$A = \frac{1}{2}bh = \frac{1}{2} \cdot 2x \cdot h = xh$

$x^2 + h^2 = 6^2$

$x^2 + h^2 = 36$

$x = \sqrt{36 - h^2}$

$A = h\sqrt{36 - h^2}$

$A' = h \cdot \cancel{\frac{1}{2}}(36 - h^2)^{-\frac{1}{2}}(-\cancel{2}h) + \sqrt{36 - h^2}$

$0 = \frac{-h^2}{\sqrt{36 - h^2}} + \sqrt{36 - h^2}\left(\frac{\sqrt{36 - h^2}}{\sqrt{36 - h^2}}\right)$

$0 = \frac{-h^2 + 36 - h^2}{\sqrt{36 - h^2}}$

$0 = -2h^2 + 36$

$2h^2 = 36$

$h^2 = 18$

$h = 3\sqrt{2}$

$A = h\sqrt{36 - h^2}$

$A = 3\sqrt{2}\sqrt{36 - 18}$

$A = 3\sqrt{2} \cdot \sqrt{18}$

$A = 3\sqrt{2} \cdot 3\sqrt{2}$

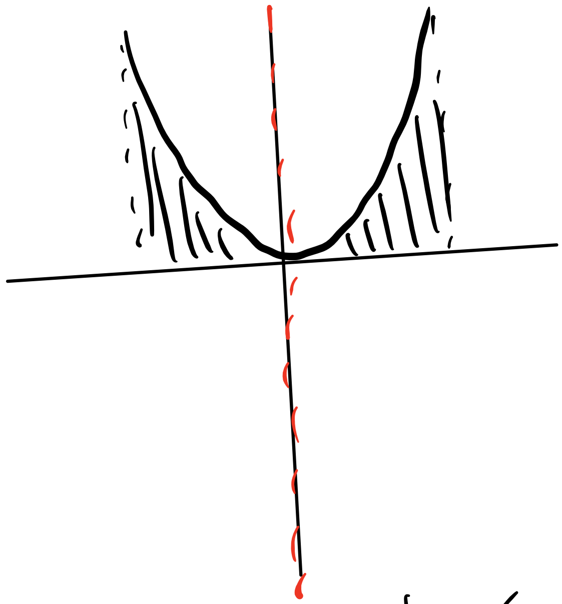
$\boxed{A = 18}$

<u>25:12</u> $h(x) = \int_{2x}^{x^2} \cos(t)\sin(t)\,dt$

$h'(x) = \cos(x^2)\sin(x^2) \cdot 2x - \cos(2x)\sin(2x) \cdot 2$

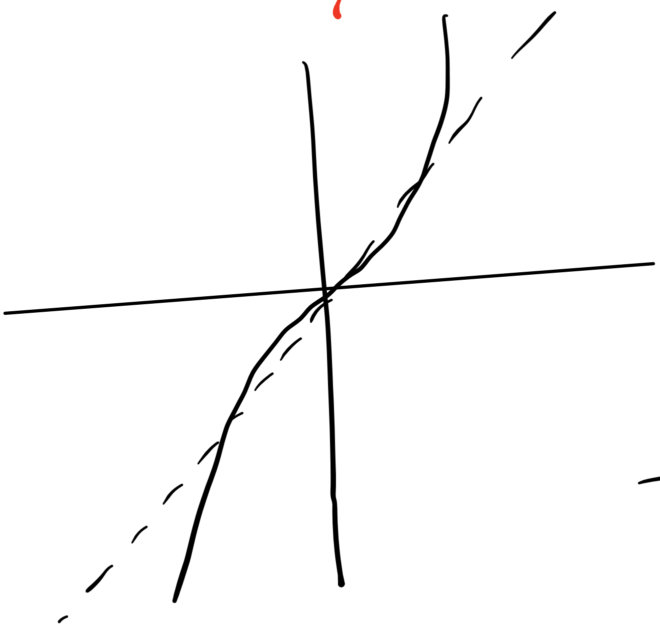
<u>25:10</u> $h(x) = \int_0^x t\sin(t)\,dt$ $\quad h'(x) = x\sin(x)$

