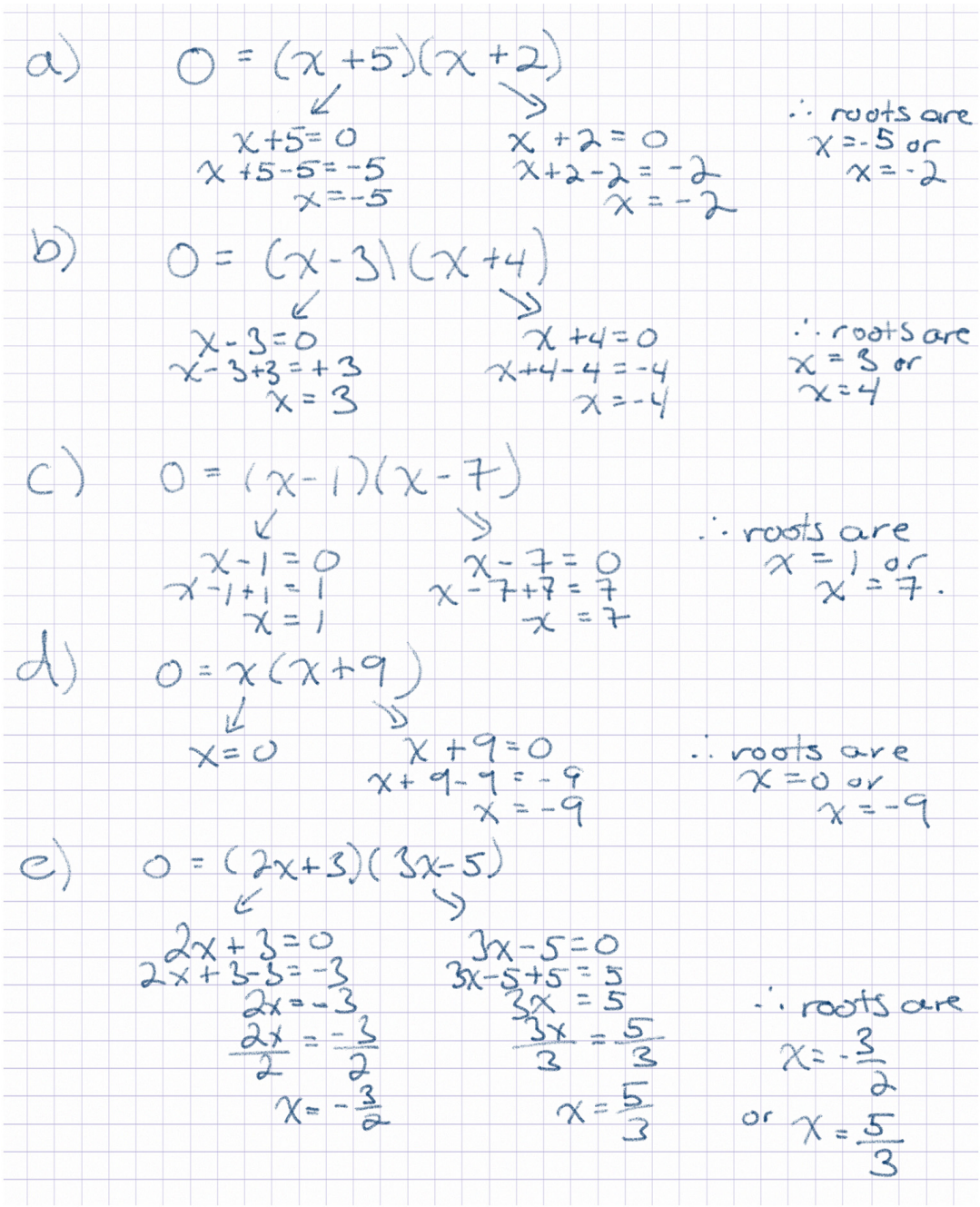
OTL – Solving Quadratic Equations by Factoring

1. Find the roots of each quadratic equation.

   a. $0 = (x+5)(x+2)$
   b. $0 = (x-3)(x+4)$
   c. $0 = (x-1)(x-7)$
   d. $0 = x(x+9)$
   e. $0 = (2x+3)(3x-5)$



