Answers ~ Exercise 6 - Factoring.

1. $x^2 - 3x + 2 = 0$
$(x-2)(x-1) = 0$
$x-2=0$ or $x-1=0$
$x=2$ or $x=1$

2. $x^2 - x - 6 = 0$
$(x-3)(x+2) = 0$
$x-3=0$ or $x+2=0$
$x=3$ or $x=-2$

3. $p^2 + 2p - 35 = 0$
$(p+7)(p-5) = 0$
$p+7=0$ or $p-5=0$
$p=-7$ or $p=5$

4. $m^2 - 7m = 18$
$m^2 - 7m - 18 = 0$
$(m-9)(m+2) = 0$
$m-9=0$ or $m+2=0$
$m=9$ or $m=-2$

5. $2a^2 + 3a - 2 = 0$ (Decomposition)

Multiply $\rightarrow -4$ Add $\rightarrow 3$

$(2a^2 + 4a)(1a - 2) = 0$

$2a(a+2) - 1(a+2) = 0$

$(a+2)(2a-1) = 0$

$a+2 = 0$ or $2a - 1 = 0$

$a = -2$ $\dfrac{2a}{2} = \dfrac{1}{2}$

$a = \dfrac{1}{2}$

6. $3s^2 - 4s + 1 = 0$ (Decomposition).

Multiply $\rightarrow 3$ Add $\rightarrow -4$.

$(3s^2 - 3s)(1s + 1) = 0$

$3s(s-1) - 1(s-1) = 0$

$s - 1 = 0$ or $3s - 1 = 0$

$s = 1$ $\dfrac{3s}{3} = \dfrac{1}{3}$

$s = \dfrac{1}{3}$

7. $2t^2 + 11t + 5 = 0$ (Decomposition)

Multiply → 10   Add → 11

$(2t^2 + 10t)(+1t + 5) = 0$
$2t(t+5) + 1(t+5) = 0$
$(t+5)(2t+1) = 0$
$t + 5 = 0$ or $2t + 1 = 0$
$t = -5$ $\dfrac{2t}{2} = \dfrac{-1}{2}$

$t = -\dfrac{1}{2}$

8. $3x^2 + 7x - 6 = 0$ (Decomposition).
Multiply $\rightarrow -18$ Add $\rightarrow 7$.

$(3x^2 + 9x - 2x - 6) = 0$
$3x(x+3) - 2(x+3) = 0$
$(x+3)(3x-2) = 0$
$x+3 = 0$ or $3x - 2 = 0$
$x = -3$ $\dfrac{3x}{3} = \dfrac{2}{3}$
             $x = \dfrac{2}{3}$

9. $4m^2 - 4m - 3 = 0$ (Decomposition)
Multiply → -12 Add → -4

$(4m^2 + 2m - 6m - 3) = 0$
$2m(2m+1) - 3(2m+1) = 0$
$(2m+1)(2m-3) = 0$
$2m+1 = 0$ or $2m-3 = 0$

$\dfrac{2m}{2} = \dfrac{-1}{2}$ $\dfrac{2m}{2} = \dfrac{3}{2}$

$m = \dfrac{-1}{2}$ $m = \dfrac{3}{2}$

10. $10y^2 - 16y = -6$

$10y^2 - 16y + 6 = 0$ (Decomposition)

Multiply → 60 Add → -16

$(10y^2 - 10y + 6y + 6) = 0$

$10y(y-1) - 6(y-1) = 0$

$(y-1)(10y-6) = 0$

$y - 1 = 0$ or $10y - 6 = 0$

$y = 1$ $\dfrac{10y}{10} = \dfrac{6}{10}$

$y = \dfrac{6}{10}$

$y = \dfrac{3}{5}$ (lowest terms!)

11. $x^2 + 2x = 0$ (Common Factor)

$x(x+2) = 0$

$x = 0$ or $x + 2 = 0$

$x = -2$

12. $y^2 - 3y = 0$ (Common Factor)

$y(y-3) = 0$

$y = 0$ or $y - 3 = 0$

$y = 3$

13. $3m^2 + 2m = 0$ (Common Factor)

$m(3m + 2) = 0$

$m = 0$ or $3m + 2 = 0$

$\dfrac{3m}{3} = \dfrac{-2}{3}$

$m = -\dfrac{2}{3}$

14. $5n^2 - 8n = 0$ (Common Factor)

$n(5n - 8) = 0$

$n = 0$ or $5n - 8 = 0$

$$\frac{5n}{5} = \frac{8}{5}$$

$$n = \frac{8}{5}$$