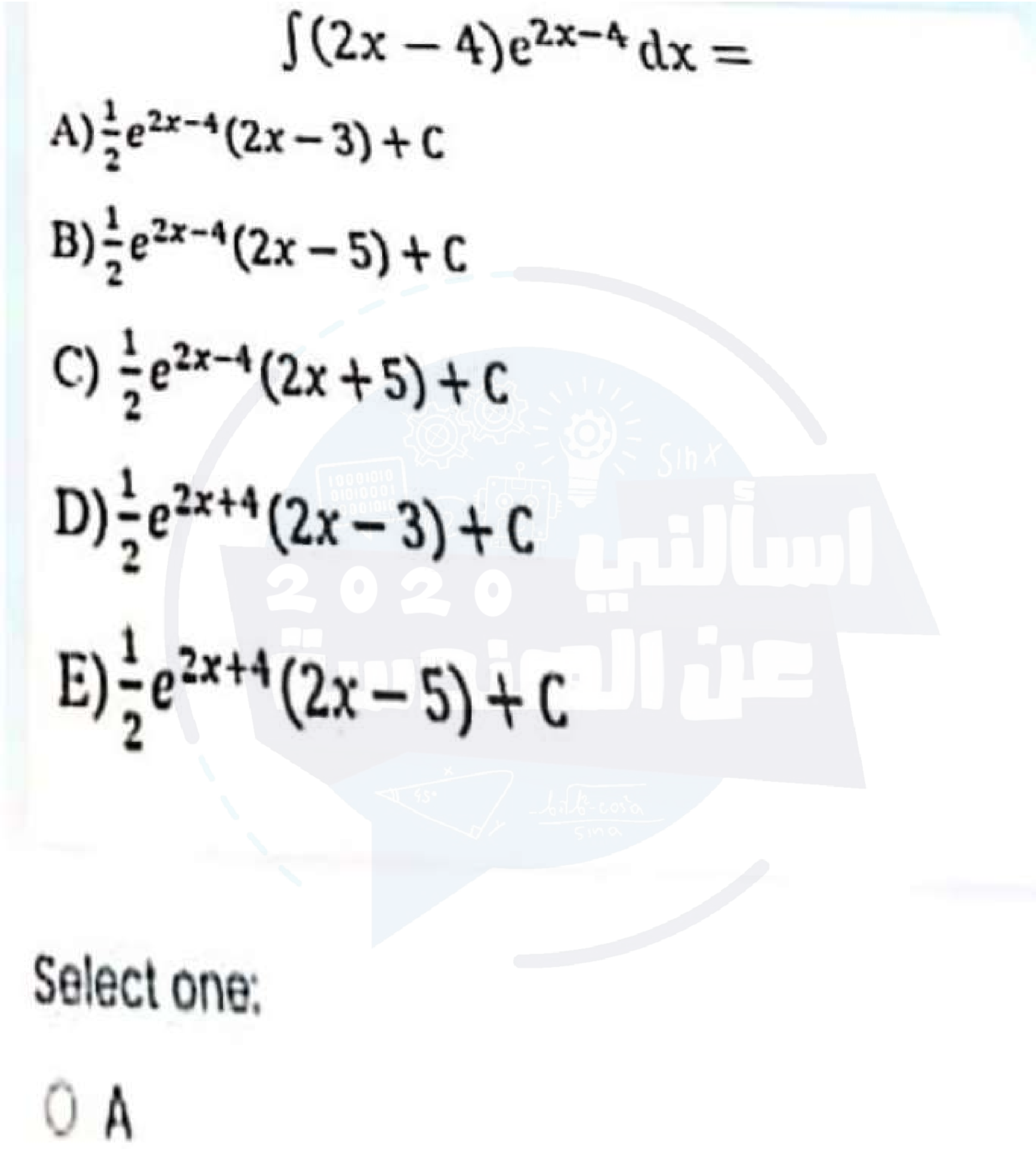


$$\int (2x-4)e^{2x-4}\,dx =$$

A) $\frac{1}{2}e^{2x-4}(2x-3)+C$

B) $\frac{1}{2}e^{2x-4}(2x-5)+C$

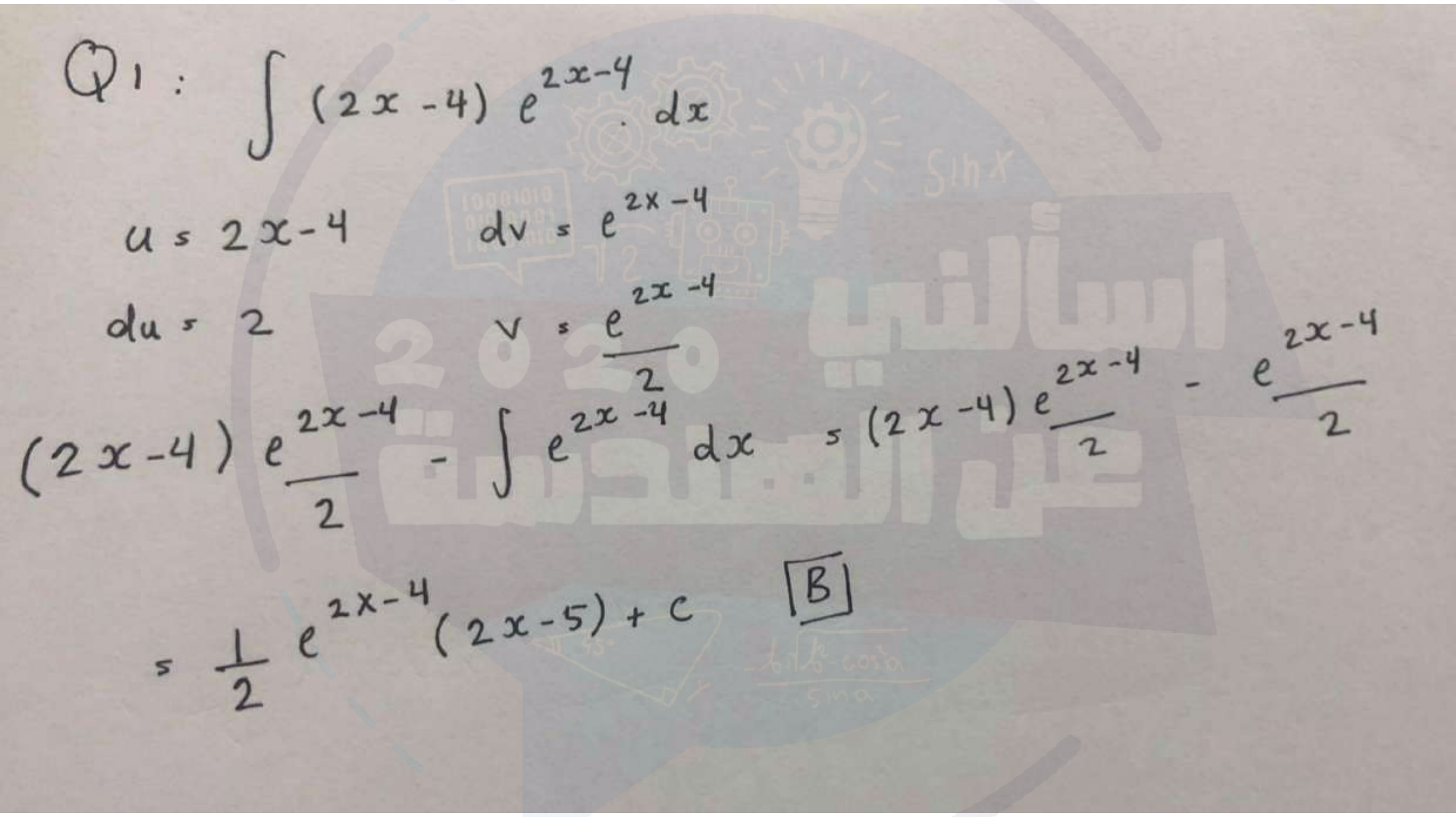
C) $\frac{1}{2}e^{2x-4}(2x+5)+C$

D) $\frac{1}{2}e^{2x+4}(2x-3)+C$

E) $\frac{1}{2}e^{2x+4}(2x-5)+C$

Select one:

○ A



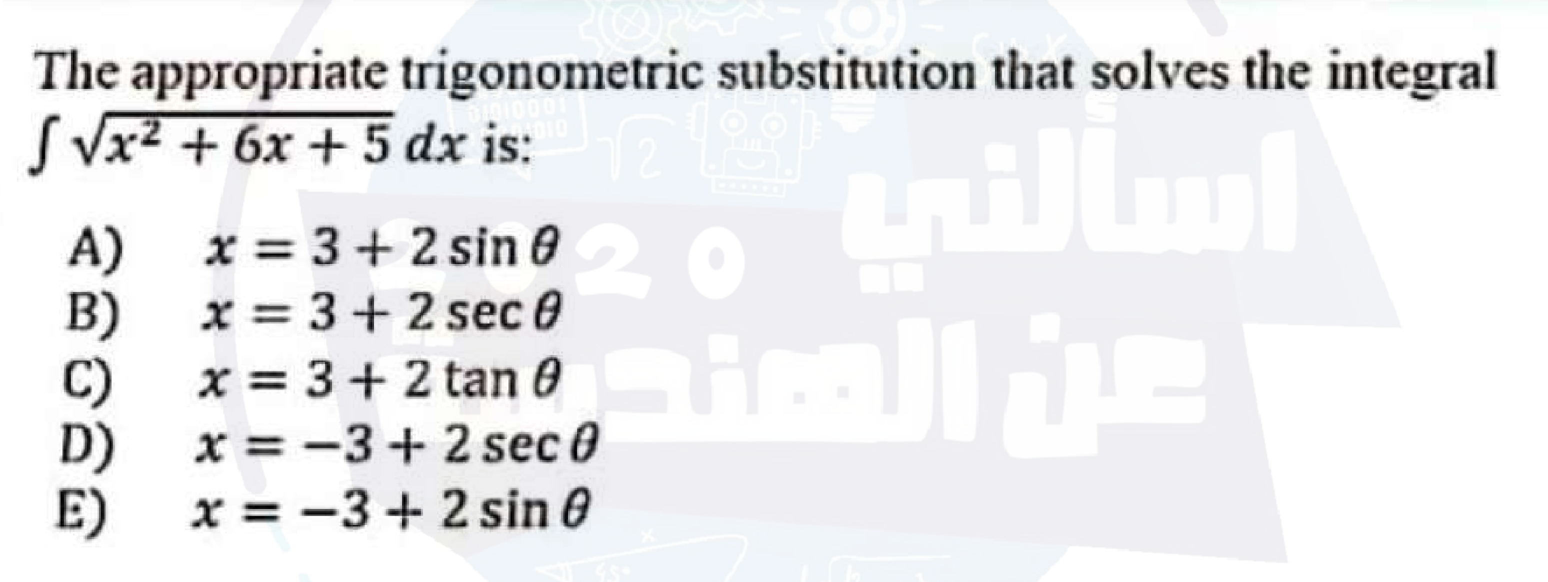
Q1 : $\int (2x-4)\, e^{2x-4}\, dx$

$u = 2x-4$ $\quad dv = e^{2x-4}$

$du = 2$ $\quad v = \frac{e^{2x-4}}{2}$

$(2x-4)\frac{e^{2x-4}}{2} - \int e^{2x-4}\, dx = (2x-4)\frac{e^{2x-4}}{2} - \frac{e^{2x-4}}{2}$

$= \frac{1}{2} e^{2x-4}(2x-5) + c$ $\quad \boxed{B}$



The appropriate trigonometric substitution that solves the integral $\int \sqrt{x^2 + 6x + 5}\, dx$ is:

A) $x = 3 + 2\sin\theta$
B) $x = 3 + 2\sec\theta$
C) $x = 3 + 2\tan\theta$
D) $x = -3 + 2\sec\theta$
E) $x = -3 + 2\sin\theta$

$\int \sqrt{x^2+6x+5}\ dx$

$\Rightarrow x^2+6x+5+9-9$

$(x^2+6x+9)-4$

$\Rightarrow (x+3)^2-4$

$\rightarrow x+3 = 2\sec\theta$

$\boxed{x = -3+2\sec\theta}$

Ⓓ

The appropriate trigonometric substitution that solves the integral $\int \sqrt{-5+6x-x^2}\,dx$ is:

A) $x = -3 + 2\sec\theta$
B) $x = 3 + 2\tan\theta$
C) $x = 3 + 2\sin\theta$
D) $x = -3 + 2\sin\theta$
E) $x = 3 + 2\sec\theta$

