

Average Rate of Change

Find the average rate of change on the given interval

1. $f(x) = 10x - 3$ on $[-2, 5]$

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2. $f(x) = 2x^2 - 5$ on $[-1, 3]$

$(-1, -3)$ $(3, 13)$

A.R.O.C = $\frac{13 - (-3)}{3 - (-1)} = \frac{16}{4} = 4$

3. $g(x) = \frac{1}{x-2}$ on $[-2, 5]$

$\frac{-\frac{1}{4} - \frac{1}{3}}{-2 - 5} = \frac{(-\frac{7}{12})}{-7} = \frac{1}{12}$ $(-2, -\frac{1}{4})$
 $(5, \frac{1}{3})$

4. $h(x) = 5x^3$ on $[-2, 4]$

$\frac{24}{320}$

$(-2, -40)$ $(4, 320)$

$\frac{320 + 40}{4 + 2} = \frac{360}{6} = 60$

5. $f(x) = 2x^2 - 5$ on $[-2, b]$

$(-2, 3)$ $(b, 2b^2 - 5)$

$\frac{2b^2 - 5 - 3}{b + 2} = \frac{2b^2 - 8}{b + 2} = \frac{2(b^2 - 4)}{b + 2}$
 $= \frac{2(b+2)(b-2)}{b+2}$
 $= 2(b-2)$

6. $g(x) = \frac{1}{x-5}$ on $[-2, b]$

$(-2, -\frac{1}{7})$ $(b, \frac{1}{b-5})$

$(7(b-5)(b-2))$
 $\frac{-\frac{1}{7} - \frac{1}{b-5}}{b+2} = \frac{-b^2 + 7b + 10 - 7b + 14}{7(b-5)(b-2)(b+2)}$
 $= \frac{-b^2 + 24}{7(b-5)(b-2)(b+2)} = \frac{(b+2)(b-2)}{7(b-5)(b-2)(b+2)}$

7. $f(x) = 2x^2 - 5$ on $[-3, -3+h]$

8. $f(x) = 10x - 3$ on $[x, x+h]$

$= \frac{-1}{7b-35}$

$(-3, 13)$

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$(-3+h, 2(-3+h)^2 - 5)$

$\frac{2(-3+h)^2 - 5 - 13}{-3+h+3} = \frac{2(9-6h+h^2) - 18}{h}$
 $= \frac{18 - 12h + 2h^2 - 18}{h}$
 $= \frac{2h^2 - 12h}{h} = 2h - 12$

$\frac{2h(h-6)}{h} = 2h - 12$