**Review set 3A**

1. Consider the quadratic function \( f(x) = -2(x + 2)(x - 1) \).
   - State the \( x \)-intercepts.
   - State the equation of the axis of symmetry.
   - Find the \( y \)-intercept.
   - Find the coordinates of the vertex.
   - Sketch the function.
   - State the range of the function.

2. Solve the following equations, giving exact answers:
   - \( 3x^2 - 12x = 0 \)
   - \( 3x^2 - x - 10 = 0 \)
   - \( x^2 - 11x = 60 \)

3. Solve using the quadratic formula:
   - \( x^2 + 5x + 3 = 0 \)
   - \( 3x^2 + 11x - 2 = 0 \)

4. Solve for \( x \):
   - \( x^2 - 4x - 21 < 0 \)
   - \( 3x^2 - 2 \geq 5x \)

5. Use the vertex, axis of symmetry, and \( y \)-intercept to graph:
   - \( y = (x - 2)^2 - 4 \)
   - \( y = -\frac{1}{4}(x + 4)^2 + 6 \)

6. Find, in the form \( y = ax^2 + bx + c \), the equation of the quadratic whose graph:
   - touches the \( x \)-axis at 4 and passes through \((2, 12)\).
   - has vertex \((-4, 1)\) and passes through \((1, 11)\).

7. Find the maximum or minimum value of the relation \( f(x) = -2x^2 + 4x + 3 \) and the value of \( x \) at which this occurs.

8. Find the points of intersection of \( y = x^2 - 3x \) and \( y = 3x^2 - 5x - 24 \).

9. For what values of \( k \) does the graph of \( y = -2x^2 + 5x + k \) not cut the \( x \)-axis?

10. Find the values of \( m \) for which \( 2x^2 - 3x + m = 0 \) has:
    - a repeated root
    - two distinct real roots
    - no real roots.

11. The sum of a number and its reciprocal is \( 2\frac{1}{3} \). Find the number.

12. Show that no line with a \( y \)-intercept of \((0, 10)\) will ever be tangential to the curve with equation \( y = 3x^2 + 7x - 2 \).

13. a Write the quadratic \( y = 2x^2 + 4x - 3 \) in the form \( y = a(x - h)^2 + k \).
    - Hence, sketch the graph of the quadratic.

14. Find the equation of the quadratic function with graph:

15. Find the range of \( y = x^2 - 6x - 4 \) on the domain \(-1 \leq x \leq 8\).
When Annie hits a softball, the height of the ball above the ground after $t$ seconds is given by $f(t) = -4.9t^2 + 19.6t + 1.4$ metres. Find the maximum height reached by the ball.