

1.16 Intermediate Value Theorem (IVT)

Calculus

Name: _____

CA #2

Below is a table of values for a continuous function g .

x	0	5	13	28	50
$g(x)$	-4	8	20	11	-15

1. On the interval $28 \leq x \leq 50$, must there be a value of x for which $g(x) = -10$? Explain.

2. On the interval $0 \leq x \leq 50$ what is the minimum number of zeros?

3. For $5 \leq x \leq 28$, what is the fewest possible times $g(x) = 10$?

4. For $0 \leq x \leq 28$, what is the fewest possible times $g(x) = 5$?

Below is a table of values for a continuous function f .

x	-12	-6	-1	30	40
$f(x)$	6	30	-40	-10	10

5. On the interval $-1 \leq x \leq 40$, must there be a value of x for which $f(x) = 9$? Explain.

6. On the interval $-12 \leq x \leq 40$ what is the minimum number of zeros?

7. For $-1 \leq x \leq 40$, what is the fewest possible times $f(x) = 15$?

8. For $-12 \leq x \leq -1$, what is the fewest possible times $f(x) = 3$?

Determine if the Intermediate Value Theorem holds for the given value of k .

9. $f(x) = 3x^2 - 5x - 2$, $[a, b] = [0, 3]$, $k = -1$

10. $g(x) = 7x^3 - 5x$, $[a, b] = [-1, 2]$, $k = 20$

Answers to 1.16 CA #2

<p>1. i. g is continuous on $[28, 50]$. ii. $g(28) = 11, g(50) = -15$ $g(28) \neq g(50)$ iii. $k = -10$ is between $g(28)$ and $g(50)$. \therefore IVT applies and there exists a value c between $(28, 50)$ such that $g(c) = -10$.</p> <p>2. 2 3. 1 4. 1</p>	<p>5. i. f is continuous on $[-1, 40]$. ii. $f(-1) = -40, f(40) = 10$ $f(-1) \neq f(40)$ iii. $k = 9$ is between $f(-1)$ and $f(40)$. \therefore IVT applies and there exists a value c between $(-1, 40)$ such that $f(c) = 9$.</p> <p>6. 2 7. 0 8. 1</p>	<p>9. i. f is continuous on $[0, 3]$. ii. $f(0) = -2, f(3) = 10$ $f(0) \neq f(3)$ iii. $k = -1$ is between $f(0)$ and $f(3)$. \therefore IVT applies and there exists a value c between $(0, 3)$ such that $f(c) = -1$.</p>	<p>10. i. g is continuous on $[-1, 2]$. ii. $g(-1) = -2, g(2) = 46$ $g(-1) \neq g(2)$ iii. $k = 20$ is between $g(-1)$ and $g(2)$. \therefore IVT applies and there exists a value c between $(-1, 2)$ such that $g(c) = 20$.</p>
---	---	--	--