$\int \sqrt{-5+6x-x^2}\ dx \Rightarrow -(x^2-6x+5+9-9)$

$= -((x^2-6x+9)-4)$

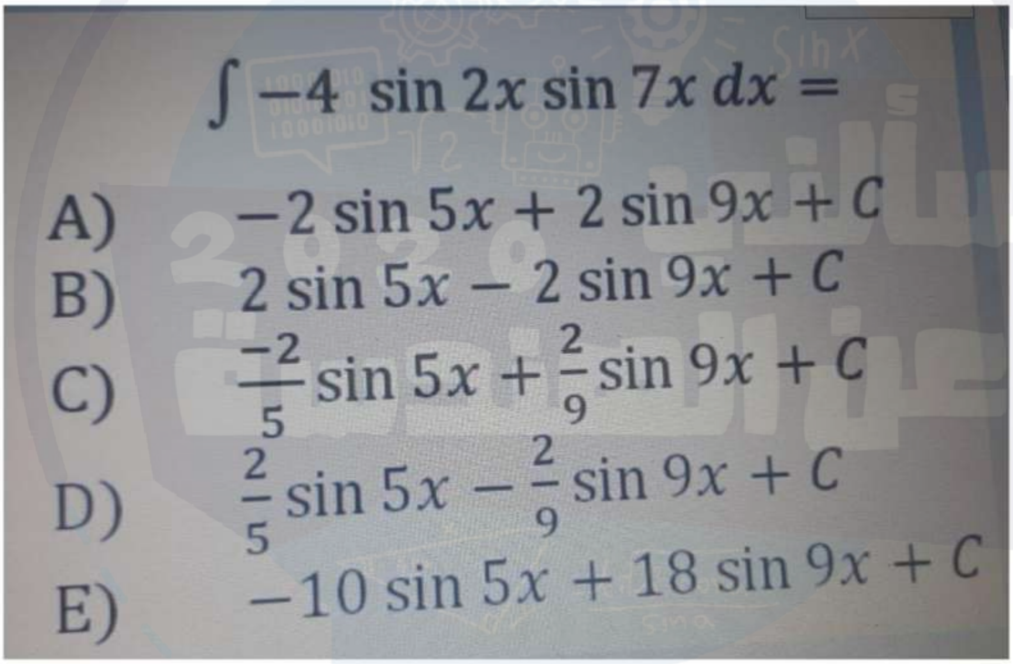
$= -((x-3)^2-4)$

$= 4-(x-3)^2$

$x-3 = 2\sin\theta$

$\boxed{x = 3+2\sin\theta}$

Ⓒ



$\int -4 \sin 2x \sin 7x \, dx =$

A) $-2 \sin 5x + 2 \sin 9x + C$

B) $2 \sin 5x - 2 \sin 9x + C$

C) $\frac{-2}{5} \sin 5x + \frac{2}{9} \sin 9x + C$

D) $\frac{2}{5} \sin 5x - \frac{2}{9} \sin 9x + C$

E) $-10 \sin 5x + 18 \sin 9x + C$

$$\int -4 \sin 2x \; \sin 7x \, dx$$

$$\sin x \; \sin y = \frac{\cos(x-y) - \cos(x+y)}{2}$$

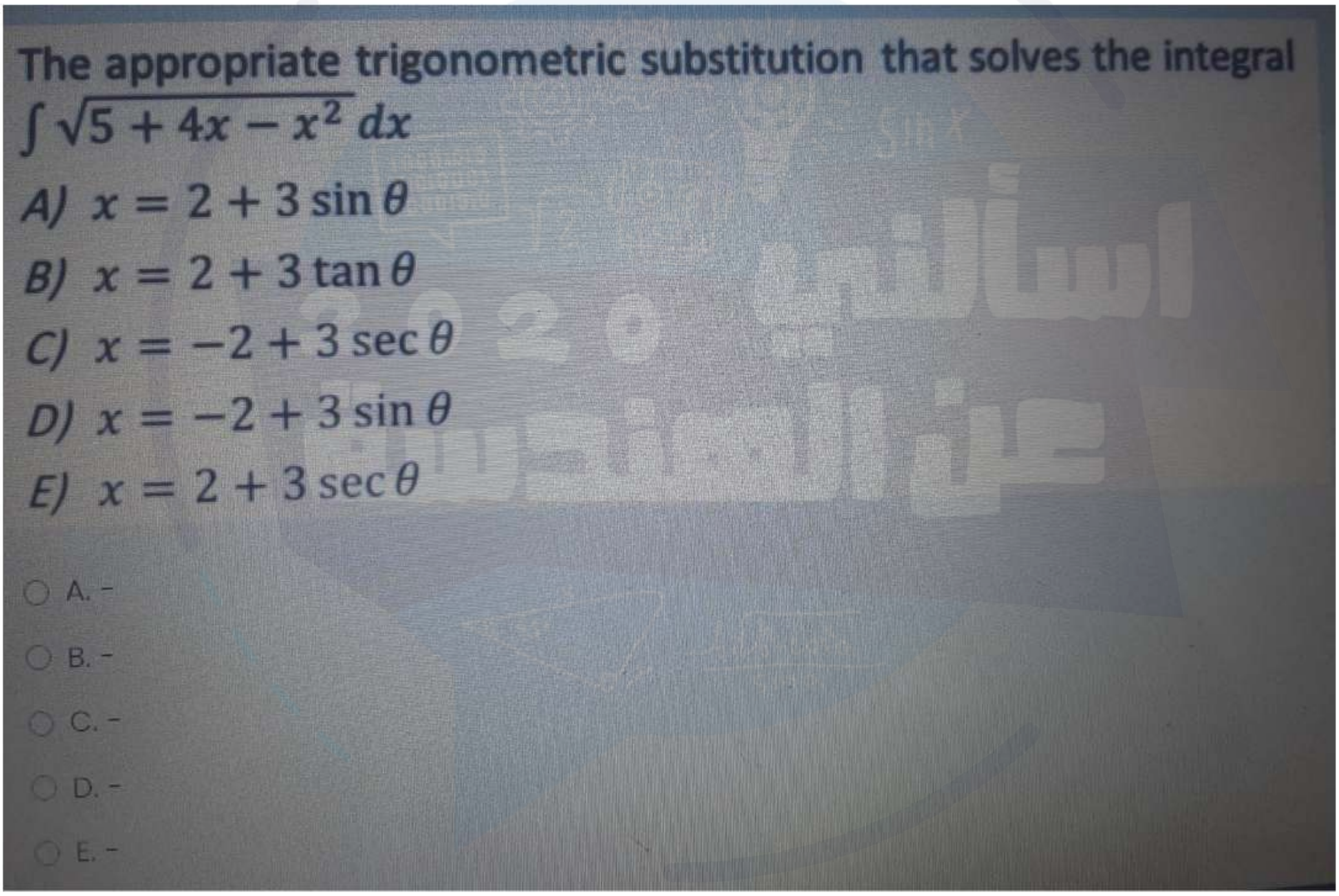
$$= -4 \int \frac{\cos(2x-7x) - \cos(2x+7x)}{2} \, dx$$

$$= -2 \int \cos(-5x) - \cos(9x) \; dx$$

$$-2 \left[\frac{\cancel{-}\sin(-5x)}{\cancel{-}5} + \frac{\sin 9x}{9} \right] + C$$

