$$\frac{32.5}{50}$$

SUNDANCE HOLLINGSWORTH

**1:**  $x^2 + 7x - 18 = \emptyset$

DISC.:  $7^2 - 4(-18 \cdot 1)$

$7^2 + 72$

$49 + 72$

$121$ (IT HAS 2 REAL ANSWERS)

*You already worked out the discriminant... Skip this and go right to plugging it in. −1*

QUADRATIC:  $x = \dfrac{-7 \pm \sqrt{7^2 - 4(-18 \cdot 1)}}{2(1)}$

$\dfrac{-7 \pm \sqrt{121}}{2}$

$\dfrac{-7 + 11}{2} \qquad \dfrac{-7 - 11}{2}$

$\dfrac{4}{2} \qquad\qquad \dfrac{-18}{2}$

$\boxed{x = 2} \qquad \boxed{x = -9}$

SOLUTION:  $x = 2, x = -9$

**2:**  $5.89x^2 - 13.09x + 7.26 = \emptyset$

DISC:  $-13.09^2 - 4(5.89 \cdot 7.26)$

$171.35 - 4(42.76)$

$171.35 - 171.04$

$0.31$ (2 REAL ANSWERS)

QUARATIC:  $x = \dfrac{13.09 \pm \sqrt{-13.09^2 - 4(5.89 \cdot 7.26)}}{2(5.89)}$

*Same, just go straight to plugging it in.*

$\dfrac{13.09 + \sqrt{0.31}}{11.79} \qquad \Longleftarrow \dfrac{13.09 \pm \sqrt{0.31}}{11.79} \Longrightarrow \qquad \dfrac{13.09 - \sqrt{0.3}}{11.79}$  −1

$\dfrac{13.65}{11.79} \qquad\qquad\qquad\qquad\qquad\qquad\qquad \dfrac{12.53}{1179}$

$\boxed{x = 1.16} \qquad\qquad\qquad \boxed{x = 1.06}$

SOLUTION:  $x = 1.16, x = 1.06$

*"Round to 4" decimal places −1*

*Those decimals are rounded, "=" means exact.*
*Use "≈" instead to show it is not exact.*

−3

# MAT 1340

**③:** $25x^2 - 20x + 7 = 0$  →  QUAD: $x = \dfrac{20 \pm \sqrt{-20^2 - 4(25 \cdot 7)}}{2(25)}$

DISC: $-20^2 - 4(25 \cdot 7)$

$400 - 4(175)$

$400 - 700$

$-300$

(IT HAS __NO__ REAL ANSWERS)

$\dfrac{20 \pm \sqrt{-300}}{50}$

$\boxed{x = \dfrac{20 \pm i\sqrt{-300}}{50}}$

$\boxed{\text{SOLUTION}}$  −1

Can go a little more...

$\dfrac{20 \pm \sqrt{100}\sqrt{-3}}{50}$

$= \dfrac{20 \pm 10\,i\sqrt{3}}{50} = \boxed{\dfrac{2 \pm i\sqrt{3}}{5}}$

**④:** $3Mx^2 - 2wx + 5R = 0$  → QUAD:

DISC: $-2w^2 - 4(3M \cdot 5R)$

$4w - 4(15MR)$

$4w - 60MR$

$-56wMR$?

$x = \dfrac{2w \pm \sqrt{2w^2 - 4(3M \cdot 5R)}}{2(3M)}$

from here...

$\dfrac{2w \pm \sqrt{-56wMR}}{6M}$  ← here is where it crashes. Can't combine "z" "M" "w"

$\boxed{\dfrac{2w \pm i\sqrt{56wMR}}{6M}}$

$\boxed{\text{SOLUTION?}}$  Good! It is always OK to not be sure. −1

leave out this "4" so you can factor it later

$= \dfrac{2w \pm \sqrt{4w^2 - 4(15MR)}}{6M}$

$= \dfrac{2w \pm \sqrt{4(w^2 - 15MR)}}{6M}$

$= \dfrac{2w \pm 2\sqrt{w^2 - 15MR}}{36M}$

$= \dfrac{w \pm \sqrt{w^2 - 15MR}}{3M}$

**⑤:** $x^2 + 7x - 18 = 0$

$(x + 9)(x - 2) = 0$

$x + 9 = 0 \qquad x - 2 = 0$

$\boxed{x = -9 \qquad x = 2}$

$\boxed{\text{SOLUTION}}$  ✓

*Style Note* When "x" has multiple values, write it as a set like...

$x = -9, 2$  OR  $x \in \{-9, 2\}$

**⑥:** $589x^2 - 1309x - 726 = 0$

$\left(589x - \dfrac{682}{589}\right)\left(x - \dfrac{627}{589}\right) = 0$

Insert miracle here.

