

Warm-Up : Solve

$$1) x^2 + 14x - 6 = 0$$

$$x^2 + 14x + 49 = 6 + 49$$

$$\sqrt{(x+7)^2} = \sqrt{55}$$

$$x+7 = \pm\sqrt{55}$$

$$x = \boxed{-7 \pm \sqrt{55}} \text{ Sol}$$

$$x^2 + 14x + 49 = 55$$

$$(x+7)^2 = 55$$

$$(x+7)^2 - 55 = 0$$

$(-7, -55)$

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

$$2x^2 - 4x = -7$$

$$2(x^2 - 2x + 1) = -7 + 2 \cdot 1$$

$$\frac{2(x-1)^2}{2} = \frac{-5}{2}$$

$$\sqrt{(x-1)^2} = \sqrt{\frac{-5}{2}}$$

$$x-1 = \pm i\sqrt{5/2}$$

$$\boxed{x = 1 \pm i\sqrt{5/2}}$$

$1 + i\sqrt{5/2}$ or $1 - i\sqrt{5/2}$

$$2(x^2 - 2x + 1) = -5$$

$$2(x-1)^2 + 5 = 0$$

↑ v: (1, 5)

Sby R1 v5

9:13

SOLVE BY COMPLETING THE SQUARE:

1. $x^2 + 14x - 51 = 0$
 $+51 +51$
 $x^2 + 14x + 49 = 51 + 49$
 $\sqrt{(x+7)^2} = \sqrt{100}$ $(x+7)^2 = 100$
 $x+7 = \pm 10$
 $x = 10-7, -10-7$
 Solutions: $-17, 3$ vertex form: $y = (x+7)^2 - 100$

2. $x^2 - 12x + 23 = 0$
 $-23 -23$
 $x^2 - 12x + 36 = -23 + 36$
 $\sqrt{(x-6)^2} = \sqrt{13} \rightarrow (x-6)^2 = 13$
 $x-6 = \pm\sqrt{13}$
 $x = 6 \pm \sqrt{13}$
 Sol: $6 \pm \sqrt{13}$ V.F.: $y = (x-6)^2 - 13$

3. $x^2 - 4x + 6 = 0$

4. $x^2 - 10x + 18 = 0$

5. $x^2 + 18x - 40 = 0$
 $(x+20)(x-2) = 0$
 $x = 2, -20$

6. $4x^2 + 4x + 36 = 0$
 $-36 -36$
 $x + \frac{1}{2} = \pm i\sqrt{\frac{35}{4}}$
 $x = -\frac{1}{2} \pm i\sqrt{\frac{35}{4}}$
 1) $4x^2 + 4x = -36$
 2) $4(x^2 + x + \frac{1}{4}) = -36 + 4 \cdot \frac{1}{4}$
 $(\frac{1}{2})^2 = \frac{1}{4}$
 $\sqrt{(x+\frac{1}{2})^2} = \sqrt{-\frac{35}{4}}$
 $4(x+\frac{1}{2})^2 = -\frac{35}{4} \rightarrow 4(x+\frac{1}{2})^2 + 35$
 Sol: $-\frac{1}{2} \pm i\sqrt{\frac{35}{4}}$ V.F. $y = 4(x+\frac{1}{2})^2 + 35$

7. $x^2 + 2x + 20 = 0$

8. $3x^2 + 12x + 21 = 0$
 $-21 -21$
 $3x^2 + 12x = -21$
 $3(x^2 + 4x + 4) = -21 + 3 \cdot 4$
 $3(x+2)^2 = -9$
 $\frac{3(x+2)^2}{3} = \frac{-9}{3}$
 $\sqrt{(x+2)^2} = \sqrt{-3}$
 $x+2 = \pm i\sqrt{3}$
 $x = -2 \pm i\sqrt{3}$

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

9. $3x^2 - 8x + 4 = 0$

10. $3x^2 - 2x - 5 = 0$

S: _____ V.F. _____

11. $2x^2 - 2x - 5 = 0$

12. $10x^2 + 4x + 68 = 0$

$$10x^2 + 4x = -68$$

$$10\left(x^2 + \frac{4}{10}x + \frac{16}{400}\right) = -68 + 10 \cdot \frac{16}{400}$$

$$\frac{4}{10} \cdot \frac{1}{2} \cdot \left(\frac{4}{20}\right)^2$$

$$10\left(x + \frac{4}{20}\right)^2 = -\frac{338}{5}$$

$$\sqrt{\left(x + \frac{4}{20}\right)^2} = \sqrt{\frac{-338}{5}}$$

$$x + \frac{4}{20} = \pm i\sqrt{\frac{338}{5}}$$

$$x = -\frac{2}{10} \pm i\sqrt{\frac{338}{5}}$$

$$9) \quad 3x^2 - 8x + 4 = 0$$

$$1) \quad 3x^2 - 8x = -4$$

$$2) \quad 3\left(x^2 - \frac{8}{3}x + \frac{64}{36}\right) = -4 + 3 \cdot \frac{64}{36}$$

$$\left(\frac{8}{3} \cdot \frac{1}{2} = \left(\frac{8}{6}\right)^2 = \frac{64}{36}\right)$$

$$\frac{3\left(x - \frac{8}{6}\right)^2}{3} = \frac{4/3}{3} \Leftrightarrow \text{V.F.} \quad \boxed{y = 3\left(x - \frac{4}{3}\right)^2 - \frac{4}{3}}$$

$$\sqrt{\left(x - \frac{8}{6}\right)^2} = \sqrt{\frac{4}{9}}$$

$$x - \frac{8}{6} = \pm \frac{2}{3}$$

$$x = \frac{8}{6} \pm \frac{2}{3} \quad \frac{2}{3}, 2$$

$$11) \quad 2x^2 - 2x - 5 = 0$$

$$+5 \quad +5$$

$$2x^2 - 2x = 5$$

$$2\left(x^2 - 1x + \frac{1}{4}\right) = 5 + 2 \cdot \frac{1}{4}$$

$$\left(\frac{1}{2}\right)^2 = \frac{1}{4}$$

$$\frac{2\left(x - \frac{1}{2}\right)^2}{2} = \frac{11/2}{2}$$

$$\sqrt{\left(x - \frac{1}{2}\right)^2} = \sqrt{\frac{11}{4}}$$

$$x - \frac{1}{2} = \pm \sqrt{\frac{11}{4}}$$

$$\boxed{x = \frac{1}{2} \pm \sqrt{\frac{11}{4}}}$$

EURUR'F'

