

Station 1

$$\textcircled{1} \quad 2x^2 - 6x + 5 = 0$$
$$\frac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(5)}}{2(2)}$$

$$= \frac{6 \pm \sqrt{-4}}{4}$$

$$= \frac{6 \pm 2i}{4}$$

$$= \frac{3}{2} \pm \frac{1i}{2}$$

$$x = \frac{3 \pm i}{2}$$

$$-6x^2 = -12x + 7$$

$$\textcircled{2} \quad -6x^2 + 12x - 7 = 0$$
$$\frac{-(12) \pm \sqrt{(12)^2 - 4(-6)(-7)}}{2(-6)}$$

$$\frac{-12 \pm \sqrt{-24}}{-12}$$

$$\frac{-12 \pm 2i\sqrt{6}}{-12}$$

$$\frac{-12}{-12} \pm \frac{2i\sqrt{6}}{-12}$$

$$x = \frac{1 \pm \frac{i\sqrt{6}}{6}}{1}$$

$$\textcircled{3} \quad 5x^2 + 8x = -4$$
$$5x^2 + 8x + 4 = 0$$
$$\frac{-8 \pm \sqrt{8^2 - 4(5)(4)}}{2(5)}$$

$$\frac{-8 \pm \sqrt{-40}}{10}$$

$$\frac{-8 \pm 4i\sqrt{10}}{10}$$

$$\frac{-8}{10} \pm \frac{4i\sqrt{10}}{10}$$

$$-\frac{4}{5} \pm \frac{2i\sqrt{10}}{5}$$

$$x = \frac{-4 \pm 2i\sqrt{10}}{5}$$

$$\textcircled{4} \quad 2x^2 - 3x - 5 = 0$$
$$\frac{-(-3) \pm \sqrt{(-3)^2 - 4(2)(-5)}}{2(2)}$$

$$\frac{3 \pm \sqrt{49}}{4}$$

$$\frac{3 \pm 7}{4}$$

$$\frac{10}{4} \text{ and } \frac{-4}{4}$$

$$x = \frac{5}{2} \text{ and } -1$$

Station 2

① $\frac{(x^{-2} \cdot x^{-3})^4}{(x^{-5})^4}$

x^{-20}

$$\frac{1}{x^{20}}$$

② $\frac{(x^{-3})^4 x^4}{2x^{-3}}$

$x^{-12} x^4$

$\frac{x^{-8}}{2x^{-3}}$

$$= \frac{1}{2x^5}$$

③ $\left(\frac{7d^2}{14d^4}\right)^5$

$\left(\frac{d^{-2}}{2}\right)^5$

$\left(\frac{1}{2d^2}\right)^5$

$\left(\frac{1}{2^5 d^{10}}\right)$

$$\frac{1}{32d^{10}}$$

④ $\left(\frac{f^5 g^{-3}}{g^{-5}}\right)^2$

$\frac{f^{10} g^{-6}}{g^{-10}}$

$$f^{10} g^4$$

⑤ $(3p^4 q^{-3})^2 (x^{-2} y^{-3})^3$

$3^2 p^8 q^{-6} x^{-6} y^{-9}$

$$\frac{9p^8}{q^6 x^6 y^9}$$

⑥ $\frac{c^4 d^{-5}}{c^3 d}$

cd^{-6}

$$\frac{c}{d^6}$$

⑦ $x^4 y^5 (xy^8)^0$

$x^4 y^5 (1)$

$$x^4 y^5$$

⑧ $\left(\frac{z^6 y^4}{x^9 a^{10}}\right)^{-1}$

$\frac{z^{-6} y^{-4}}{x^9 a^{10}}$

$\frac{1}{x^9 a^{10} z^6 y^4}$

$$\frac{1}{x^9 a^{10} z^6 y^4}$$

⑨ $(m^4 n^2)^4$

$$m^{16} n^8$$

⑩ $\frac{1}{x^{-4} y^{-3} z^{-2}}$

$$x^4 y^3 z^2$$

Station 3

Remainder

0	→	1
1	→	1 i
2	→	-1
3	→	-i

- ① i^{27} $\boxed{-i}$ ② i^{48} $\boxed{1}$ ③ i^{13} $\boxed{-1}$ ④ i^{59} $\boxed{-i}$ ⑤ i^{270} $\boxed{-1}$

⑥ Add! $(7+8i) + (2-7i)$ $\boxed{9+i}$ ⑦ subtract! $(5+i) - (3-5i)$
 $5+i + -3 + 5i$ $\boxed{2+6i}$

⑧ $2i - (2+3i) + (1-8i)$
 $2i + \boxed{-2} - 3i + \boxed{1} - 8i$
 $\boxed{-1-9i}$