$$-\frac{2}{5} \sin(-5x) + \frac{-2}{9} \sin 9x + C$$

$$= \frac{2}{5} \sin 5x - \frac{2}{9} \sin 9x + C$$



The appropriate trigonometric substitution that solves the integral

$\int \sqrt{5 + 4x - x^2}\, dx$

A) $x = 2 + 3 \sin \theta$

B) $x = 2 + 3 \tan \theta$

C) $x = -2 + 3 \sec \theta$

D) $x = -2 + 3 \sin \theta$

E) $x = 2 + 3 \sec \theta$

○ A. -

○ B. -

○ C. -

○ D. -

○ E. -

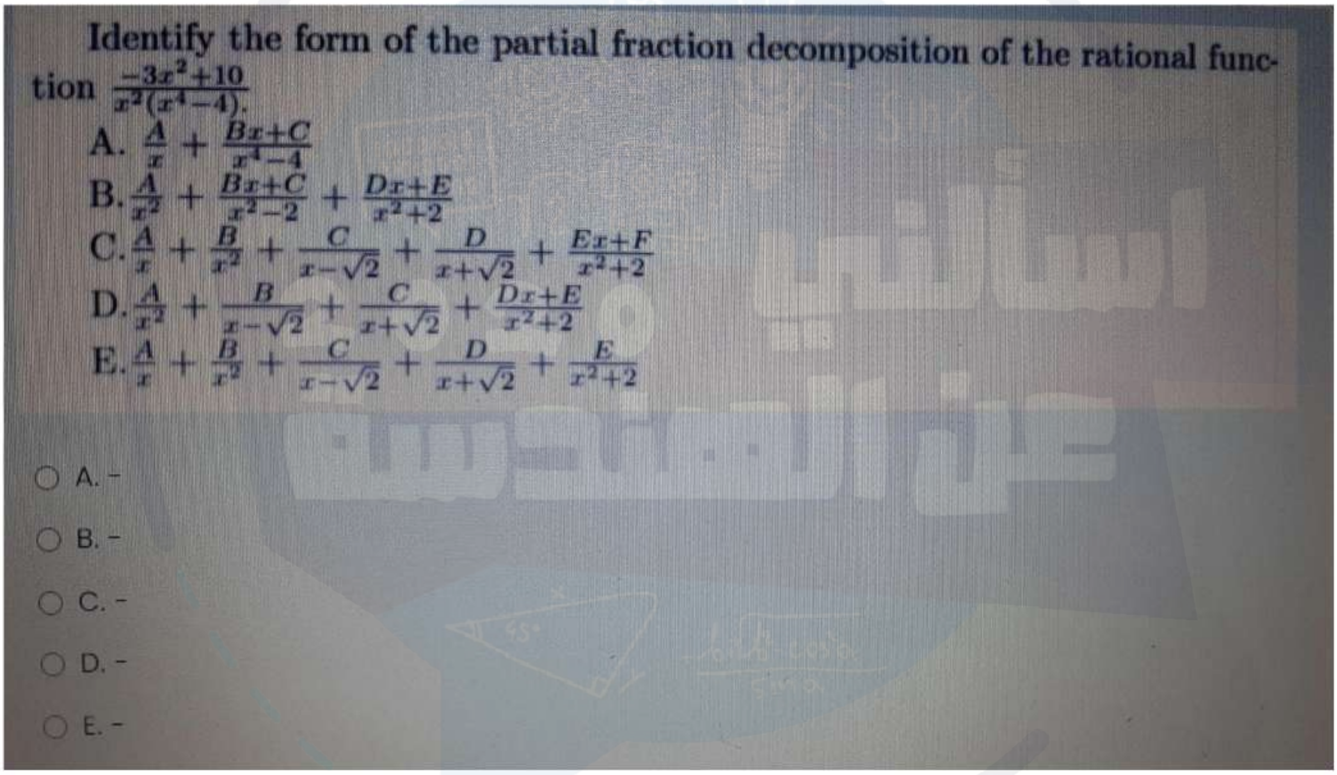
$\int \sqrt{5+4x-x^2}\,dx \Rightarrow -(x^2-4x-5+4-4)$

$= -((x-2)^2-9)$

$= 9-(x-2)^2$

$\rightarrow x-2 = 3\sin\theta$

$\rightarrow \boxed{x = 2+3\sin\theta}$ Ⓐ



Identify the form of the partial fraction decomposition of the rational function $\frac{-3x^2+10}{x^2(x^4-4)}$.

