus \frac{5}{4}x + \frac{15}{16})$$

$$\frac{15}{16}$$

$$c) f(x+h)$$

$$= -(x+h)^2 + 2(x+h)$$

$$= -(x^2 + 2xh + h^2) + 2x + 2h$$

$$= -x^2 - 2xh - h^2 + 2x + 2h$$

$$d) (fg)(-1) = f(-1) \cdot g(-1)$$

$$= (-3) \cdot (-7)$$

$$= 21$$

$$\text{side } f(-1) = -(-1)^2 + 2(-1) = -3$$

$$g(-1) = 4(-1) - 3 = -7$$

$$\begin{aligned}
 8. e) (f+g)(4) &= f(4) + g(4) \\
 &= -8 + 13 \\
 &= 5
 \end{aligned}$$

side $f(4) = -(4)^2 + 2(4) = -8$
 $g(4) = 4(4) - 3 = 13$

$$9. (x^4 - 19x + 30) \div (x^2 - 6)$$

$$\begin{array}{r}
 \overline{) x^4 + 0x^3 + 0x^2 - 19x + 30} \\
 \underline{-(x^4)} \\
 \underline{+ 6x^2} \\
 \underline{- 19x} \\
 \underline{+ 36} \\
 \underline{- 19x + 66}
 \end{array}$$

$$x^2 + 6 + \frac{-19x + 66}{x^2 - 6} //$$

10.

Pure dye	Type I	=	Type II
100%	25%	=	40%
x	4		$x+4$

$$1x + 0.25(4) = 0.4(x+4)$$

$$x + 1 = 0.4x + 1.6$$

$$0.6x + 1 = 1.6$$

$$0.6x = 0.6$$

$$x = 1$$

need 1 gal of pure dye.

$$\begin{aligned}
 11. a) 24a^2 + 58ab + 9b^2 \\
 = (6a + 1b)(4a + 9b)
 \end{aligned}$$

$$\begin{aligned}
 b) 54x^3y + 33x^2y - 72xy \\
 = 3xy(18x^2 + 11x - 24) \\
 = 3xy(9x - 8)(2x + 3)
 \end{aligned}$$

$$\begin{aligned}
 c) -24m^3n - 18m^2n + 27mn \\
 = -3mn(8m^2 + 6m - 9) \\
 = -3mn(4m - 3)(2m + 3)
 \end{aligned}$$

$$\begin{aligned}
 d) t^2 - 5t + 8 \\
 = \text{not factorable}
 \end{aligned}$$

$$e) 9(z+2)^2 - 10(z+2) + 1$$

$$\text{let } u = z+2$$

$$= 9u^2 - 10u + 1$$

$$= (9u - 1)(u - 1)$$

$$= (9(z+2) - 1)(z+2 - 1)$$

$$= (9z + 17)(z + 1)$$

$$f) r^6 - 6r^3 + 8$$

$$= (r^3 - 4)(r^3 - 2)$$

1. a) $f(x) = 4x^2 + 3$

Domain: $\{x \mid x \in \mathbb{R}\}$

b) $g(x) = \frac{x+5}{1-2x}$

denominator $\neq 0$

$1 - 2x \neq 0$

$1 \neq 2x$

$\frac{1}{2} \neq x$

Domain: $\{x \mid x \in \mathbb{R}, x \neq \frac{1}{2}\}$

c) $h(x) = 3|x+1| + 2$

Domain: $\{x \mid x \in \mathbb{R}\}$

d) $I(x) = \sqrt{3 - \frac{4}{3}x}$

radicant ≥ 0

$3 - \frac{4}{3}x \geq 0$

$3 \geq \frac{4}{3}x$

$\frac{9}{4} \geq x$

Domain: $\{x \mid x \leq \frac{9}{4}\}$

2.
$$\begin{cases} \frac{1}{3}x - \frac{1}{2}y = -5 & | \times 6 \\ -\frac{4}{5}x + \frac{6}{5}y = 1 & | \times 5 \end{cases}$$

$$\begin{cases} 2x - 3y = -30 \\ -4x + 6y = 5 \end{cases}$$

$2x - 3y = -30$

$-3y = -2x - 30$

$y = \frac{2}{3}x + 10$

$-4x + 6y = 5$

$-4x + 6(\frac{2}{3}x + 10) = 5$

$-4x + 4x + 60 = 5$

$60 = 5 \leftarrow \text{false}$

\emptyset

3.

	P	r	t	I
saving	x	0.02	1	0.02x
stock	10000 - x	0.10	1	0.10(10000 - x)

$0.02x + 0.10(10000 - x) = 0.07(10000)$

$0.02x + 1000 - 0.10x = 700$

$1000 - 0.08x = 700$

$-0.08x = -300$

$x = 3750$

need to invest \$3750 into saving and \$6250 into stock.

$$4. \begin{cases} 0.2x = 0.4y + 1.8 & \times 10 \\ 0.03x + 0.05y + 0.03 = 0 & \times 100 \end{cases}$$

$$\begin{cases} 2x = 4y + 18 \\ 3x + 5y + 3 = 0 \end{cases}$$

$$5 \times \begin{cases} 2x - 4y = 18 \\ 3x + 5y = -3 \end{cases}$$

$$+ \begin{cases} 10x - 20y = 90 \\ 12x + 20y = -12 \end{cases}$$

$$\hline 22x = 78$$

$$x = \frac{78}{22}$$

$$x = \frac{39}{11}$$

$$3x + 5y = -3$$

$$3\left(\frac{39}{11}\right) + 5y = -3$$

$$\frac{117}{11} + 5y = -3$$

$$5y = -3 - \frac{117}{11}$$

$$5y = -\frac{150}{11}$$

$$y = -\frac{30}{11}$$

$$\left(\frac{39}{11}, -\frac{30}{11}\right) //$$

$$5. a) H(x) = \frac{2}{3}x - 4$$

$$-2 = \frac{2}{3}(3) - 4$$

$$-2 = -2$$

So $(3, -2)$ is on the graph of $H(x)$.

$$b) H(x) = -4 ; x = ?$$

$$-4 = \frac{2}{3}x - 4$$

$$0 = \frac{2}{3}x$$

$$0 = x$$

$$c) H(x) = 0 ; x = ?$$

$$0 = \frac{2}{3}x - 4$$

$$4 = \frac{2}{3}x$$

$$6 = x$$

$$6. a) [2a - (3b + 4c)][2a + (3b + 4c)]$$

$$= (2a)^2 - (3b + 4c)^2$$

$$= 4a^2 - (9b^2 + 24bc + 16c^2)$$

$$= 4a^2 - 9b^2 - 24bc - 16c^2$$

$$b) \frac{2x^2y^3 - 9xy^3 + 16x^2y}{2x^2y^2}$$

$$= \frac{2x^2y^3}{2x^2y^2} - \frac{9xy^3}{2x^2y^2} + \frac{16x^2y}{2x^2y^2}$$

$$= y - \frac{9y}{2x} + \frac{8}{y}$$

$$c) [r - (s+t)]^2$$

$$= r^2 - 2 \cdot r \cdot (s+t) + (s+t)^2$$

$$= r^2 - 2rs - 2rt + s^2 + 2st + t^2$$