9.4 Factoring to Solve Quadratic Equations

* Property: Zero Product Property

For any real numbers a & b, if $ab=0$, then $a=0$ or $b=0$.

Therefore if $(x+3)(x+2)=0$ then $x+3=0$ or $x+2=0$

* Review Problem 1 on pg. 568

* Got it #1

A) $(x+1)(x-5)=0$

$(x+1)=0$ $(x-5)=0$

$-1\ -1$ $+5\ +5$

$x=-1$ $x=5$

$\{-1,5\}$

*write your answer as a set

B) $(2x+3)(x-4)=0$

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

$-3\ -3$ $+4\ +4$

$\frac{2x=-3}{2}$ $x=4$

$x=-\frac{3}{2}$ $x=4$

$\{-\frac{3}{2}, 4\}$

C) $\{-\frac{1}{2}, -14\}$

D) $\{\frac{2}{7}, \frac{4}{5}\}$

* Review Problem 2 on pg. 569

* Got it? 2 (* Factor 1st)

A) $m^2 - 5m - 14 = 0$

$m^2 - 7m + 2m - 14 = 0$

$(m^2 - 7m) + (2m - 14) = 0$

$m(m-7) + 2(m-7) = 0$

$(m+2)(m-7) = 0$

$m = \{-2, 7\}$

Factors of ac (-14)	Sum of b (-5)
-7, +2	✓

B) $p^2 + p - 20 = 0$

$(p^2 + 5p) + (-4p - 20) = 0$

$p(p+5) - 4(p+5) = 0$

$(p-4)(p+5) = 0$

$p = \{-5, 4\}$

Factors of ac (-20)	Sum of b (1)
+5, -4	✓

C) $2a^2-15a+18=0$

Factors of ac (36)	Sum of b(-15)
-9, -4	NO
-3, -12	✓

$2a^2-12a-3a+18=0$

$(2a^2-12a)+(-3a+18)=0$

$2a(a-6)-3(a-6)=0$

$(2a-3)(a-6)=0$

$2a-3=0$ $\quad$ $a-6=0$

$+3\ +3$ $\quad$ $+6\ +6$

$\frac{2a=3}{2}$ $\quad$ $a=6$

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

$a=\left\{\frac{3}{2}, 6\right\}$

* Review Problem 3 on pg. 569

* Got it #3)

A) $x^2+14x=-49$

$+49\ +49$

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

$(x+7)^2=0$

$x=-7$

B) The quadratic polynomials are perfect trinomial squares that yields the same binomial multiplied by itself (binomial squared)

* Review Problem 4 on pg. 570

* Got it #4)

$(2x+11)(2x+17) = 391$

$4x^2+56x+187 = 391$

$-391 \quad -391$

$4x^2+56x-204 = 0$

$4(x^2+14x-51) = 0$

Factors of ac (-51)	Sum of b (14)
$+17, -3$	✓

$4(x^2+17x-3x-51) = 0$

$4((x^2+17x)+(-3x-51)) = 0$

$4(x(x+17)-3(x+17)) = 0$

$4(x-3)(x+17) = 0$

$x-3=0$ $\qquad$ $x+17=0$

$x=3$ $\qquad$ $x=-17$

* Not a reasonable x value

$(2x+11)$ $\qquad$ $(2x+17)$

$2(3)+11$ $\qquad$ $2(3)+17$

$6+11$ $\qquad$ $6+17$

17 in by 23 in

9.4 pg. 571 #8-36 Evens

8) $\{8, 9\}$

10) $\{-2, 0\}$

12) $(7x+2)(5x-4)=0$

$7x+2=0$ $\quad 5x-4=0$

$-2\ -2$ $\quad +4\ +4$

$7x=-2$ $\quad \frac{5x=4}{5}$

$x=\frac{-2}{7}$ $\quad x=4/5$

$\{-2/7, 4/5\}$

14) $x^2+11x+10=0$

$x^2+10x+1x+10=0$

$x(x+10)+1(x+10)=0$

$(x+1)(x+10)=0$

$\{-10, -1\}$

16) $s^2-14s+45=0$

$s^2-9s-5s+45=0$

$s(s-9)-5(s-9)=0$

$(s-5)(s-9)=0$

$\{5, 9\}$

18) $3q^2+q-14=0$

$3q^2+7q-6q-14=0$

$q(3q+7)-2(3q+7)=0$

$(q-2)(3q+7)=0$

$\{-2\frac{1}{3}, 2\}$

$\{-\frac{7}{3}, 2\}$

20) $x^2+13x+42=0$

$x^2+7x+6x+42=0$

$x(x+7)+6(x+7)=0$

$(x+6)(x+7)=0$

$\{-7, -6\}$

22) $c^2-5c=0$

$c(c-5)=0$

$\{0, 5\}$

$l = 2w+5$
$w = w$

$A = lw$

24) $3h^2+17h=-10$

$3h^2+17h+10=0$

$3h^2+15h+2h+10=0$

$3h(h+5)+2(h+5)=0$

$(3h+2)(h+5)=0$

$\{-5, -\frac{2}{3}\}$

26) $V=lwh$

$280=4(n+2)(n+5)$

$280=(4n+8)(n+5)$

$280=4n^2+28n+40$

$-280 \quad -280$

$0=4n^2+28n-240$

$4(n^2+7n-60)$

$4(n^2+12n-5n-60)$

$4(n(n+12)-5(n+12))$

$4(n-5)(n+12)$

$n=5$ or -12

* -12 is not a reasonable answer

28) $250=(2w+5)(w)$

$250=2w^2+5w$

$2w^2+5w-250=0$

$2w^2+25w-20w-250=0$

$w(2w+25)-10(2w+25)$

$(w-10)(2w+25)=0$

$w=10$ or $\frac{-25}{2}$

* $-25/2$ is not a reasonable answer

$w=10$

$l=2w+5$

$l=2(10)+5$

$l=20+5$

$l=25$

10ft by 25ft

Mistake = * cannot factor out an "x"

30) $a^2+8a+12=0$

$a^2+6a+2a+12=0$

$a(a+6)+2(a+6)=0$

$(a+2)(a+6)=0$

$a=\{-6,-2\}$

36) $2x^2+3x=20$

$2x^2+3x-20=0$

$2x^2+8x-5x-20=0$

$2x(x+4)-5(x+4)=0$

$(2x-5)(x+4)=0$

Correct = $\{-4, +\frac{5}{2}\}$

32) $7n^2+16n+15=2n^2+3$

$5n^2+16n+12=0$

$5n^2+10n+6n+12=0$

$5n(n+2)+6(n+2)=0$

$(5n+6)(n+2)=0$

$n=\{-2, -\frac{6}{5}\}$

34) lg sq. − sm sq = 72

$(2x+8)(2x+6)-(6\cdot 8)$

$4x^2+28x+48-48=72$

$4x^2+28x-72=0$

$4(x^2+7x-18)=0$

$4(x^2+9x-2x-18)=0$

$4(x(x+9)-2(x+9))=0$

$4(x-2)(x+9)$

$x=2$

-9 is not a reasonable answer

2 feet