Solving Equations Using Factoring

a) Factored form:

1. $x(x+2)=0 \Rightarrow \{-2,0\}$
2. 2. $(x-3)(x+4)=0 \Rightarrow \{-4,3\}$
3. $(2x-4)(5x+3)=0 \Rightarrow \{-3/5,\ 2\}$

b) Removing Common Factor:

1. $x^2+4x=0 \Rightarrow x(x+4)=0 \Rightarrow \{0,-4\}$
2. $4x^2-12x=0 \Rightarrow 4x(x-3)=0 \Rightarrow \{0,3\}$
3. $x\ (x-1)+9\ (x-1)=0 \Rightarrow (x-1)(x+9)=0 \Rightarrow \{-9,1\}$ x (x - 1) + 9 (x - 1) = 0

c) Difference of Squares:

1. $x^2-25=0 \Rightarrow (x+5)(x-5)=0 \Rightarrow \{-5,5\}$
2. $x^2-81=0 \Rightarrow (x+9)(x-9)=0 \Rightarrow \{-9,9\}$
3. $x^2-169=0 \Rightarrow (x+13)(x-13)=0 \Rightarrow \{-13,13\}$
4. $4x^2-25=0 \Rightarrow (2x+5)(2x-5)=0 \Rightarrow \{-5/2,5/2\}$
5. $36-x^2=0 \Rightarrow -1(x^2-36)=0 \Rightarrow -1(x+6)(x-6)=0 \Rightarrow \{-6,6\}$
6. $144-81x^2=0 \Rightarrow -1(81x^2-144)=0 \Rightarrow -9(3x+4)(3x-4)=0 \Rightarrow \{-4/3,4/3\}$
7. $3x^2-12=0 \Rightarrow 3(x+2)(x-2)=0 \Rightarrow \{-2,2\}$
8. $5x^2-45=0 \Rightarrow 5(x+3)(x-3)=0 \Rightarrow \{-3,3\}$

d) Easy Type 1

1. $x^2+7x+12=0 \Rightarrow (x+4)(x+3)=0 \Rightarrow \{-3,-4\}$
2. $x^2+15x+16=0 \Rightarrow$ *prime*
3. $x^2+15x+56=0 \Rightarrow (x+8)(x+7)=0 \Rightarrow \{-8,-7\}$
4. $x^2+14x=-40 \Rightarrow x^2+14x+40=0 \Rightarrow (x+10(x+4)=0 \Rightarrow \{-10,-4\}$
5. $3x^2+60x+225=0 \Rightarrow 3(x^2+20x+75)=0 \Rightarrow 3(x+15)(x+5)=0 \Rightarrow \{-15,-5\}$

e) Easy Type 2

1. $x^2-12x+13=0 \Rightarrow$ can not factor
2. $x^2-15x+14=0 \Rightarrow (x-14)(x-1)=0 \Rightarrow \{1,14\}$
3. $x^2-9x+18=0 \Rightarrow (x-6)(x-3)=0 \Rightarrow \{3,6\}$

4. $x^2 - 13x = -30 \Rightarrow x^2 - 13x + 30 = 0 \Rightarrow (x-10)(x-3) = 0 \Rightarrow \{3,10\}$
5. $4x^2 - 20x = -16 \Rightarrow 4x^2 - 20x + 16 = 0 \Rightarrow 4(x^2 - 5x + 4) = 0 \Rightarrow$
$4(x-4)(x-1) = 0 \Rightarrow \{1,4\}$

f) Easy Type 3

1. $x^2 + 5x - 6 = 0 \Rightarrow (x+6)(x-1) \Rightarrow 0\{-6,1\}$
2. $x^2 + 8x - 48 = 0 \Rightarrow (x+12)(x-4) = 0 \Rightarrow \{-12,4\}$
3. $x^2 + 3x - 54 = 0 \Rightarrow (x+9)(x-6) = 0 \Rightarrow \{-9,6\}$
4. $x^2 + 6x = 40 \Rightarrow x^2 + 6x - 40 = 0 \Rightarrow (x+10)(x-4) = 0 \Rightarrow \{-10,4\}$
5. $3x^2 + 15x - 18 = 0 \Rightarrow 3(x^2 + 5x - 6) = 0 \Rightarrow 3(x+6)(x-1) = 0 \Rightarrow \{-6,1\}$

g) Easy Type 4

1. $x^2 - 7x - 8 = 0 \Rightarrow (x-8)(x+1) = 0 \Rightarrow \{-1,8\}$
2. $x^2 - 12x - 28 = 0 \Rightarrow (x-14)(x+2) = 0 \Rightarrow \{-2,14\}$
3. $x^2 - 5x - 36 = 0 \Rightarrow (x-9)(x+4) = 0 \Rightarrow \{-4,9\}$
4. $x^2 - 3x = 88 \Rightarrow x^2 - 3x - 88 = 0 \Rightarrow (x-11)(x+8) = 0 \Rightarrow \{-8,11\}$
5. $-4x^2 + 8x + 252 = 0 \Rightarrow -4(x^2 - 2x - 63) = 0 \Rightarrow -4(x-9)(x+7) = 0 \Rightarrow \{-7,9\}$