Test III

26. $\dfrac{4}{3n^2-27n+60} - \dfrac{4}{4n^2-20n}$

$\dfrac{4}{3(n^2-9n+20)} - \dfrac{4}{4n(n-5)}$

$\dfrac{4n}{3(n-4)(n-5)n} - \dfrac{1-3(n-4)}{n(n-5)3(n-4)}$

$\dfrac{4n-3(n-4)}{3(n-4)(n-5)n}$

$\dfrac{4n-3n+12}{3n(n-4)(n-5)} = \dfrac{n+12}{3n(n-4)(n-5)}$

30. $\dfrac{\dfrac{7}{(x-6)(x-8)} + \dfrac{x}{(x-8)(x-6)}}{\dfrac{2}{(x-5)(x-6)} - \dfrac{1}{(x-6)(x-5)}} = \dfrac{\dfrac{7(x-8)+x(x-6)}{(x-6)(x-8)}}{\dfrac{2(x-6)-(x-5)}{(x-5)(x-6)}}$

$\dfrac{7x-56+x^2-6x}{(x-6)(x-8)} \cdot \dfrac{(x-5)(x-6)}{2x-12-x+5}$

$\dfrac{x^2+x-56}{x-8} \cdot \dfrac{x-5}{x-7}$

$\dfrac{(x+8)(x-7)(x-5)}{(x-8)(x-7)}$

$\dfrac{(x+8)(x-5)}{x-8}$

1. $\frac{x-1}{x+2}$ $\quad x+2=0$

$x=-2$

2. $\frac{x^2-9x-7}{2}$ $\quad 2=0$

none

EX: $x^2-5x+6=0$

$(x-2)(x-3)=0$

$x-2=0$ $\quad x-3=0$

$x=2$ $\quad x=3$

9.1: Solving Quadratic Equations by the Square Root Property

$$ax^2+bx+c=0,\quad a\neq 0$$

Ex:

$x^2=0$

$x=0$

$x=0$

$x=0$

$x^2=9$

$x=3,-3$

$x^2-9=0$

$(x+3)(x-3)=0$

$x+3=0$ $\quad x-3=0$

$x=-3$ $\quad x=3$

$w^2=16$

$w=4,-4$ or ± 4

$t^2 = 7$

$t = \sqrt{7}, -\sqrt{7}$ or $\pm\sqrt{7}$

Aside $\sqrt{x}$ is that positive number (non-negative) that when squared equals x.

$\sqrt{9} = 3$

$x = \sqrt{9}$ $\quad x^2 = 9$

$x = 3$ $\quad x = \pm 3$

Square Root Property

If $x^2 = a$ for $a \geq 0$, then

$$x = \sqrt{a} \quad \text{or} \quad x = -\sqrt{a}$$

Ex: (p 560)

2. $x^2 = 121$ $x = \pm 11$

4. $x^2 = 22$ $x = \pm \sqrt{22}$

10. $5x^2 = 2$

12. $2x^2 = 9$

$5x^2 = 2$

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

$x = \pm\sqrt{\frac{2}{5}}$

$2x^2 = 9$

$x^2 = \frac{9}{2}$

$x = \pm\sqrt{\frac{9}{2}} = \pm\frac{3}{\sqrt{2}}$

14. $x^2 - 15 = 0$

16. $7x^2 - 21 = 0$

$x^2 - 15 = 0$

$x^2 = 15$

$x = \pm\sqrt{15}$

$7x^2 - 21 = 0$

$7x^2 = 21$

$x^2 = 3$

$x = \pm\sqrt{3}$

22. $(x-7)^2 = 2$

24. $\left(m+\frac{1}{3}\right)^2 = \frac{1}{9}$

$(x-7)^2 = 2$

$x-7 = \pm\sqrt{2}$

$x = 7 \pm \sqrt{2}$

$w^2 = 2$

$w = \pm\sqrt{2}$

$\left(m+\frac{1}{3}\right)^2 = \frac{1}{9}$

$m+\frac{1}{3} = \pm\frac{1}{3}$

$m+\frac{1}{3} = \frac{1}{3}$

$m = 0$

$m+\frac{1}{3} = -\frac{1}{3}$

$m = -\frac{2}{3}$

30. $(z + 7)^2 = -20$

32. $(3x - 17)^2 = 28$

$(z+7)^2 = -20$ undefined (for right now)

$z+7 = \pm\sqrt{-20}$

$z = -7 \pm \sqrt{-20}$

$(3x-17)^2 = 28$

$3x-17 = \pm\sqrt{28}$

$3x = 17 \pm \sqrt{28}$

$x = \dfrac{17 \pm \sqrt{28}}{3}$

34. $(5x - 11)^2 = 54$

36. $(3p - 1)^2 = 4$

$$(5x-11)^2 = 54$$

$$5x-11 = \pm\sqrt{54}$$

$$5x = 11 \pm \sqrt{54}$$

$$x = \frac{11 \pm \sqrt{54}}{5}$$

$$(3p-1)^2 = 4$$

$$3p-1 = \pm 2$$

$$3p-1 = 2$$

$$3p = 3$$

$$p = 1$$

$$3p-1 = -2$$

$$3p = -1$$

$$p = -\frac{1}{3}$$

9.2: Solving Quadratic Equations by Completing the Square

Ex: (p 566)

10. $x^2 - 10x = -24$

12. $z^2 + 6z - 9 = 0$

14. $y^2 + 4y = 0$

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

20. $y^2 - 5y + 6 = 0$

24. $3x^2 - 12x + 14 = 0$

26. $4x^2 = -20x + 3$

9.3: Solving Quadratic Equations by the Quadratic Formula

Find the Quadratic Formula

Ex: (p 574)

8. $x^2 - 5x - 6 = 0$

10. $7k^2 + 3k - 1 = 0$

18. $5x^2 = 15$

20. $m^2 - 14 = 5m$

38. $5y^2 = 4 - y$

40. $2z^2 = z + 3$

42. $k^2 + 2k + 5 = 0$

48. $\frac{m^2}{2} = 3m - 1$

54. $\frac{2}{3}x^2 - 2x - \frac{2}{3} = 0$

58. $y^2 - 2\sqrt{5}y - 1 = 0$

9.4: Complex Solutions of Quadratic Equations

Imaginary Unit *i*

The imaginary unit, written i, is the number whose square is -1. That is,

$$i^2 = -1 \quad \text{and} \quad i = \sqrt{-1}$$

Complex Numbers and Pure Imaginary Numbers

A complex number is a number that can be written in the form

$$a + bi$$

where a and b are real numbers. A complex number that can be written in the form

$$0 + bi$$

$b \neq 0$, is also called a pure imaginary number.

Ex: (p 583)

10. $(-7 + 2i) + (5 - 3i)$

14. $(-6 + i) - (3 + i)$

18. $-2i(5 + 4i)$

20. $(6 + 2i)(4 - i)$

22. $(-9 + 2i)(-9 - 2i)$

34. $y^2 - 2y + 5 = 0$

36. $8x^2 - 7x + 2 = 0$

38. $5m^2 - 6m + 7 = 0$