A. $\frac{A}{x}+\frac{Bx+C}{x^4-4}$

B. $\frac{A}{x^2}+\frac{Bx+C}{x^2-2}+\frac{Dx+E}{x^2+2}$

C. $\frac{A}{x}+\frac{B}{x^2}+\frac{C}{x-\sqrt{2}}+\frac{D}{x+\sqrt{2}}+\frac{Ex+F}{x^2+2}$

D. $\frac{A}{x^2}+\frac{B}{x-\sqrt{2}}+\frac{C}{x+\sqrt{2}}+\frac{Dx+E}{x^2+2}$

E. $\frac{A}{x}+\frac{B}{x^2}+\frac{C}{x-\sqrt{2}}+\frac{D}{x+\sqrt{2}}+\frac{E}{x^2+2}$

○ A. -

○ B. -

○ C. -

○ D. -

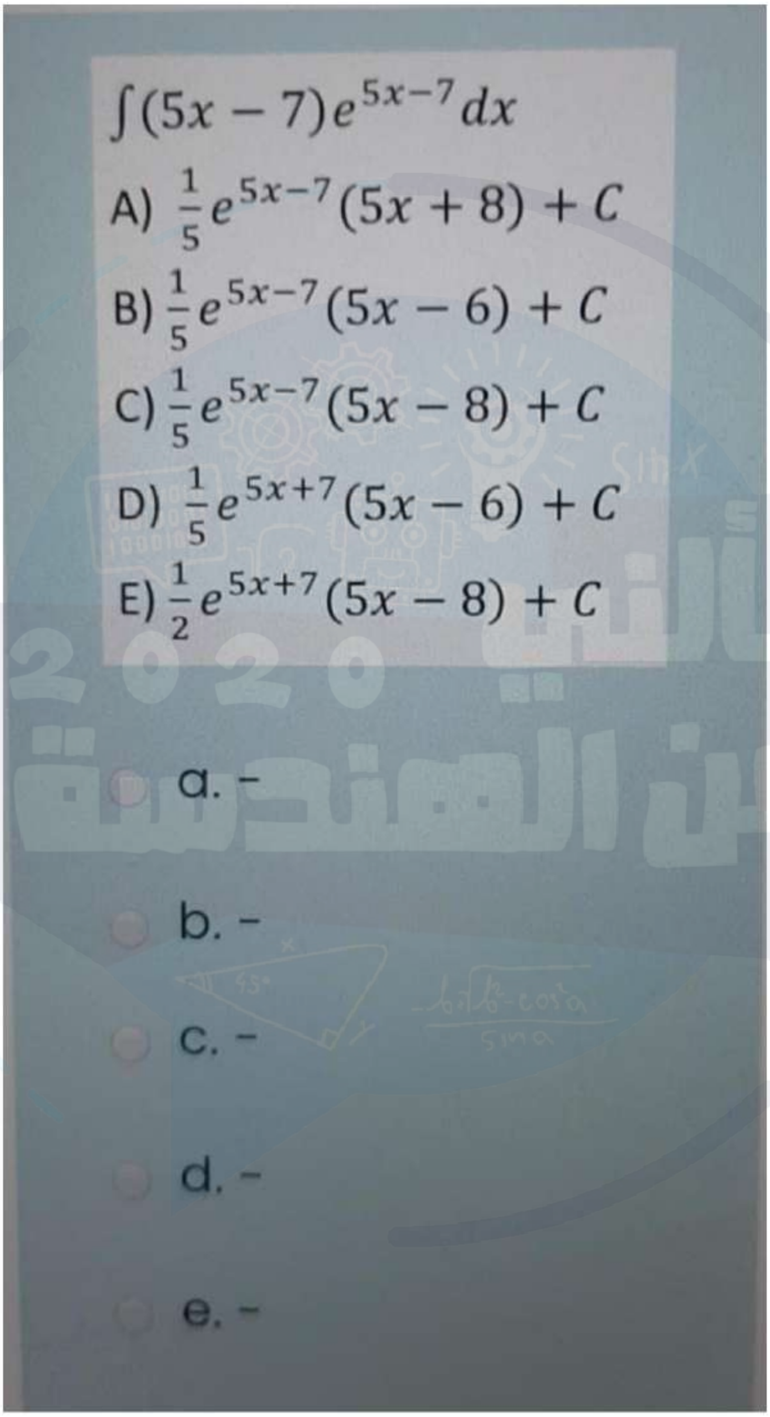
○ E. -

$$= \frac{-3X^2+10}{X^2(X^4-4)}$$

$$= \frac{-3X^2+10}{X^2(X^2-2)(X^2+2)}$$

$$\frac{A}{X} + \frac{B}{X2} + \frac{C}{X-\sqrt{2}} + \frac{D}{X+\sqrt{2}} + \frac{EX+F}{X2+2}$$

