

MAT 121

$$1.) \quad x^2 + 8x - 33 = 0 \quad x = \frac{-8 \pm \sqrt{8^2 - 4(1)(-33)}}{2(1)}$$

$$\hookrightarrow \sqrt{64 + 132} = \sqrt{196} = 14$$

$$x = \frac{-8 \pm 14}{2}$$

$$\hookrightarrow -4 + 7 \quad -4 - 7$$

$$x = 3, -11$$

$$2.) \quad 16.12x^2 + 5.85x - 2.47 = 0$$

$$\hookrightarrow x = \frac{-5.85 \pm \sqrt{5.85^2 - 4(16.12)(-2.47)}}{2(16.12)} \quad -39.8164$$

$$\sqrt{34.2225 + 159.2456}$$

$$\hookrightarrow \sqrt{199.082}$$

$$\hookrightarrow 14.1096$$

$$\hookrightarrow \frac{-5.85 \pm 14.1096}{32.24}$$

$$32.24$$

$$\frac{-5.85 + 14.1096}{32.24}$$

$$\frac{-5.85 - 14.1096}{32.24}$$

$$x = 0.2562, -0.6191$$

$$32.24$$

$$32.24$$

$$3) 6x^2 + 5x + 3 = 0$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4(6)(3)}}{2(6)}$$

$$\hookrightarrow 25 - 72 = \sqrt{-47}$$

$$\hookrightarrow \frac{-5 \pm \sqrt{-47}}{12} = \boxed{\frac{-5 \pm \sqrt{47}i}{12}}$$

$$4) ax^2 + 2rx + 17w = 0$$

$$x = \frac{-2r \pm \sqrt{(2r)^2 - 4(a)(17w)}}{2(a)}$$

$$\hookrightarrow \frac{-2r \pm \sqrt{4r^2 - 68aw}}{2a}$$

$$\hookrightarrow \frac{-2r \pm 2\sqrt{r^2 - 17aw}}{2a}$$

$$\hookrightarrow \boxed{\frac{-r \pm \sqrt{r^2 - 17aw}}{a}}$$

$$5.) x^2 + 8x - 33 = 0$$

$$x = 3, -11$$

$$\hookrightarrow (x+11)(x-3)$$

$$6.) 33x^2 + 4x - 12 = 0$$

$$(11x-6)(3x+2) = 0$$

$$33x^2 + 22x - 18x - 12 = 0$$

$$11x - 6 = 0$$

$$\hookrightarrow x = \frac{6}{11}$$

$$3x + 2 = 0$$

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

$$7. x^2 + 7x - 33 = 0$$

$$\left(\frac{7}{2}\right)^2 = \frac{49}{4}$$

$$x^2 + 7x + \left(\frac{7}{2}\right)^2 = 33 + \left(\frac{7}{2}\right)^2$$

$$\hookrightarrow \left(x + \frac{7}{2}\right)^2 = \frac{181}{4}$$

$$x + \frac{7}{2} = \pm \sqrt{\frac{181}{4}}$$

$$\hookrightarrow x = -\frac{7}{2} \pm \frac{\sqrt{181}}{2}$$

MAT 121

$$8) 2x^2 - 4x - 17 = 0$$

$$\left(\frac{2}{2}\right)^2$$

$$x^2 - 2x - \frac{17}{2} = 0$$

$$\hookrightarrow x^2 - 2x + 1^2 = \frac{17}{2} + 1^2$$

$$\hookrightarrow (x-1)^2 = \frac{19}{2}$$

$$x-1 = \pm \sqrt{\frac{19}{2}}$$

$$x = 1 \pm \sqrt{\frac{19}{2}}$$

$$\hookrightarrow x = 1 \pm \sqrt{\frac{38}{4}}$$

$$\boxed{\hookrightarrow x = 1 \pm \frac{\sqrt{38}}{2}}$$

MAT 121

$$9) 3x^2 + 2x + 1 = 0$$

$$\hookrightarrow x^2 + \frac{2}{3}x + \frac{1}{3} = 0$$

$$\hookrightarrow \left(x + \frac{1}{3}\right)^2 = -\frac{1}{3} + \left(\frac{1}{3}\right)^2$$

$$\hookrightarrow \left(x + \frac{1}{3}\right)^2 = -\frac{20}{9}$$

$$\hookrightarrow x + \frac{1}{3} = \sqrt{-\frac{20}{9}}$$

$$\hookrightarrow x = -\frac{1}{3} \pm \frac{2\sqrt{5}i}{3}$$

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$$10) 23x^2 - 4x + 5 = 0$$

$$\hookrightarrow x^2 - \frac{4}{23}x + \frac{5}{23} = 0$$

$$\hookrightarrow x^2 - \frac{4}{23}x + \left(\frac{2}{23}\right)^2 = \frac{5}{23} + \frac{4}{23}$$

$$\hookrightarrow x^2 - \frac{4}{23}x + \left(\frac{2}{23}\right)^2 =$$

$$\sqrt{\left(x - \frac{2}{23}\right)^2} = \sqrt{-\frac{111}{529}}$$

$$\hookrightarrow x - \frac{2}{23} = \frac{\sqrt{111}}{23} i$$

$$\boxed{\hookrightarrow x = \frac{2}{23} \pm \frac{\sqrt{111}}{23} i}$$