11 A circle C has centre (0, 10) and radius $\sqrt{20}$

A line L has equation $y = mx$

11 (a) (i) Show that the x-coordinate of any point of intersection of L and C satisfies the equation

$$(1 + m^2)x^2 - 20mx + 80 = 0$$

[3 marks]

11 (a) (ii) Find the values of m for which the equation in part **(a)(i)** has equal roots.

[3 marks]

11 (b) Two lines are drawn from the origin which are tangents to C.

Find the coordinates of the points of contact between the tangents and C.

[4 marks]