A∞Ω
MATH@TD
MCR3U

11U: Functions - U3 - Practice Quiz: Zeros

Multiple Choice
*Identify the choice that best completes the statement or answers the question. Circle the letter of your choice **AND** write the leter beside the question number.*

1. Which of the following are roots of the equation $-3x^2 + 6x + 105 = 0$?
   a. $x = -7, 5$ c. $x = -5, 3, 7$
   b. $x = -5, 7$ d. $x = -5, -3, 7$

B

$\div -3$ $x^2 - 2x - 35 = 0$
$(x-7)(x+5) = 0$
$x = 7, -5$

2. What are the x-intercepts of the function $f(x) = -2x^2 - 11x + 8$?
   a. (0.65, 0), (–6.15, 0) c. (4.64, 0), (0.86, 0)
   b. (–4.64, 0), (–0.86, 0) d. (23.13, 0), (–2.75, 0)

A

set to zero
$-2x^2 - 11x + 8 = 0$ dnf → QF
$x = \frac{11 \pm \sqrt{(-11)^2 - 4(-2)(8)}}{2(-4)} = \frac{11 \pm \sqrt{185}}{-4}$
$\Rightarrow x = \frac{11+\sqrt{185}}{-4}$ or $\frac{11-\sqrt{185}}{-4}$
$= -6.15$ | $= 0.65$

3. What is the value of the discriminant for the function $f(x) = 8x^2 + 13x + 7$?
   a. –68 c. 0
   b. –55 d. 393

B

$a=8$ $b=13$ $c=7$
$b^2 - 4ac = (13)^2 - 4(8)(7)$
$= 169 - 224$
$= -55$

Full Solution
Solutions will be posted tonight

4. Neal dropped a small stone off a bridge that is 21 m above the water. The height of the stone is given by the function $h(t) = -4.9t^2 + x + 21$, where $h(t)$ is the height in metres and t is the time in seconds. How long will it take for the stone to hit the water?

5. Determine the number of zeros for the function $f(x) = x^2 - 3x - 5$. Explain your answer.

6. For what value(s) of k will the function $h(x) = 4x^2 - kx + 25$ have only one zero? Explain your answer.

4. Want $h(t) = 0$
$\Rightarrow -4.9t^2 + t + 21 = 0$ → QF
$t = \frac{-1 \pm \sqrt{(1)^2 - 4(-49)(21)}}{2(-49)}$
$\Rightarrow t = \frac{-1 \pm 20.3}{-9.8} =$
$\therefore t = \frac{-1+20.3}{-9.8}$ or $\frac{-1-20.3}{-9.8} =$
$= -2.0$ sec (inadmissible) | $= 2.0$ sec.
$\therefore$ Approximately 2 seconds

5) $f(x) = x^2 - 3x - 5$

There are 2 zeros.

Reasons

① the y-int is -5 and the parabola opens up

$\Rightarrow$ 2 zeros

② the discriminant $b^2 - 4ac = (-3)^2 - 4(1)(-5)$

$= +29 > 0 \quad \therefore$ 2 zeros

6) $h(x) = 4x^2 - kx + 25$

One zero $\Rightarrow$ discriminant $= 0$

$\Rightarrow b^2 - 4ac = 0$

$\Rightarrow (-k)^2 - 4(4)(25) = 0$

$\Rightarrow k^2 - 400 = 0$

$\Rightarrow k^2 = 400$

$\Rightarrow k = \pm 20.$