College Alg Review 1-5 - 1-6

STATION #1 Factoring When $a \neq 1$
Solving When $a \neq 1$

Factor each you may build a house or box and Circle (look on back for help)

① $5x^2+17x+6$ $\quad 30 \quad 15,2 \quad 17$

$5x^2+15x+2x+6$

$5x(x+3)+2(x+3)$

$(5x+2)(x+3)$

② $3x^2+5x+2$ $\quad 6 \quad 2,3 \quad 5$

$3x^2+3x+2x+2$

$3x(x+1)+2(x+1)$

$(3x+2)(x+1)$

Just factor no Solve

Find the Zeros

③ $f(x)=8x^2-14x+3$ $\quad 24 \quad -2,-12 \quad -14$

$0=8x^2-14x+3$

$8x^2-12x-2x+3$

$4x(2x-3)-1(2x-3)$

$(4x-1)(2x-3)=0$

$x=\frac{1}{4}$ $\quad x=\frac{3}{2}$

④ $-6x^2+17x=+10$ (typo and Fix) $\quad 60 \quad -5,-12 \quad -17$

$+6x^2 \quad -17x \quad +6x^2 \quad -17x$

$6x^2-17x+10=0$

$6x^2-12x-5x+10=0$

$6x(x-2)-5(x-2)=0$

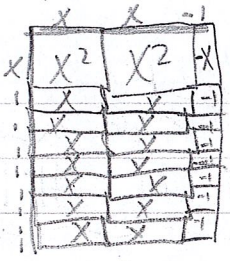
$(6x-5)(x-2)=0$

$x=\frac{5}{6}$ $\quad x=2$

build a house -16
$2x^2+15x-8=0$ $+16,-1$ 15

help if needed

$2x^2+15x=8$
$\quad -8 \quad -8$



$(2x-1)(x+8)=0$
now solve
$x=\frac{1}{2}$ $x=-8$

① Get all terms on same side set $=0$

$2x^2+15x-8=0$ $\quad \frac{ac}{b}$

② look for 2 factors of -16 that add up to 15
-16
$16,-1$ | 15

③ Rewrite the Middle term
$2x^2+15x-8=0$
$2x^2+16x-1x-8=0$

④ Box and Circle & GCF Factor each

$\boxed{2x^2+16x}$ $\bigcirc{-1x-8}=0$

$2x(x+8)-1(x+8)=0$

⑤ Rewrite as (length)(width) $=0$

$(x+8)(2x-1)=0$

⑥ Solve

$x=-8$ $\quad x=\frac{1}{2}$

$2x-1=0$
$+1 \quad +1$
$2x=1$

College Alg Review 1-5-1-6

STATION #2 Extracting Square Roots to Solve
factoring binomials to Solve
→ over the set of Complex #s