$$\underline{\underline{C}}$$



$\int (5x-7)e^{5x-7}dx$

A) $\frac{1}{5}e^{5x-7}(5x+8)+C$

B) $\frac{1}{5}e^{5x-7}(5x-6)+C$

C) $\frac{1}{5}e^{5x-7}(5x-8)+C$

D) $\frac{1}{5}e^{5x+7}(5x-6)+C$

E) $\frac{1}{2}e^{5x+7}(5x-8)+C$

○ a. -

○ b. -

○ c. -

○ d. -

○ e. -

$$\int (5x-7)\, e^{5x-7} \, . d1$$

$u = 5x - 7 \qquad dv = e^{5x-7}$

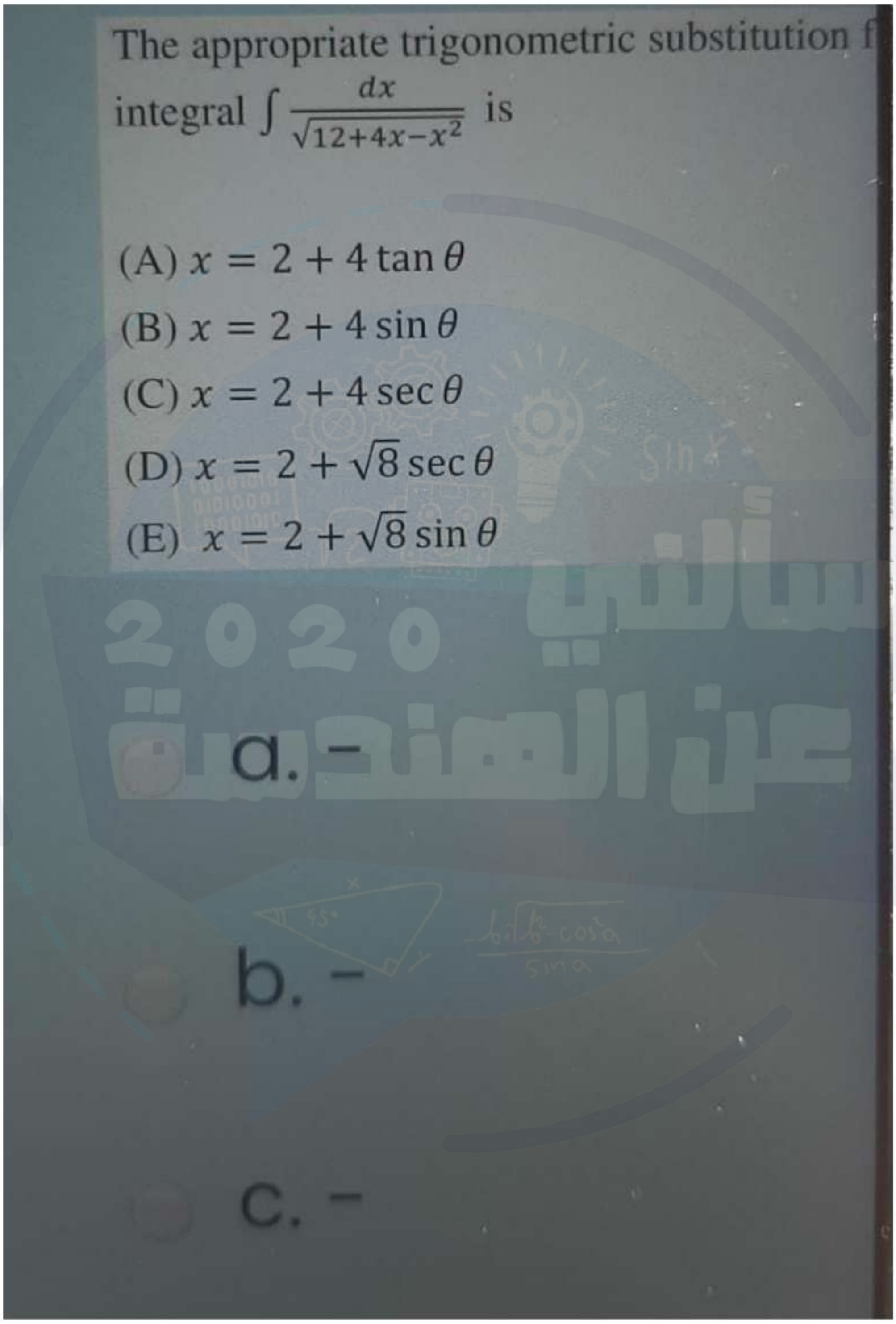
$du = 5 \qquad v = \dfrac{e^{5x-7}}{5}$

$$(5x-7)\frac{e^{5x-7}}{5} - \int e^{5x-7}$$

$$(5x-7)\frac{e^{5x-7}}{5} - \frac{e^{5x-7}}{5}$$

$$\frac{1}{5} e^{5x-7} (5x-8) + C$$

$\underline{\underline{C}}$



The appropriate trigonometric substitution f

integral $\int \frac{dx}{\sqrt{12+4x-x^2}}$ is

(A) $x = 2 + 4\tan\theta$

(B) $x = 2 + 4\sin\theta$

(C) $x = 2 + 4\sec\theta$

(D) $x = 2 + \sqrt{8}\sec\theta$

(E) $x = 2 + \sqrt{8}\sin\theta$

○ a. –

○ b. –

○ c. –

$$\int \frac{dx}{\sqrt{12+4x-x^2}}$$

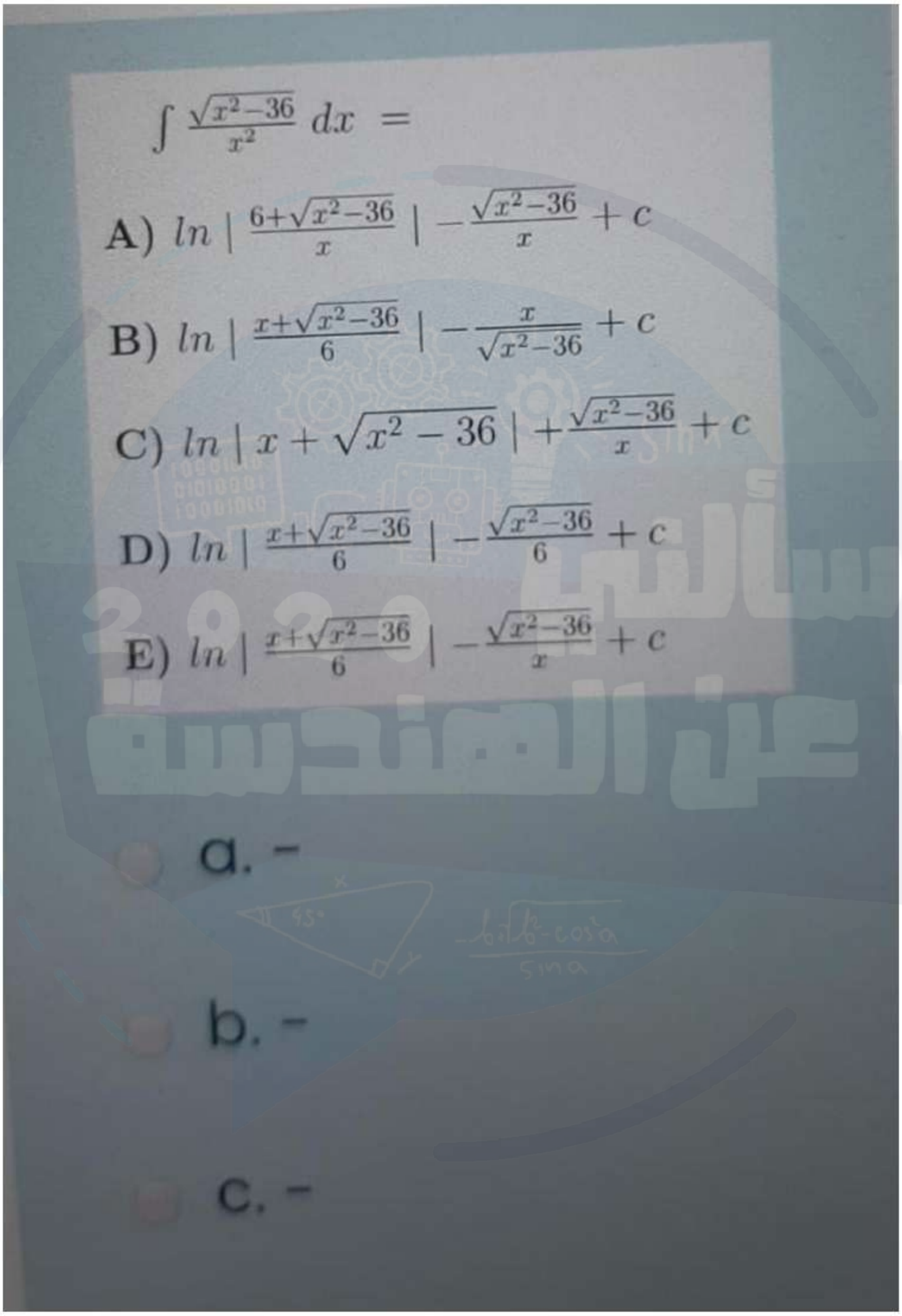
$$\Rightarrow -(x^2-4x-12+4-4)$$

$$= -((x-2)^2-16)$$

$$= 16-(x-2)^2$$

$$\Rightarrow x-2 = 4\sin\theta$$

$$\boxed{x = 4\sin\theta + 2}$$ Ⓑ



$\int \frac{\sqrt{x^2-36}}{x^2}\,dx \ =$

A) $ln\,|\,\frac{6+\sqrt{x^2-36}}{x}\,| - \frac{\sqrt{x^2-36}}{x} + c$

B) $ln\,|\,\frac{x+\sqrt{x^2-36}}{6}\,| - \frac{x}{\sqrt{x^2-36}} + c$

C) $ln\,|\,x + \sqrt{x^2-36}\,| + \frac{\sqrt{x^2-36}}{x} + c$

D) $ln\,|\,\frac{x+\sqrt{x^2-36}}{6}\,| - \frac{\sqrt{x^2-36}}{6} + c$

E) $ln\,|\,\frac{x+\sqrt{x^2-36}}{6}\,| - \frac{\sqrt{x^2-36}}{x} + c$

○ a. -

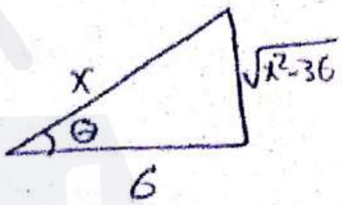
○ b. -

○ c. -

$$\int \frac{\sqrt{x^2-36}}{x^2}\,dx$$

$x^2-36 \Rightarrow x = 6\sec\theta$

$dx = 6\sec\theta\tan\theta\,d\theta$



$$= \int \frac{\sqrt{36(\sec^2\theta-1)}}{36\sec^2\theta}\cdot 6\sec\theta\tan\theta\,d\theta$$

$$= \int \frac{\cancel{6}\tan\theta}{\cancel{36}\sec^{\cancel{2}}\theta}\cdot \cancel{6}\,\cancel{\sec\theta}\tan\theta\,d\theta$$

$$= \int \frac{\tan^2\theta}{\sec\theta}\,d\theta = \int \frac{\sec^2\theta-1}{\sec\theta}\,d\theta$$