<u>25:11</u> $h(x) = \int_x^2 t + e^t\,dt$ $\quad h'(x) = -(x + e^x)$

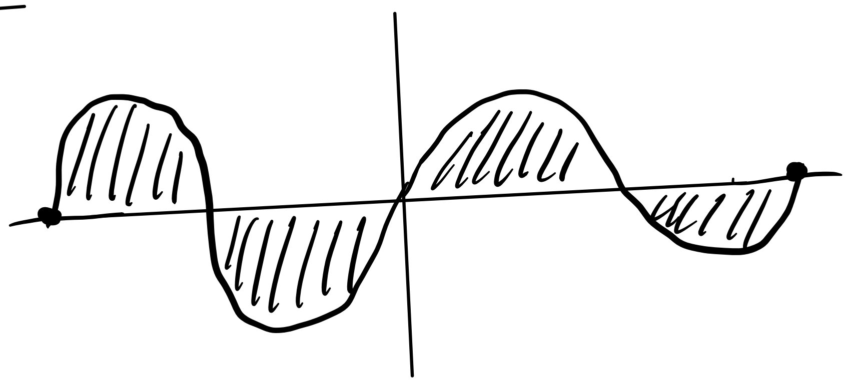


$f(x) = f(-x)$

$$\int_{-1}^{1} x^2 dx = 2\int_{0}^{1} x^2 dx$$



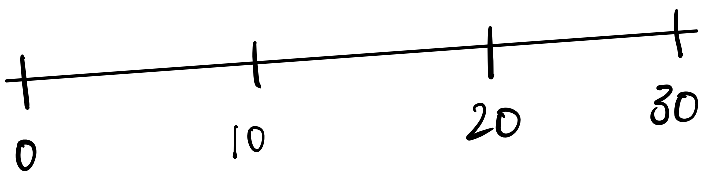
$f(x) = -f(-x)$



$$\int_{-2\pi}^{2\pi} \sin(x) dx = 0$$

23:3 $f(x)=x^2+2x$ $[0,30]$ $n=3$

$\Delta x=10$



left:

$f(0)=0$
$f(10)=120$
$f(20)=440$

$10[0+120+440]$
$=10[560]$
$=5600$

mid:

$f(5)=35$
$f(15)=255$
$f(25)=675$

$10[35+255+675]$
$10[965]=9650$

right:

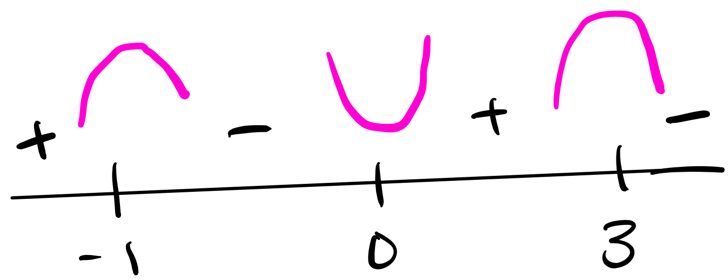
$f(10)=120$
$f(20)=440$
$f(30)=960$

$10[120+440+960]$
$=10[1520]$
$=15200$

MC#13 $f'(x)=-x^3+2x^2+3x$ FALSE?

✓a) local max @ $x=-1$
✓b) local max @ $x=3$
c) local max @ $x=0$
✓d) increasing $(0,3)$

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



$-\frac{1}{8}+2\cdot\frac{1}{4}+3\cdot-\frac{1}{2}=-\frac{1}{8}+\frac{1}{2}-\frac{3}{2}=-\frac{1+4-12}{8}=-$

27:6

$u=-3x \quad du=-3dx$

$$\int_{-1}^{1} 12e^{-3x}\,dx = -4\int_{-1}^{1} -3e^{-3x}\,dx = -4\int_{3}^{-3} e^{u}\,du = -4e^{u}\Big|_{3}^{-3}$$

$$= -4e^{-3x}\Big|_{-1}^{1} = -4e^{-3}+4e^{3} \quad = \quad -4e^{-3}+4e^{3}$$

27:11

$u=3x+1 \quad du=3dx$

$$\int_{0}^{3} \frac{12}{3x+1}\,dx = 4\int_{0}^{3} \frac{3}{3x+1}\,dx = 4\int \frac{du}{u} = 4\ln|u|$$

$$= 4\ln(3x+1)\Big|_{0}^{3} = 4\ln(10) - 4\ln(1) = \underline{4\ln(10)}$$

27:14

$u=\ln x \quad du=\frac{1}{x}dx$

$$\int_{1}^{e} \frac{8(\ln x)^3}{x}\,dx = \int 8u^3\,du = \frac{8u^4}{4} = 2(\ln x)^4\Big|_{1}^{e}$$

$$= 2(\ln e)^4 - 2(\ln(1))^4 = 2\cdot 1 - 2\cdot 0 = 2$$

27:15

$u=x^4+2x \quad du=4x^3+2$

$$\int_{1}^{2} \frac{8x^3+4}{\sqrt{x^4+2x}}\,dx = 2\int_{1}^{2} \frac{4x^3+2}{\sqrt{x^4+2x}}\,dx$$

$$= 2\int u^{-\frac{1}{2}} du = 2 \cdot 2u^{\frac{1}{2}} = 4(x^4 + 2x)^{\frac{1}{2}} \Big|_1^2$$

$$= 4(16+4)^{\frac{1}{2}} - 4(3)^{\frac{1}{2}} = 4\sqrt{20} - 4\sqrt{2} = 8\sqrt{5} - 4\sqrt{3}$$