Solve by extracting Square roots or by getting the variable by itself

① $\frac{3x^2}{3} = \frac{60}{3}$

$\sqrt{x^2} = \sqrt{20}$

$x = \pm\sqrt{4}\sqrt{5}$

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

② $2x(x-3) = 5x^2 - 7x$

$2x^2 - 6x = 5x^2 - 7x$

$-2x^2 + 6x \quad -2x^2 + 6x$

$0 = 3x^2 - 1x$

$0 = x(3x-1)$

$x = 0$ $\quad x = \frac{1}{3}$

③ $\sqrt{(x+5)^2} = \sqrt{-10}$

$x + 5 = \pm i\sqrt{10}$

$x = -5 \pm i\sqrt{10}$

④ $3x^2 + 27 = 0$

$-27 \quad -27$

$\frac{3x^2}{3} = \frac{-27}{3}$

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

$x = \pm 3i$

Undo what is happening to x

$3x^2 + 9 = 0$

$-9 \quad -9$

$\frac{3x^2}{3} = \frac{-9}{3}$

$\sqrt{x^2} = \sqrt{-3}$

$x = \pm i\sqrt{3}$

$(x+4)^2 = 16$

$\sqrt{(x+4)^2} = \sqrt{16}$

$x+4 = 4 \qquad x+4 = -4$

$-4 \quad -4 \qquad -4 \quad -4$

$x = 0 \qquad x = -8$

$4x(x-1) = 2x^2 + 2x$

$4x^2 - 4x = 2x^2 + 2x$

$-2x^2 \quad -2x \quad -2x^2 \quad -2x$

$2x^2 - 6x = 0$ Now factor

$2x(x-3) = 0$

$x = 0 \qquad x = 3$

College Alg Renew 1-5 1-6

STATION #4

* You choose the Method to Solve Quadratics Most efficiently... Which tool do you choose
* Quadratic formula to Solve

hint on back

Solve over the set of Complex #s

① $3x^2 - 4x = 0$

$x(3x-4) = 0$

$x = 0$ $\quad x = \frac{4}{3}$

② $x^2 + 14x - 24 = 0$

Not factorable: -24 / 7 / 14

$x^2 + 14x + 49 = 24 + 49$

$\sqrt{(x+7)^2} = \sqrt{73}$

$x + 7 = \pm\sqrt{73}$

$x = -7 \pm \sqrt{73}$

③ $x^2 - 6x + 13 = 0$ $\quad 13$ / nope / -6

$x^2 - 6x + 9 = -13 + 9$

x^2	x	x	x
$-x$			
$-x$			9
$-x$			

$\sqrt{(x-3)^2} = \sqrt{-4}$

$x - 3 = \pm 2i$

$+3 \quad +3$

$x = 3 \pm 2i$

④ $3x^2 - 3x = 4$ $\quad -12$ / nope / -3

$3x^2 - 3x - 4 = 0$

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

$x = \frac{3 \pm \sqrt{9 + 48}}{6}$

$x = \frac{3 \pm \sqrt{57}}{6}$

⑤ $3x^2 - 27 = 0$

$+27 \quad +27$

$\frac{3x^2}{3} = \frac{27}{3}$

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

$x = \pm 3$

⑥ $\frac{3(x+4)^2}{3} = \frac{21}{3}$

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

$x + 4 = \pm\sqrt{7}$

$-4 \quad -4$

$x = -4 \pm \sqrt{7}$

★ If it is a binomial and $b \neq 0$ try to factor
① GCF
② Special Cases

★ If it is a binomial and $b = 0$ try and extract Square roots or get x by itself

★ If it is a trinomial First Set $= 0$ $ax^2 + bx + c = 0$
① try and factor
② $a = 1$ try and Complete the Square
③ Quadratic formula

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

College Algebra Renew 1-5-1-6

{STATION #5}

Solve none quadratic equations
hints on back

#13 pg. 178

$(\sqrt{x+3})^2 = (x-3)^2$

$x+3 = x^2-6x+9$

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

$0 = x^2-7x+6$

6, -7; -1, -6

$0 = (x-1)(x-6)$

$x=1$ extraneous; $x=6$ ☆

Check

#25 pg. 178

$\sqrt{x-5} - \sqrt{x-8} = 3$

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

$(\sqrt{x-8}+3)(\sqrt{x-8}+3)$

$(x-5) = x-8+3\sqrt{x-8}+3\sqrt{x-8}+9$

$x-5 = x+1+6\sqrt{x-8}$

$-x-1 \quad -x-1$

$-6 = 6\sqrt{x-8}$

$\frac{-6}{6} = \frac{6\sqrt{x-8}}{6}$

$(-1)^2 = (\sqrt{x-8})^2$

$1 = x-8$

$+8 \quad +8$

$9 = x$

Check No Solution

Extraneous

#37 pg. 178

$(x-4)^{\frac{2}{3}} = (16)^{\frac{3}{2}}$

$\left((x-4)^{\frac{2}{3}}\right)^{\frac{3}{2}} = \left(16^{\frac{1}{2}}\right)^{3}$