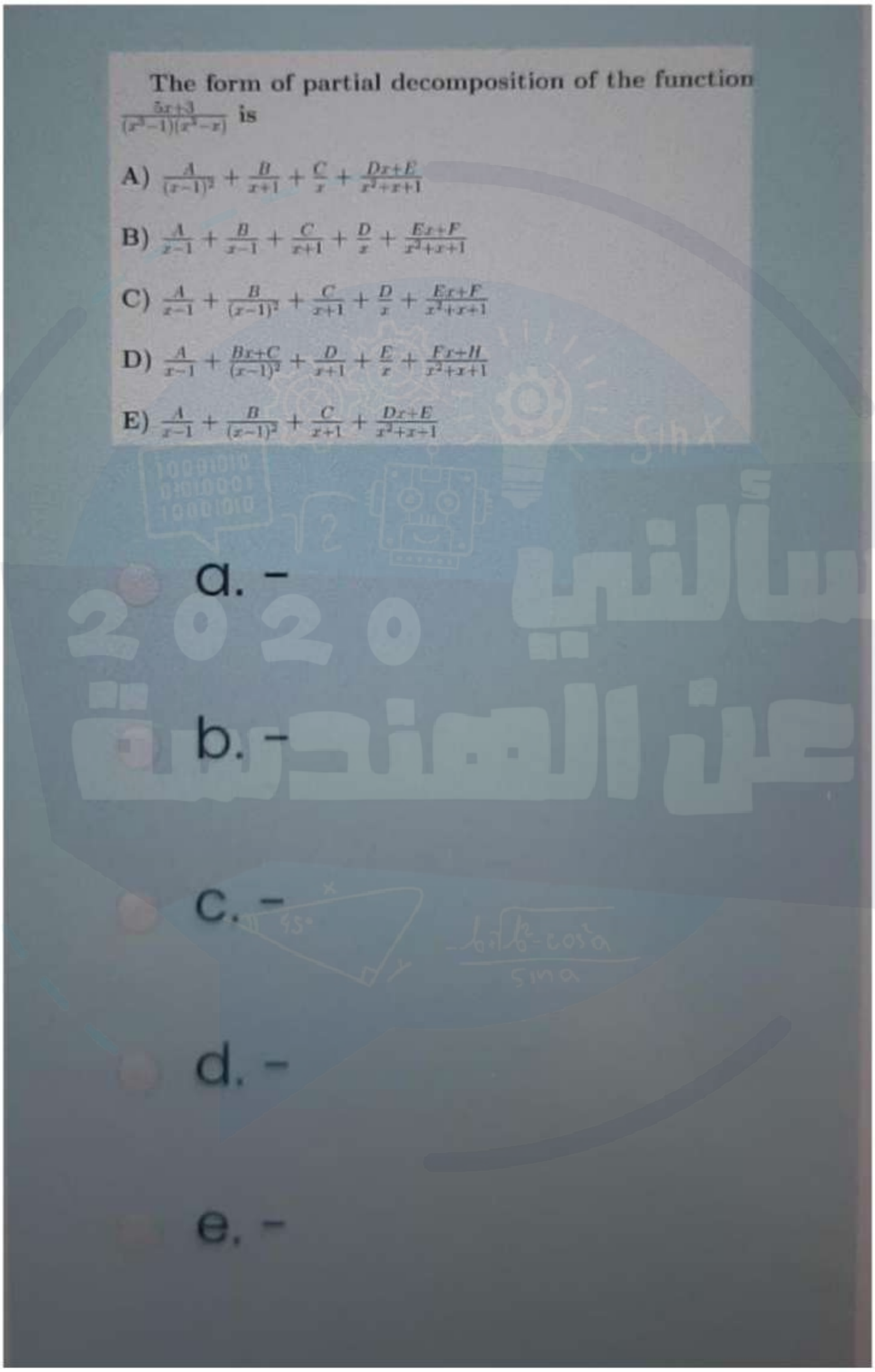
$$= \int (\sec\theta - \cos\theta)\,d\theta$$

$$= \ln|\sec\theta+\tan\theta| - \sin\theta + C \Rightarrow$$

تعويض من المثلث

$$= \ln\left|\frac{x+\sqrt{x^2-36}}{6}\right| - \frac{\sqrt{x^2-36}}{x} + C$$

Ⓔ



The form of partial decomposition of the function $\frac{5x+3}{(x^3-1)(x^3-x)}$ is

A) $\frac{A}{(x-1)^2} + \frac{B}{x+1} + \frac{C}{x} + \frac{Dx+E}{x^2+x+1}$

B) $\frac{A}{x-1} + \frac{B}{x-1} + \frac{C}{x+1} + \frac{D}{x} + \frac{Ex+F}{x^2+x+1}$

C) $\frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{x+1} + \frac{D}{x} + \frac{Ex+F}{x^2+x+1}$

D) $\frac{A}{x-1} + \frac{Bx+C}{(x-1)^2} + \frac{D}{x+1} + \frac{E}{x} + \frac{Fx+H}{x^2+x+1}$

E) $\frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{x+1} + \frac{Dx+E}{x^2+x+1}$