QUAD: $x = \dfrac{1309 \pm \sqrt{-1309^2 - 4(589 \cdot 726)}}{2(589)}$

Need to see the factored form of this!

ie: $(31x - 33)(19x - 22)$

$\dfrac{1309 + \sqrt{3025}}{1178} \qquad \dfrac{1309 - \sqrt{3025}}{1178}$

$\dfrac{1309 \pm \sqrt{-1309^2 - 1,710,456}}{1178}$

$\dfrac{1309 \pm \sqrt{3025}}{1178}$  −S

$x = \dfrac{1364}{1178} \qquad x = \dfrac{1254}{1178}$

$\boxed{x = \dfrac{682}{589}} \qquad \boxed{x = \dfrac{627}{589}}$

Hmm... took a wrong turn somewhere. $x \in \left\{\dfrac{33}{31}, \dfrac{22}{19}\right\}$

# MAT 1340

**(7):**

$$x^2 + 7x - 18 = 0$$

$$x^2 + 7x + \left(\tfrac{7}{2}\right)^2 - 18 - \left(\tfrac{7}{2}\right)^2 = 0$$

$$\left(x + \tfrac{7}{2}\right)^2 - \tfrac{7^2}{4} - \tfrac{49}{4} = 0$$

$$\left(x + \tfrac{7}{2}\right)^2 - \tfrac{23}{4} = 0$$

$$\sqrt{\left(x + \tfrac{7}{2}\right)^2} = \sqrt{\tfrac{23}{4}}$$

$$x + \tfrac{7}{2} = \sqrt{\tfrac{23}{4}}$$

$$\boxed{x = \pm\sqrt{\tfrac{23}{4}} - \tfrac{7}{2}}$$

SOLUTION

*(red)* $-72 - 49 = \boxed{-121}$  The wrong turn was here.

*(red)* ← Make sure your radicals are tall enough for the whole fraction. $-1.5$

*(red)* w/ $\tfrac{-121}{4}$: $\quad x = -\tfrac{7}{2} \pm \sqrt{\tfrac{121}{4}} = -\tfrac{7}{2} \pm \tfrac{\sqrt{121}}{\sqrt{4}}$

$$= -\tfrac{7}{2} \pm \tfrac{11}{2} \longrightarrow_{LCD} \boxed{\tfrac{-7 \pm 11}{2}}$$

**(8):**

$$x^2 - 24x - 9 = 0$$

$$x^2 - 24x + 144 - 9 - 144 = 0$$

$$(x - 12)^2 - 153 = 0$$

$$(x - 12)^2 = 153$$

$$x - 12 = \sqrt{153}$$

$$\boxed{x = \pm\sqrt{163} + 12}$$

*(red)* *style note* Put the "$\pm$" part second like... "$12 \pm \sqrt{153}$"

**(9):**

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

$$5x^2 + 2x + \left(\tfrac{2}{2}\right)^2 + 3 - \left(\tfrac{2}{2}\right)^2 = 0$$

$$\tfrac{5x^2}{5} + \tfrac{2x}{5} + \tfrac{1}{5} = -\tfrac{2}{5}$$

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

$$x + \tfrac{1}{5} = \pm i\sqrt{\tfrac{2}{5}}$$

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

SOLUTION

*(red)* DISC: $2^2 - 4(5 \cdot 3)$
$4 - 60$
$-56 < 0$

*(red)* Move over the $3_i$ then factor the $5_i$ then complete the square.

*(red)* $-3$

*(red)* Sol'n: $x = \dfrac{-1 \pm i\sqrt{14}}{5}$

*(red)* $-4.5$

**10:**

$$4x^2 - 16x + 11 = 0$$

$$4x^2 - 16x + 8^2 + 11 - 8^2 = 0$$

$$4x^2 - 16x + 64 - 53 = 0$$

$$\frac{4x^2}{4} - \frac{16x}{4} + \frac{64}{4} = \frac{53}{4}$$

$$x^2 - 4x + 16 = \frac{53}{4}$$

$$(x-4)^2 = \frac{53}{4}$$

$$x - 4 = \pm\sqrt{\frac{53}{4}}$$

$$\boxed{x = \pm\sqrt{\frac{53}{4}} + 4}$$

$$\boxed{\text{SOLUTION}}$$

Move the 11...
then factor the 4...
then complete the
    square.

$$4x^2 - 16x = -11$$

$$4\left(x^2 - 4x + 2^2\right) = -11 + 4\left(2^2\right)$$

$$4(x-2)^2 = 5$$

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

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