$x-4 = 4^3$

$x-4 = 64$ also can be $x-4 = -64$

$+4 \quad +4 \qquad +4 \quad +4$

$x = 68 \qquad x = -60$

because you can take $(\text{negative})^{\frac{1}{3}}$

#43 pg. 179 Chunk look at back

$9x^4 = 25x^2 - 16$

$9x^4 - 25x^2 + 16 = 0$

$9(x^2)^2 - 25x^2 + 16 = 0$

$9m^2 - 25m + 16 = 0$

144, -9, -16, -25

$9m^2 - 9m - 16m + 16 = 0$

$9m(m-1) - 16(m-1) = 0$

$(9m-16)(m-1) = 0$

$m = \frac{16}{9} \qquad m = 1$

$m = x^2$

$x^2 = \frac{16}{9} \qquad x^2 = 1$

$x = \pm\frac{4}{3} \qquad x = \pm 1$

#61 pg. 179

$|x| = 8$

$x = \pm 8$

#67 pg. 179

$\frac{2|3x-2|}{2} = \frac{14}{2}$

$|3x-2| = 7$

$3x-2 = 7 \qquad 3x-2 = -7$

$+2 \quad +2 \qquad +2 \quad +2$

$\frac{3x}{3} = \frac{9}{3} \qquad \frac{3x}{3} = \frac{-5}{3}$

$x = 3 \qquad x = -\frac{5}{3}$

like problem #13

#15 pg. 178 $\sqrt{2x+13} = x+7$

$(\sqrt{2x+13})^2 = (x+7)^2$

Square both sides to get rid of $\sqrt{}$ sign

$2x+13 = (x+7)^2$ foil out $(x+7)(x+7)$

$2x+13 = x^2+14x+49$ Set $=0$

$-2x \quad -13 \qquad -2x \quad -13$

$0 = x^2+12x+36$ now factor 36: 6,6 | 12

$0 = (x+6)(x+6)$

$x = -6$ only one answer

like problem #25

#27 pg. 178 $\sqrt{2x+3} + \sqrt{x-2} = 2$

get radicals on opp side $=$

$(\sqrt{2x+3})^2 = (2-\sqrt{x-2})^2$ ← FOIL out $(2-\sqrt{x-2})(2-\sqrt{x-2})$

now square both sides $4 - 2\sqrt{x-2} - 2\sqrt{x-2} + x - 2$

$2x+3 = 4 - 4\sqrt{x-2} - x - 2$

$2x+3 = 2 - 4\sqrt{x-2} - x$

$+x \quad -2 \qquad -2 \qquad +x$

$(1x+1)^2 = (-4\sqrt{x-2})^2$

$x^2+2x+1 = 16(x-2)$

$x^2+2x+1 = 16x-32$

$-16x+32 \qquad -16x+32$

$x^2-14x+33 = 0$

like prob #43

Original was degree of 4 so there will be 4 solutions

#44 pg. 179 $4x^4 = 13x^2 - 9$

chunk call $x^2 = m$

$4(x^2)^2 - 13(x^2) + 9 = 0$ now sub $m = x^2$

$4m^2 - 13m + 9 = 0$

Now factor 36: $-9, -4$ | -13

$4m^2 - 4m - 9m + 9 = 0$

$4m(m-1) - 9(m-1) = 0$

$(4m-9)(m-1) = 0$

$m = \frac{9}{4} \qquad m = 1$

but m actually $= x^2$

$x^2 = \frac{9}{4} \qquad x^2 = 1$

take square root and solve

$x = \pm\frac{3}{2} \qquad x = \pm 1$

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

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

$x = 1$

$x = -1$

$x^2 - 14x + \boxed{49} = -33 + \boxed{49}$

$\boxed{\quad} = \left(\frac{b}{2}\right)^2$

$\sqrt{(x-7)^2} = \sqrt{16}$

$x-7 = 4 \qquad x-7 = -4$

