MAT 1340

Brooklyn Hoskins

48/50 Nice!

(1) $x^2+7^2-18=0$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$a=1, b=7, c=-18$

b^2-4ac

$7^2-4(1)(-18)=49+72=121$

$\sqrt{121}=11$

$x=\frac{-7\pm\sqrt{121}}{2(1)}=\frac{-7\pm11}{2}$

$\frac{-7+11}{2}=\frac{4}{2}=2$

$\frac{-7-11}{2}=\frac{-18}{2}=-9$

$x=2,-9$

Style note (Because some professors down the line might actually count points off for it.)
Write number sets from small → big
ie: "-9, 2"

(2) $5.89x^2-13.09x+7.26=0$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$a=5.89, b=-13.09\ c=7.26$

b^2-4ac

$-13.09^2-4(5.89)(7.26)$

$=171.3481-171.0456$

$=0.3025$

$x=\frac{13.09\pm\sqrt{0.3025}}{2(5.89)}$

$x=\frac{13.09\pm0.55}{11.78}$

$\frac{13.09+0.55}{11.78}=\frac{13.64}{11.78}\neq1.1579$

$\frac{13.09-0.55}{11.78}=\frac{12.54}{11.78}\neq1.0645$

$x\neq1.1579, 1.0645$

"=" means exact. If there is any rounding done it is no longer exact, so use "≈".

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③ $25x^2 - 20x + 7 = 0$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$a = 25, b = -20, c = 7$

$b^2 - 4ac$

$-20^2 - 4(25)(7) = 400 - 700 = -300$

$$x = \frac{20 \pm \sqrt{-300}}{2(25)}$$

$$x = \frac{20 \pm i\sqrt{300}}{50}$$

$$x = \frac{20 \pm 10i\sqrt{3}}{50}$$

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

Nice!

④ $3mx^2 - 2wx + 5r = 0$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$a = 3m, b = -2w, c = 5r$

$b^2 - 4ac$

$(-2w)^2 - 4(3m)(5r)$

If you leave this 4 out you can factor the whole thing.

$4w^2 - 12m(5r)$

$4w^2 - 60mr$

$$x = \frac{2w \pm \sqrt{4w^2-60mr}}{2(3m)}$$

$$x = \frac{2w \pm \sqrt{4w^2-60mr}}{6m}$$

-1

$\rightarrow 4w^2 - 4(15mr)$

$= 4(w^2 - 15mr)$

and then...

$$= \frac{2w \pm \sqrt{4(w^2-15mr)}}{6m} = \frac{2w \pm 2\sqrt{w^2-15mr}}{3(2)m} = \frac{w \pm \sqrt{w^2-15}}{3m}$$

-1

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⑤ $x^2+7x-18=0$

$9(-2)=-18$

$9-2=7$

$x^2+9x-2x-18$

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

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

$x=-9$ or $x=2$

$x=-9,2$

$a=1, b=7, c=-18$

$b^2-4ac=7^2-4(1)(-18)$

$=49+72=121=11^2$

$x=\frac{-7\pm\sqrt{121}}{2(1)}=\frac{-7\pm 11}{2}$

$\frac{-7+11}{2}=\frac{4}{2}=2$

$\frac{-7-11}{2}=\frac{-18}{2}=-9$

Nice! You did this 3 diff. ways!!

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⑥ $589x^2-1309x+726=0$

$ac=(589)(726)$

$=427,614$

	Sum	product
-1309	$-1000+(-309)$	309,000
	$-650+(-659)$	428,350
	$-630+(-679)$	427,770
	$-629+(-680)$	427,720
	$-628+(-681)$	427,668
	$-627+(-628)$	427,614

$589x^2-1309x+726=0$

$589x^2-627x-682x+726=0$

$19x(31x-33)-22(31x-33)=0$

$(31x-33)(19x-22)=0$

$31x-33=0$

$+33\ +33$

$31x=33$

$\frac{31x}{31}=\frac{33}{31}$ $x=\frac{33}{31}$

$19x-22=0$

$+22\ +22$

$19x=22$

$\frac{19x}{19}=\frac{22}{19}$ $x=\frac{22}{19}$

$x=\frac{33}{31},\frac{22}{19}$

-0

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

$x^2+7x=18$

$\frac{b}{2}^2=\frac{7}{2}^2$

$x^2+7x+(\frac{7}{2})^2=18+(\frac{7}{2})^2$

$x^2+7x+\frac{7^2}{2^2}=18+(\frac{7}{2})^2$

$x^2+7x+\frac{49}{4}=18+(\frac{7}{2})^2$

$x^2+7x+\frac{49}{4}=18\cdot\frac{4}{4}+\frac{49}{4}$

$x^2+7x+\frac{49}{4}=\frac{18\cdot4+49}{4}$

$x^2+7x+\frac{49}{4}=\frac{121}{4}$

$(x+\frac{7}{2})^2=\frac{121}{4}$

$x+\frac{7}{2}=\pm\sqrt{\frac{121}{4}}$

$x+\frac{7}{2}=\pm\frac{11}{2}$

$x=2,-9$

Good!

$x=\frac{11-7}{2}=x=\frac{4}{2}=x=2$

$x=\frac{-11-7}{2}=x=\frac{-18}{2}=x=-9$

-0

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(8) $x^2 - 24x - 9$

$x^2 - 24x = 9$

$\frac{b}{2}^2 = -12^2$

$x^2 - 24x + (-12)^2 = 9 + (-12)^2$

$x^2 - 24x + 144 = 153$

$(x-12)^2 = 153$

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

$x - 12 = \pm\sqrt{9(17)}$

$x - 12 = \pm\sqrt{3^2 \cdot 17}$

$x - 12 = \pm 3\sqrt{17}$

$x = \pm 3\sqrt{17} + 12$

Style
Be consistent, keep "±" on the right! :)
ie: $x = 12 \pm 3\sqrt{17}$

-0

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(9) $5x^2+2x+3=0$

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

$\frac{5x^2}{5}+\frac{2x}{5}=\frac{-3}{5}$

$x^2+\frac{2x}{5}=-\frac{3}{5}$

$\frac{b}{2}^2=\frac{1}{5}^2$

$x^2+\frac{2x}{5}+\left(\frac{1}{5}\right)^2=-\frac{3}{5}+\left(\frac{1}{5}\right)^2$

$x^2+\frac{2x}{5}+\frac{1}{25}=-\frac{14}{25}$

$x+\frac{1}{5}=\pm\sqrt{-\frac{14}{25}}$

Nice move!

$x+\frac{1}{5}=\pm\sqrt{\left(\frac{i}{5}\right)^2\cdot 14}$

$x+\frac{1}{5}=\pm\frac{i}{5}\sqrt{14}$

$x+\frac{1}{5}=\pm\frac{i\sqrt{14}}{5}$

$x=-\frac{1}{5}\pm\frac{i\sqrt{14}}{5}$

Style

Take advantage of the LCD here and combine the whole thing.

i.e. "$\frac{-1\pm i\sqrt{14}}{5}$"

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(10.) $4x^2 - 16x + 11 = 0$

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

$\frac{4x^2}{4} + \frac{-16x}{4} = \frac{-11}{4}$

$x^2 - 4x = -\frac{11}{4}$

$\frac{b}{2}^2 = (-2)^2$

$x^2 - 4x + (-2)^2 = -\frac{11}{4} + (-2)^2$

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

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

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

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

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

style

"$2 \pm \frac{\sqrt{5}}{2}$"

-0