Answer on Question #55821 – Math – Calculus

7. Describe the Nature of the roots for this equation.
2x^2 + 5x – 7 = 0

A: one real, double root
B: Two complex roots.
C: Two real, rational roots
D: Two real, irrational roots.

Solution

2x^2 + 5x – 7 = 0
The discriminant:
D= b^2-4ac= 5^2-4*2*(-7)=25+56=81
$X_{1,2}=\frac{-b\pm\sqrt{D}}{2a}=\frac{-5\pm9}{4}$; x_1=-3.5; x_2=1
Answer. C: Two real, rational roots .

8. Describe the nature of the roots for this equation.
x^2 -2x + 1 = 0

A: Two complex roots
B: One real, double root
C: Two real, rational roots
D: Two real, irrational roots

Solution

x^2 -2x + 1 = 0
$(x-1)^2=0$
$X_{1,2}$=1 - double root
Answer. B: One real, double root

9. x^2 – 4x + 85 = 0

A: {2 + 19i, 2 – 19i}
B: {2 + 9i, 2 – 9i}
C: {7 +3i, 7 - 3i}
D: {3 + 7i, 3 – 7i}

Solution

The discriminant:
D= b^2-4ac= $(-4)^2$-4*1*(85)=16-340=-324
$X_{1,2}=\frac{-b\pm\sqrt{D}}{2a}=\frac{4\pm18i}{2}$; x_1=2+9i; x_2=2-9i
Answer. B: {2 + 9i, 2 – 9i}

10. A toy company has determined that the revenue generated by a particular toy is modeled by the following equation: r(x)= 11x -0.025x^2

The variable x is measured in thousands of toys produced, and r(x) is measured in thousands of dollars. What is the maximum revenue the company can earn with this toy?

Give the answer in dollars.

Solution

The function r(x)=11x -0.025x^2 is a quadratic function with a=-0.025<0, then maximum will be at the vertex of the parabola:

$X_{max}=\frac{-b}{2a}=\frac{-11}{2*(-0,025)}$=220

r_{max}=11*220-0,025*220^2=2420-1210=1210 thousands dollars.

Answer: 1210 000 dollars.