2. Find the roots of each quadratic equation.

a. $0 = x^2 + 8x + 12$
b. $0 = x^2 + 3x$
c. $x^2 + 5x = -4$
d. $x^2 = 7x$
e. $3x^2 + 24x + 45 = 0$

a) $0 = x^2 + 8x + 12$
$0 = (x+6)(x+2)$
∴ roots are $x = -6$ or $x = -2$

b) $0 = x^2 + 3x$
$0 = x(x+3)$
$x = 0$ or $x + 3 = 0$
$x + 3 - 3 = -3$
$x = -3$
∴ roots are $x = 0$ or $x = -3$

c) $x^2 + 5x = -4$
$x^2 + 5x + 4 = -4 + 4$
$x^2 + 5x + 4 = 0$
$(x+4)(x+1) = 0$
∴ roots are $x = -4$ or $x = -1$.

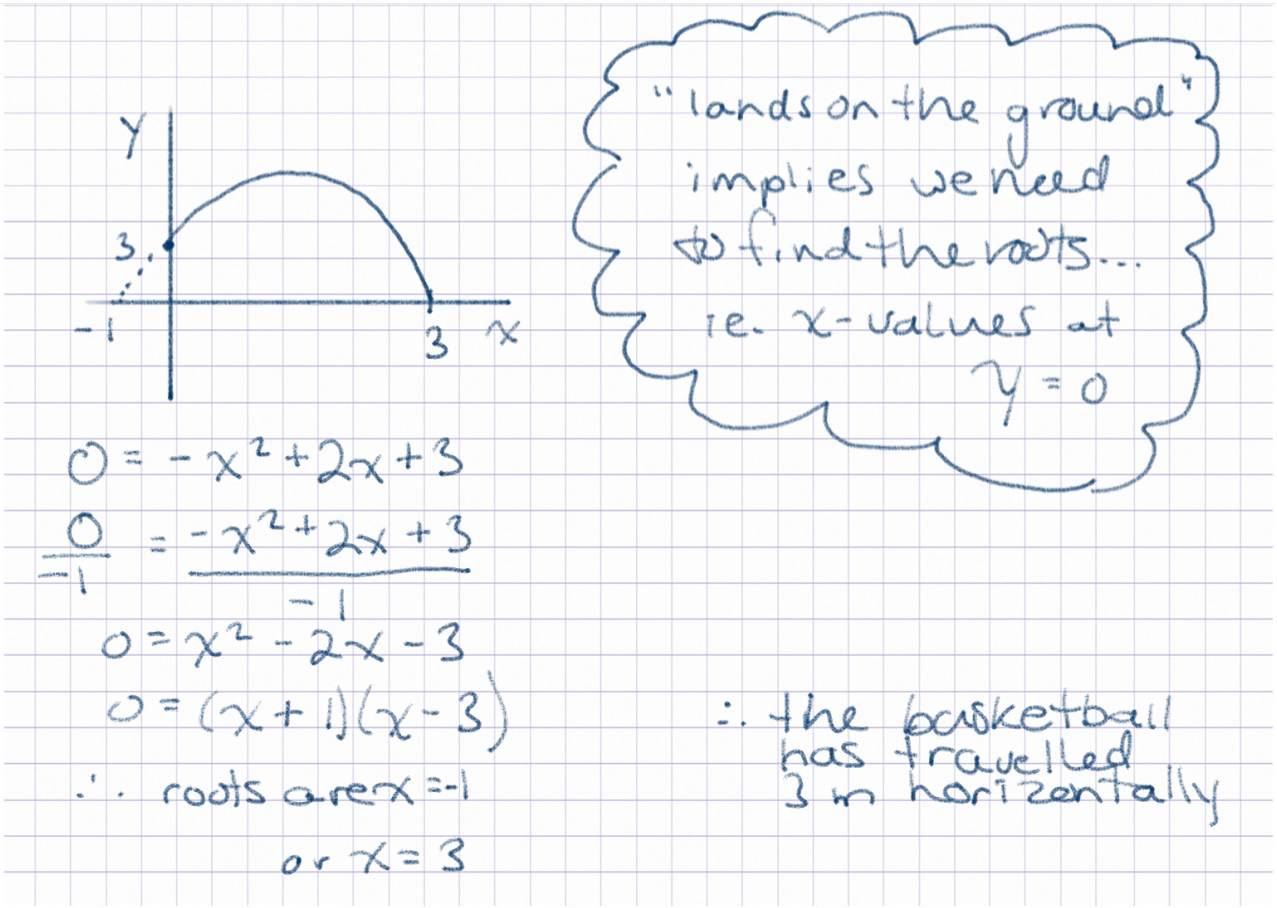
d) $x^2 = 7x$
$x^2 - 7x = 7x - 7x$
$x^2 - 7x = 0$
$x(x-7) = 0$
$x = 0$ or $x - 7 = 0$
$x - 7 + 7 = 7$
$x = 7$
∴ roots are $x = 0$ or $x = 7$

