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Given $f(x) = x^3 - 3x + 2$.

a. Sketch the curve for $-2 \leq x \leq 2$.

Find the area bounded by f(x), x axis, x= –2 and x = 1, using 6 sub-intervals and:

b. Left Riemann
c. Right Riemann
d. Mid Riemann

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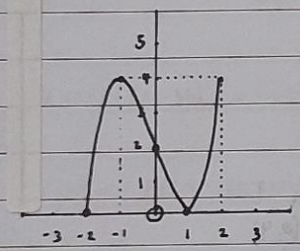
$f(x) = x^3 - 3x + 2$

ⓐ Sketch the curve for $-2 \leq x \leq 2$

x	f(x)	
-2	0	$(-2)^3 - 3(-2) + 2 = 0$
-1	4	$(-1)^3 - 3(-1) + 2 = 4$
0	2	$0^3 - 3(0) + 2 = 2$
1	0	$1^3 - 3(1) + 2 = 0$
2	4	$2^3 - 3(2) + 2 = 4$



area bounded by f(x), $x = -2$ and $x = 1$, 6 sub-intervals

ⓑ Left Riemann

↳ interval: $\frac{1-(-2)}{6} = 0.5$

↳ start: -2, end: 0.5

$x = -2, -1.5, -1, -0.5, 0, 0.5$

$f(-2) = 0$

$f(-1.5) = (-1.5)^3 - 3(-1.5) + 2 = 3.125$

$f(-1) = 4$

$f(-0.5) = (-0.5)^3 - 3(-0.5) + 2 = 3.375$

$f(0) = 2$

$f(0.5) = (0.5)^3 - 3(0.5) + 2 = 0.625$

Area: $0.5\,(0 + 3.125 + 4 + 3.375 + 2 + 0.625) = 0.5\,(13.125) = \underline{6.5625}$

© Right Riemann

↳ start = -1.5, end = 1

x = -1.5, -1, -0.5, 0, 0.5, 1

f(-1.5) = 3.125

f(-1) = 4

f(-0.5) = 3.375

f(0) = 2

f(0.5) = 0.625

f(1) = 0

Area = 0.5 (3.125 + 4 + 3.375 + 2 + 0.625 + 0) = 0.5 (13.125) = 6.5625

(d) Mid Riemann

↳ start = $\frac{-2+(-1.5)}{2}$ = -1.75, end = $\frac{0.5+1}{2}$ = 0.75

x = -1.75, -1.25, -0.75, -0.25, 0.25, 0.75

$f(-1.75) = (-1.75)^3 - 3(-1.75) + 2 = 1.890625 \approx 1.8906$

$f(-1.25) = (-1.25)^3 - 3(-1.25) + 2 = 3.796875 \approx 3.7969$

$f(-0.75) = (-0.75)^3 - 3(-0.75) + 2 = 3.828125 \approx 3.8281$

$f(-0.25) = (-0.25)^3 - 3(-0.25) + 2 = 2.734375 \approx 2.7344$

$f(0.25) = (0.25)^3 - 3(0.25) + 2 = 1.265625 \approx 1.2656$

$f(0.75) = (0.75)^3 - 3(0.75) + 2 = 0.171875 \approx 0.1719$

Area = 0.5 (1.8906 + 3.7969 + 3.8281 + 2.7344 + 1.2656 + 0.1719) = 0.5 (13.6875) = 6.84375

≈ 6.8438