

Polynomial Functions Review #1

① $x^2 - 4x - 32 = 0$
 $(x-8)(x+4) = 0$
 $x = 8 \text{ or } -4$

② $4x^2 + 20x = 0$
 $4x(x+5) = 0$
 $x = 0 \text{ or } -5$

③ $d^2 - 29d = -100$
 $d^2 - 29d + 100 = 0$
 $(d-25)(d-4) = 0$
 $d = 25 \text{ or } 4$

④ $18x^2 + 29x + 3 = 0$
 $18x^2 + 27x + 2x + 3 = 0$
 $9x(2x+3) + 1(2x+3) = 0$
 $(9x+1)(2x+3) = 0$
 $x = -\frac{1}{9} \text{ or } -\frac{3}{2}$

$\begin{array}{r} 54 \\ 27 \times 2 \\ 29 \end{array}$

⑤ $x^2 + 4 = 8x$
 $x^2 - 8x = -4$
 $x^2 - 8x + 16 = -4 + 16$
 $(x-4)^2 = 12$
 $(x-4) = \pm\sqrt{12}$
 $x = 4 \pm 2\sqrt{3}$

⑥ $x^2 - 5x = 8$
 $x^2 - 5x + \frac{25}{4} = 8 + \frac{25}{4}$
 $(x - \frac{5}{2})^2 = \frac{32}{4} + \frac{25}{4}$
 $x - \frac{5}{2} = \pm\sqrt{\frac{57}{4}}$
 $x = \frac{5}{2} \pm \frac{\sqrt{57}}{2}$

⑦ $2x^2 - 12x = 8$
 $x^2 - 6x = 4$
 $x^2 - 6x + 9 = 4 + 9$
 ~~$(x-3)^2 = 13$~~ $(x-3)^2 = 13$
 ~~$x-3 = \pm\sqrt{13}$~~ $x-3 = \pm\sqrt{13}$
 $x = 3 \pm \sqrt{13}$

⑧ $6x^2 - 3x + 2 = 0$
 $6x^2 - 3x = -2$
 $6(x^2 - \frac{1}{2}x + \frac{1}{16}) = -2 + \frac{6}{16}$
 $6(x - \frac{1}{4})^2 = -\frac{16}{8} + \frac{3}{8}$
 $(x - \frac{1}{4})^2 = -\frac{13}{8} \cdot \frac{1}{6}$
 $x - \frac{1}{4} = \pm\sqrt{-\frac{13}{48}}$
 $x - \frac{1}{4} = \pm i\sqrt{\frac{13}{12}}$
 $x = \frac{1}{4} \pm i\sqrt{\frac{13}{12}}$

$$13. x = -1 \text{ (double root)}$$

#1

$$14. -3 \pm \sqrt{13}$$

$$15. \frac{-1 \pm \sqrt{33}}{4}$$

$$16. x = -2 \quad x = -\frac{1}{3}$$

$$17. x = -7 \quad x = 10$$

$$18. 3 \pm \sqrt{6}$$

$$19. \frac{4 \pm i\sqrt{14}}{6}$$

$$20. x = -\frac{3}{2} \quad x = -\frac{1}{2}$$

$$\boxed{9.} \quad a=1 \\ b=2 \\ c=-7$$

$$\frac{-2 \pm \sqrt{4+28}}{2} =$$

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

$$\boxed{10.} \quad a=2 \\ b=-12 \\ c=5$$

$$\frac{12 \pm \sqrt{144-40}}{4} =$$

$$\frac{12 \pm \sqrt{104}}{4} =$$

$$\frac{12 \pm 2\sqrt{26}}{4} = \boxed{\frac{6 \pm \sqrt{26}}{2}}$$

$$\boxed{11.} \quad a=-5 \\ b=2 \\ c=3$$

$$\frac{-2 \pm \sqrt{4+60}}{-10} =$$

$$\frac{-2 \pm \sqrt{64}}{-10} = \frac{-2 \pm 8}{-10}$$

$$X = \frac{-2+8}{-10} = \frac{6}{-10} = -\frac{3}{5}$$

$$X = \frac{-2-8}{-10} = \frac{-10}{-10} = 1$$

$$\boxed{12.} \quad a=6 \\ b=-3 \\ c=2$$

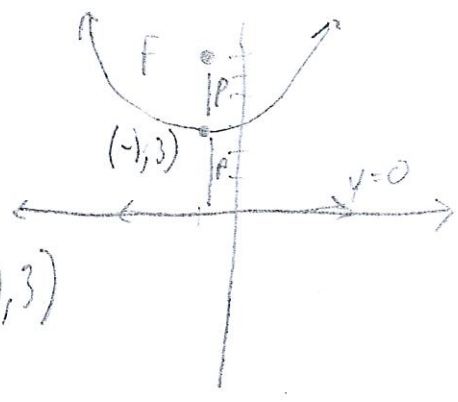
$$\frac{3 \pm \sqrt{9-48}}{12} =$$

$$\boxed{\frac{3 \pm i\sqrt{39}}{12}}$$

21. Focus (-1, 6)

Directrix $y=0$

$p=3$ Vertex (-1, 3)



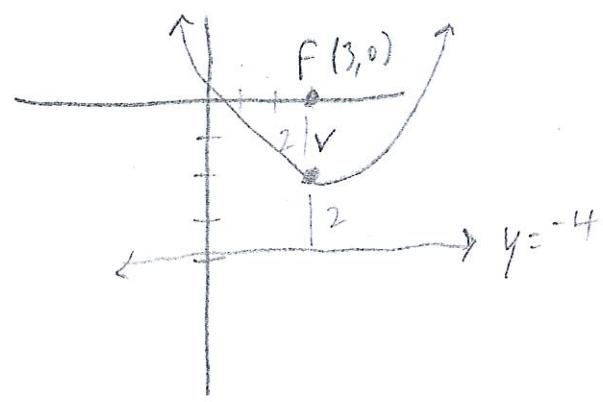
$$y = \frac{1}{4p}(x-h)^2 + k$$

$$y = \frac{1}{4 \cdot 3}(x-(-1))^2 + 3 \Rightarrow y = \frac{1}{12}(x+1)^2 + 3$$

22. Vertex (3, -2)

Directrix $y=-4$

$p=2$



$$y = \frac{1}{4(p)}(x-h)^2 + k$$

$$y = \frac{1}{4(2)}(x-3)^2 - 2$$

- 23. $1-3i$ 24. $-7+7i$ 25. $-2+23i$ 26. $-18+19i$

27. $14+28i$

- 28. $3x(y^2 + 12yz + 4x^3z)$ 29. $(6a+5)(6a-5)$

- 30. $(x-3y)(x^2 + 3xy + 9y^2)$ 31. Prime

- 32. $4n(m-2) + 5(m-2) \Rightarrow (4n+5)(m-2)$ 33. $(x^a+2)(x^{2a}-2x^a+4)$

- 34. $(x^2-5)(x^2-1) \Rightarrow (x^2-5)(x+1)(x-1)$ 35. $a(a^2-81) \Rightarrow a(a+9)(a-9)$