e) $3x^2 + 24x + 45 = 0$
$\frac{3x^2 + 24x + 45}{3} = \frac{0}{3}$
$x^2 + 8x + 15 = 0$
$(x+5)(x+3) = 0$
∴ roots are $x = -5$ or $x = -3$

3. A basketball is tossed from the top of a 3-m wall.

   The path of the basketball is defined by the relation $y = -x^2 + 2x + 3$, where x represents the horizontal distance travelled, in metres, and y represents the height, in metres, above the ground.

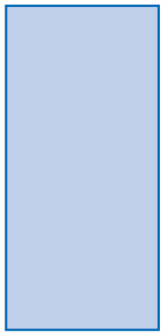
   How far has the basketball travelled horizontally when it lands on the ground?

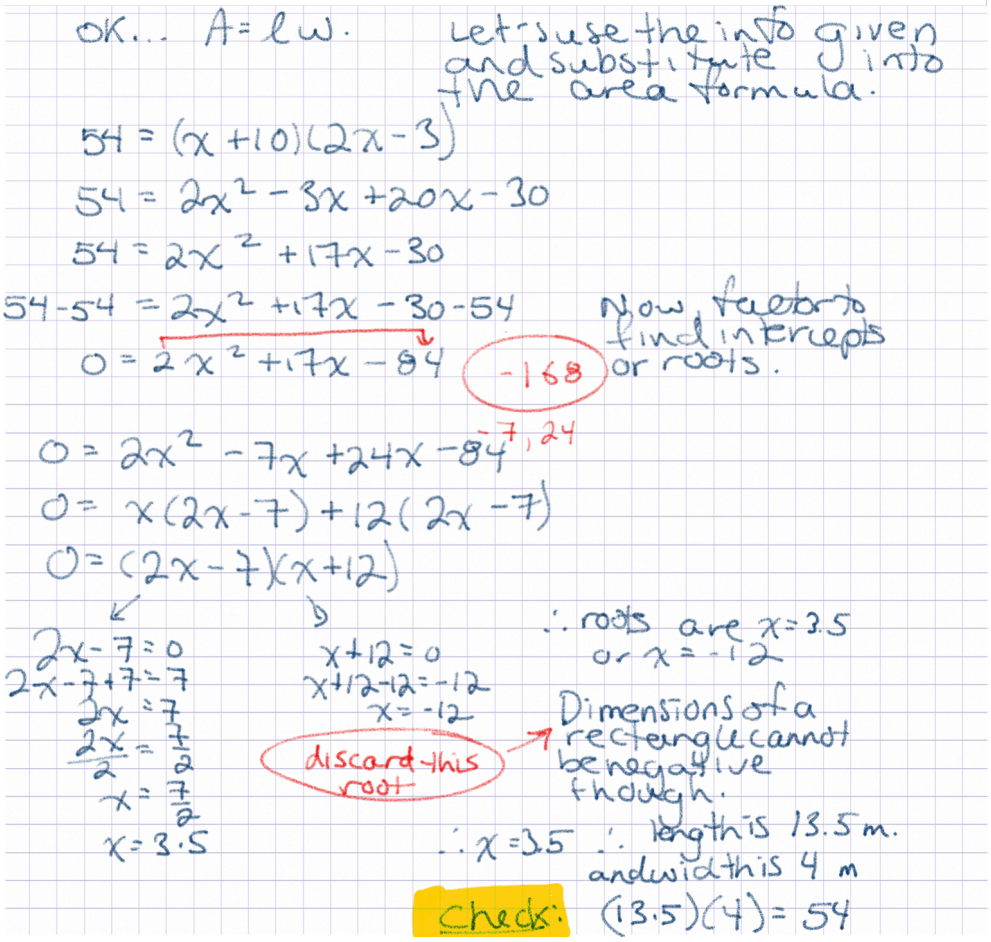


4. A rectangle has dimensions $x + 10$ and $2x - 3$.

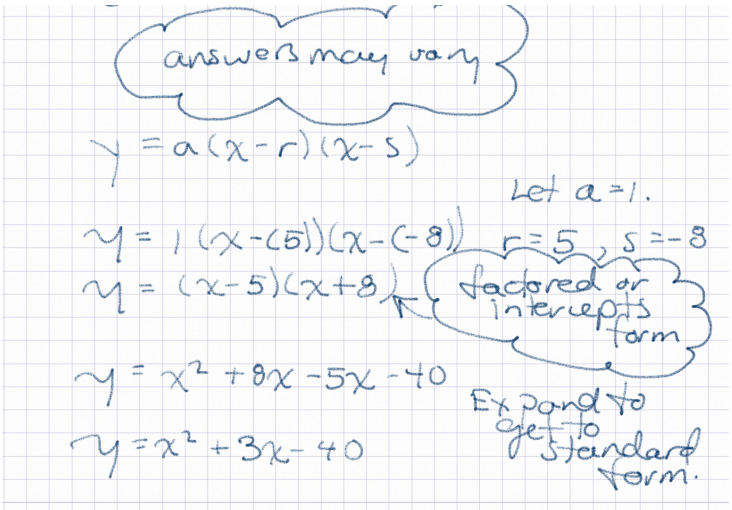
   Determine the value of x that gives an area of 54 cm^2 .

   Remember that the area of a rectangle is defined by $A = lw$.





5. Write a quadratic equation, in standard form, that has roots of 5 and -8.



6. Find the x-intercepts for each quadratic relation.