$+7 \quad +7 \qquad +7 \quad +7$

$x = 11$ Extraneous $\qquad x = 3$ Extraneous

$\sqrt{2(11)+3} + \sqrt{11-2} = 2 \qquad \sqrt{2(3)+3} + \sqrt{3-2} = 2$

$\sqrt{25} + \sqrt{9} = 2 \qquad \sqrt{9} + \sqrt{1} = 2$

$5+3 \neq 2 \qquad 3+1 = 2$

No No

So No Solutions

like problem #67

#66 pg. 179 $|2x-3| = 11$

$2x-3 = 11$ or $2x-3 = -11$

$+3 \quad +3 \qquad +3 \quad +3$

$2x = 14 \qquad 2x = -8$

$x = 7 \qquad x = -4$

#38 pg. 178 $(x+5)^{\frac{2}{3}} = 4$ like prob #37

take both sides to reciprocal

$\left((x+5)^{\frac{2}{3}}\right)^{\frac{3}{2}} = (4)^{\frac{3}{2}}$

$x+5 = \left(4^{\frac{1}{2}}\right)^3$

$x+5 = 2^3$

$x+5 = 8$

$-5 \quad -5$

$x = 3$

College Alg Review 1-5-1-6

Station #3 Completing the Square

Solving by Completing the Square.

(Look on back for help)

Solve each by Completing the Square
Show all work

① $0 = x^2 + 18x - 37$

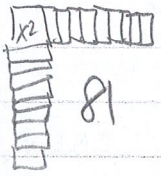
$+37 = x^2 + 18x + \boxed{81}$

$\sqrt{118} = \sqrt{(x+9)^2}$

$\pm\sqrt{118} = x + 9$

$-9 \quad -9$

$-9 \pm \sqrt{118} = x$



② $16 = x^2 + 6x$

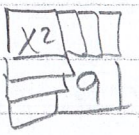
$16 + \boxed{9} = x^2 + 6x + \boxed{9}$

$\sqrt{25} = \sqrt{(x+3)^2}$

$5 = x + 3 \qquad -5 = x + 3$

$-3 \quad -3 \qquad -3 \quad -3$

$2 = x \qquad -8 = x$



③ $x^2 - 4x + 10 = 0$

$x^2 - 4x + \boxed{4} = -10 + \boxed{4}$

$\sqrt{(x-2)^2} = \sqrt{-6}$

$x - 2 = \pm i\sqrt{6}$

$x = 2 \pm i\sqrt{6}$

④ $15 = x^2 + 30x - 10$

$-10 \qquad +10$

$25 + \boxed{225} = x^2 + 30x + \boxed{225}$

$\sqrt{250} = \sqrt{(x+15)^2}$

$\pm\sqrt{25}\sqrt{10} = x + 15$

$\pm 5\sqrt{10} = x + 15$

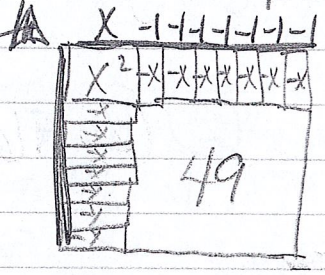
$-15 \qquad -15$

$-15 \pm 5\sqrt{10} = x$

Solving by Completing the Square

① Rewrite equation so it looks like this
$x^2 - 14x + \square = -46 + \square$

② Draw a perfect square house



How many closets do you have to build to make it a perfect square

$\square = \left(\frac{b}{2}\right)^2 \quad \left(\frac{-14}{2}\right)^2 = 49$

③ What ever you do to one side do to the other

$x^2 - 14x + \boxed{49} = -46 + 49$

④ Now you have a square write it as length times width do tado tado how far you walk

$(x-7)^2 = 3$

⑤ Now extract square Roots and Solve

$\sqrt{(x-7)^2} = \sqrt{3}$

$x - 7 = \pm\sqrt{3}$

$\boxed{x = 7 \pm \sqrt{3}}$