Inadmissable Roots

- one of the roots of a quadratic equation may not lead to a solution that satisfies the original problem.
- may also be called an "extraneous root"

Example #1: The width (in metres) for the most efficient wind tunnel is given by the equation...

$$w^2 + 1.40w - 7.35 = 0$$

Solve the equation to obtain the width.

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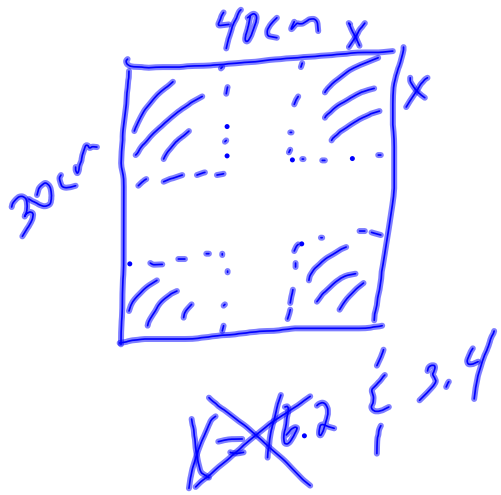
width is 2.1 m

$$w = \frac{-1.40 \pm \sqrt{(1.40)^2 - 4(1)(-7.35)}}{2(1)}$$

$w = -3.5$ & $w = 2.1$

inadmissible

2.1 m



$x = -6.2$ & 3.4

Example #2: After experimentation, it was found that the safe stopping distance, d, (in metres) for a heavy aircraft that taxis at a speed, v, (in km/h) is given by...

$$d = 0.003(6v^2 + 400v + 50\,000)$$

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a) What is the safe stopping distance of the aircraft taxiing at 100 km/h?

b) Determine the speed at which the aircraft is taxiing to take 200 m to stop safely.

a) $d = 0.003(6(100)^2 + 400(100) + 50000)$

$d = 450$ m

b) $200 = 0.003(6v^2 + 400v + 50000)$

$200 = 0.018v^2 + 1.2v + 150$

$0 = 0.018v^2 + 1.2v - 50$

$v = \dfrac{-1.2 \pm \sqrt{(1.2)^2 - 4(0.018)(-50)}}{2(0.018)}$

$\sqrt{\quad} \approx 2.245$

$\dfrac{-1.2 - 2.245}{2(0.018)}$

$v = -63.56$ & 61.16

$= -75.694$ 29.028

-1.2 ± 2.245 / $2(0.018)$

≈ 29.028 km/h

Homework...

WORD PROBLEMS (equation given)...

Page 52... #37, #39a, #40, #41 and #45

"Perpendicular lines have slopes that are negative reciprocals to eachother."

NOTE

Page 57... #59 & #60

Page 52 SOLUTIONS...

#37. a) Discuss together

b) $\frac{-3 \pm \sqrt{849}}{2}$ where x = -16.609 & 13.069

#39. a) 24.85 seconds

b) 79.87 seconds

#40. a) 121.5 m

b) 5.54 seconds

#41. a) -40 °C & 10 °C

b) -15°C

#45. $\frac{-4 \pm \sqrt{2}}{2}$

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#59. a) Bangor to Moncton

354 km

Moncton to Bathurst

186 km

b) Two possible solns

Need a map!

#60. a) 4 m

b) 40 m

c) 0 & 12 seconds

d) 20 s