

# Math 2215 - Calculus 1

Quiz #13 - 2005.11.21

Solutions

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Find the point on the line  $2x + 3y = 6$  that is closest to the point  $(-2, -2)$ .

Define the squared distance  $D = d^2 = (x+2)^2 + (y+2)^2$ . Solving for  $y$  in the equation for the line gives  $y = 2 - \frac{2}{3}x$ . Thus

$$D = (x+2)^2 + \left(4 - \frac{2}{3}x\right)^2$$

Taking a derivative gives

$$D' = \frac{26}{9}x - \frac{4}{3}.$$

Setting  $D' = 0$  gives  $x = \frac{6}{13}$ . Clearly this is a minimum (why?). Substituting this into  $D$  gives

$$D = d^2 = \frac{256}{13}$$

The actual distance is the square root  $d = \sqrt{\frac{256}{13}}$ .