ANSWERS

Trapezium Rule – Past Paper Questions

(d) Use the trapezium rule with three strips of equal width to estimate the area of the region enclosed by the curve $y = x^3 - 6x^2 + 3x + 10$ and the x-axis between $x = -1$ and $x = 2$.

Strips will go from $x=-1$ to $x=0$, $x=0$ to $x=1$, and $x=1$ to $x=2$
all 1 wide. $(h=1)$.

at $x=-1$, $y = -1-6-3+10 = 0$
$x=0$, $y = 10$
$x=1$, $y = 1-6+3+10 = 8$
$x=2$, $y = 8-24+6+10 = 0$

Trapezium $= \frac{1}{2}(a+b)h$.

So 1st Strip $= 0.5 \times (0+10) \times 1 = 5$
2nd Strip $= 0.5 \times (10+8) \times 1 = 9$
3rd Strip $= 0.5 \times (8+0) \times 1 = 4$
$= 18$

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(d) Use the trapezium rule with 4 strips to estimate the area of the region enclosed by the curve $y = x^3 - 3x^2 - 13x + 15$ and the x-axis between $x = -3$ and $x = 1$.

Strips $x=-3$ to -2, $x=-2$ to -1, $x=-1$ to 0, $x=0$ to 1.
all 1 wide, so $h=1$.

Trapezium $= \frac{1}{2}(a+b)h$.

at $x=-3$, $y = -27-27+39+15 = 0$
$x=-2$, $y = -8-12+26+15 = 21$
$x=-1$, $y = -1-3+13+15 = 24$
$x=0$, $y = 15$
$x=1$, $y = 1-3-13+15 = 0$

So 1st Strip $= 0.5 \times (0+21) \times 1 = 11.5$
2nd Strip $= 0.5 \times (21+24) \times 1 = 22.5$
3rd Strip $= 0.5 \times (24+15) \times 1 = 19.5$
4th Strip $= 0.5 \times (15+0) \times 1 = 7.5$

Total $= 51$

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