a. $y = x^2 + 5x + 6$
b. $y = x^2 + 9x$
c. $y = x^2 + 9x - 36$
d. $y = 4x^2 + 20x + 9$
e. $y = 3x^2 - 13x + 4$

a) $y = x^2 + 5x + 6$
$0 = (x+2)(x+3)$
∴ x-intercepts are $x = -2$ or $x = -3$

b) $y = x^2 + 9x$
$0 = x(x+9)$
$x = 0$ or $x + 9 = 0$
$x + 9 - 9 = -9$
$x = -9$
∴ x-intercepts are $x = 0$ or $x = -9$.

c) $y = x^2 + 9x - 36$
$0 = (x+12)(x-3)$
∴ x-intercepts are $x = -12$ or $x = 3$

d) $y = 4x^2 + 20x + 9$ (36)
$0 = 4x^2 + 18x + 2x + 9$ 18, 2
$0 = 2x(2x+9) + 1(2x+9)$
$0 = (2x+9)(2x+1)$
$0 = 2x + 9$
$-9 = 2x + 9 - 9$
$-9 = 2x$
$\frac{-9}{2} = \frac{2x}{2}$
$-\frac{9}{2} = x$
$2x + 1 = 0$
$2x + 1 - 1 = -1$
$2x = -1$
$\frac{2x}{2} = -\frac{1}{2}$
$x = -\frac{1}{2}$
∴ x-intercepts are $x = -\frac{1}{2}$ or $x = -\frac{9}{2}$

e) $y = 3x^2 - 13x + 4$ (12)
$-12, -1$
$0 = 3x^2 - 12x - x + 4$
$0 = 3x(x-4) - 1(x-4)$
$0 = (x-4)(3x-1)$
∴ x-intercepts are $x = 4$ or $x = \frac{1}{3}$