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12/11/11

Math 1010 Extra Credit Project Fall 2011

The following data set gives the gives the number of accidents per year in a state that involved drivers of various ages. Assume there is a quadratic relationship between the driver's age and the number of annual accidents.

| Driver's Age (yr.) | Annual Accidents with Drivers of this Age |
|---|---|
| 16 | 642 |
| 27 | 350.5 |
| 75 | 494.5 |

$y = ax^2 + bx + c$

1. What equation models the data?

$y = .5x^2 - 48x + 1,282$

2. What age seems to have the fewest accidents per year?

$\frac{+48}{2(.5)} = \frac{48}{1}$ 48

3. What is the minimum number of accidents per year?

$.5(48)^2 - 48(48) + 1282$ $1152 - 2,304 + 1282$

4. How many accidents per year happen by driver's of your same age? 130 accidents

$.5(21)^2 - 48(21) + 1282$

$220.5 - 1,008 + 1282$

494.5 accidents

$642 = a(16)^2 + b(16) + c$

$642 = 256a + 16b + c$

$350.5 = a(27)^2 + b(27) + c$

$350.5 = 729a + 27b + c$

$494.5 = a(75)^2 + b(75) + c$

$494.5 = 5{,}625a + 75b + c$

$642 = 256a + 16b + c$

$350.5 = 729a + 27b + c$

$494.5 = 5{,}625a + 75b + c$

$642 = 256a + 16b + c$

$350.5 = 729a + 27b + c$

$-(350.5 = 729a + 27b + c)$

$-350.5 = -729a - 27b - c$

$642 = 256a + 16b + c$

$291.5 = -473a - 11b$

$350.5 = 729a + 27b + c$

$494.5 = 5{,}625a + 75b + c$

$-(350.5 = 729a + 27b + c)$

$-350.5 = -729a - 27b - c$

$494.5 = 5{,}625a + 75b + c$

$144 = 4{,}896a + 48b$

$291.5 = -473a - 11b$

$144 = 4{,}896a + 48b$

$48(291.5 = -473a - 11b)$

$13{,}992 = -22{,}704a - 528b$

$11(144 = 4{,}896a + 48b)$

$1{,}584 = 53{,}856a + 528b$

$13{,}992 = -22{,}704a - 528b$

$1{,}584 = 53{,}856a + 528b$

$\frac{15{,}576}{31{,}152} = \frac{31{,}152a}{31{,}152}$

$a = .5$

$291.5 = -473(.5) - 11b$

$291.5 = -236.5 - 11b$

$+236.5 \quad +236.5$

$\frac{528}{-11} = \frac{-11b}{-11}$ $\quad b = -48$

$642 = 256(.5) + 16(-48) + c$

$642 = 128 - 768 + c$

$642 = -640 + c$

$+640 \quad +640$

$1282$ $\quad C = 1{,}282$