⑨ $3i - (4+5i) - (7+8i)$
 $3i - \boxed{4} - 5i - \boxed{7} - 8i$
 $\boxed{-11-10i}$

Station 4

(1) $(5x+1)^2 = 25$
* Square root both sides
 $5x+1 = 5$ and $5x+1 = -5$

$$\frac{5x}{5} = \frac{4}{5}$$

$$\frac{5x}{5} = \frac{-6}{5}$$

$$x = \frac{4}{5} \text{ and } -\frac{6}{5}$$

(2) $\frac{-2(x-1)^2}{-2} = \frac{36}{-2}$

$$\sqrt{(x-1)^2} = \sqrt{-18}$$

$$x-1 = \pm 3i\sqrt{2}$$

$$+1 \quad +1$$

$$\boxed{x = \pm 3i\sqrt{2} + 1}$$

or

$$\boxed{1 \pm 3i\sqrt{2}}$$

(3) $\frac{3x^2 + 40}{+x^2} = \frac{-x^2 - 56}{+x^2}$

$$\frac{4x^2 + 40}{-40} = \frac{-56}{-40}$$

$$\frac{4x^2}{4} = \frac{-96}{4}$$

$$\sqrt{x^2} = \sqrt{-24}$$

$$\boxed{x = \pm 2i\sqrt{6}}$$

(4) $x^2 + 9 = 5$
 $-9 \quad -9$

$$x^2 = -4$$

$$\boxed{x = \pm 2i}$$

Station 5

① $\sqrt{-72}$
 $\pm 6i\sqrt{2}$

② $\sqrt{-45}$
 $\pm 3i\sqrt{5}$

③ $4\sqrt{-36}$
 $4 \cdot 6i$
 $\pm 24i$

④ $\sqrt{-400}$
 $\pm 20i$

⑤ $\sqrt{-1}$
 i

⑥ $-2i(3-i)$
 $-6i + 2i^2$
 $-6i + 2(-1)$
 $-6i - 2$

⑦ $(7-6i)^2$
 $(7-6i)(7-6i)$
 $49 - 42i - 42i + 36i^2$
 $49 - 84i - 36$
 $15 - 84i$

⑧ $\frac{2-i}{3+4i} \cdot \frac{3-4i}{3-4i}$
 $\frac{(2-i)(3-4i)}{(3+4i)(3-4i)}$
 $\Rightarrow \frac{6 - 8i - 3i + 4i^2}{9 - 16i^2}$

$(5-2i)(1-3i)$
 $5 - 15i - 2i + 6i^2$
 $5 - 17i - 6$
 $-1 - 17i$

$\Rightarrow \frac{6 - 11i - 4}{9 + 16}$

$\Rightarrow \frac{2 - 11i}{25}$

⑩ $\frac{5}{3-2i} \cdot \frac{3+2i}{3+2i}$

$\frac{15 + 10i}{9 - 4i^2}$

$\frac{15 + 10i}{9 + 4}$

$\frac{15 + 10i}{13}$

"EOI"

"Exponent over index"

Station 6

① $\sqrt[3]{y^2}$
 $y^{\frac{2}{3}}$

② $\sqrt[6]{z^5}$
 $z^{\frac{5}{6}}$

③ $\sqrt[4]{a^2 b^3}$
 $a^{\frac{2}{4}} b^{\frac{3}{4}}$
 $a^{\frac{1}{2}} b^{\frac{3}{4}}$

④ $\sqrt[3]{y^3 x^4}$
 $y^{\frac{3}{3}} x^{\frac{4}{3}}$
 $y^1 x^{\frac{4}{3}}$

⑤ \sqrt{abc}
 $a^{\frac{1}{2}} b^{\frac{1}{2}} c^{\frac{1}{2}}$

⑥ $(x^{\frac{1}{2}})^8$
 $x^{\frac{8}{2}}$
 x^4

⑦ $(a^{\frac{1}{3}} b^{\frac{1}{4}})^{12}$
 $a^{\frac{12}{3}} b^{\frac{12}{4}}$
 $a^4 b^3$
 a^7

⑧ $\frac{q^{\frac{5}{4}}}{q^{\frac{1}{4}}}$
 $q^{\frac{4}{4}}$
 q^1

⑨ $(2x^{-\frac{1}{3}} y^2 z^{\frac{5}{3}})^3$
 $2^3 x^{-\frac{3}{3}} y^{6} z^{\frac{15}{3}}$
 $8x^{-1} y^6 z^5$
 $\frac{8y^6 z^5}{x}$

⑩ $\frac{4t^{-\frac{1}{3}}}{t^{\frac{4}{3}}} = 4t^{-\frac{5}{3}}$
 \Rightarrow $\frac{4}{t^{\frac{5}{3}}}$