○ a. -

○ b. -

○ c. -

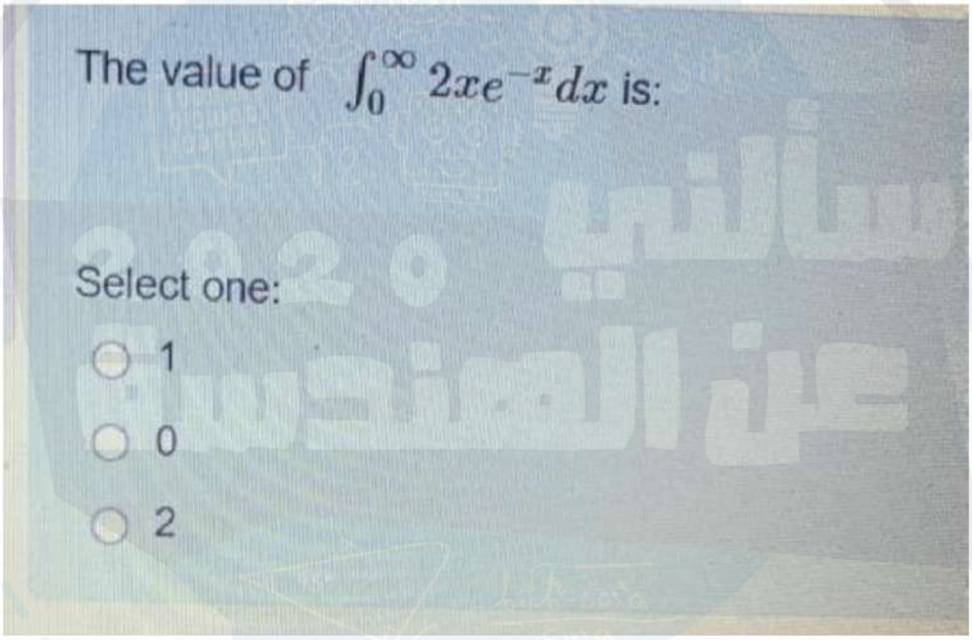
○ d. -

○ e. -

$$\frac{5x+3}{(x^3-1)\,(x^3-x)} = \frac{5x+3}{(x-1)\,(x^2+x+1)\,(x)\,(x-1)\,(x+1)}$$

$$= \frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{x+1} + \frac{D}{x} + \frac{Ex+F}{(x^2+x+1)}$$

Ⓒ



The value of $\int_0^\infty 2xe^{-x}\,dx$ is:

Select one:

○ 1

○ 0

○ 2

$\int_0^\infty 2xe^{-x}\,dx$

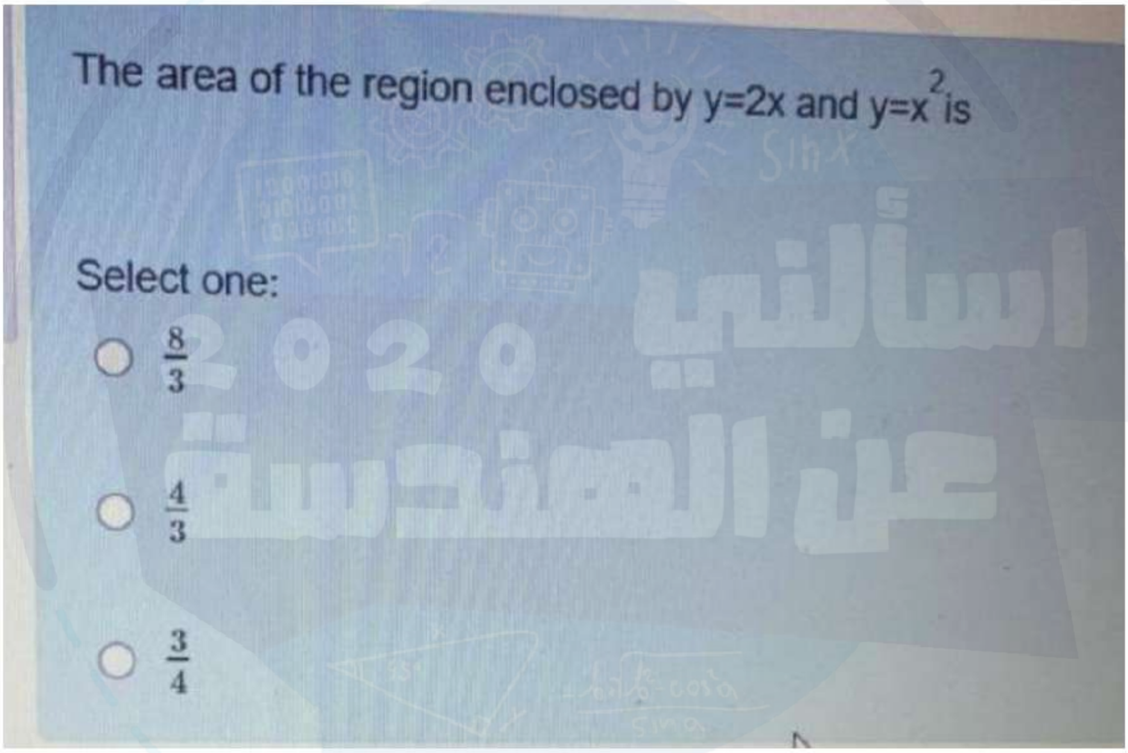
$u = 2x \qquad dv = e^{-x}\,dx$

$du = 2\,dx \qquad v = -e^{-x}$

$= -2xe^{-x}\Big]_0^\infty + 2\int e^{-x}\,dx$

$= -2xe^{-x}\Big]_0^\infty + 2e^{-x}\Big]_0^\infty$

$= 0 + 0 - (-2) = \boxed{2}$ Ⓒ



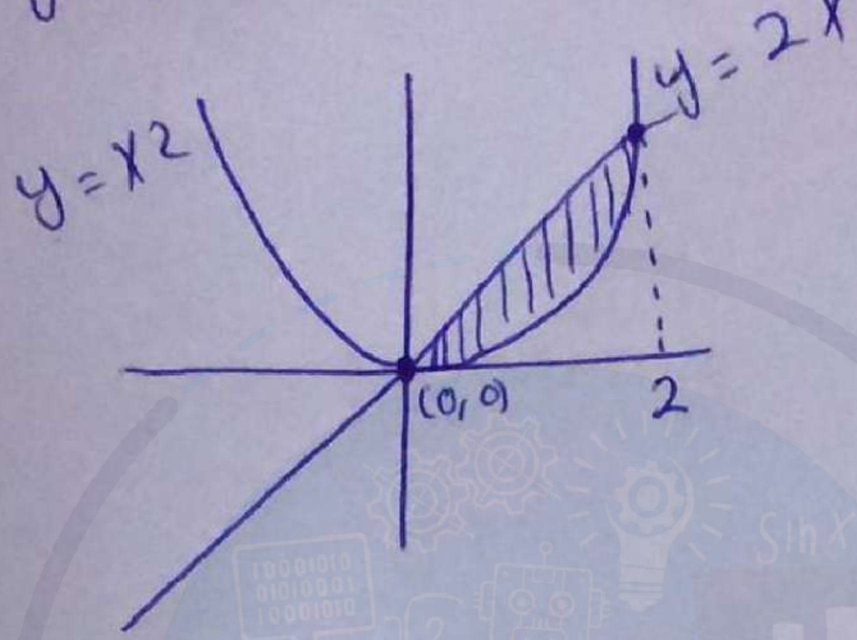
The area of the region enclosed by $y=2x$ and $y=x^2$ is

Select one:

- ○ $\frac{8}{3}$
- ○ $\frac{4}{3}$
- ○ $\frac{3}{4}$

$y = 2x$

$y = x2$



$x^2 - 2x = 0$

$x(x-2) = 0$

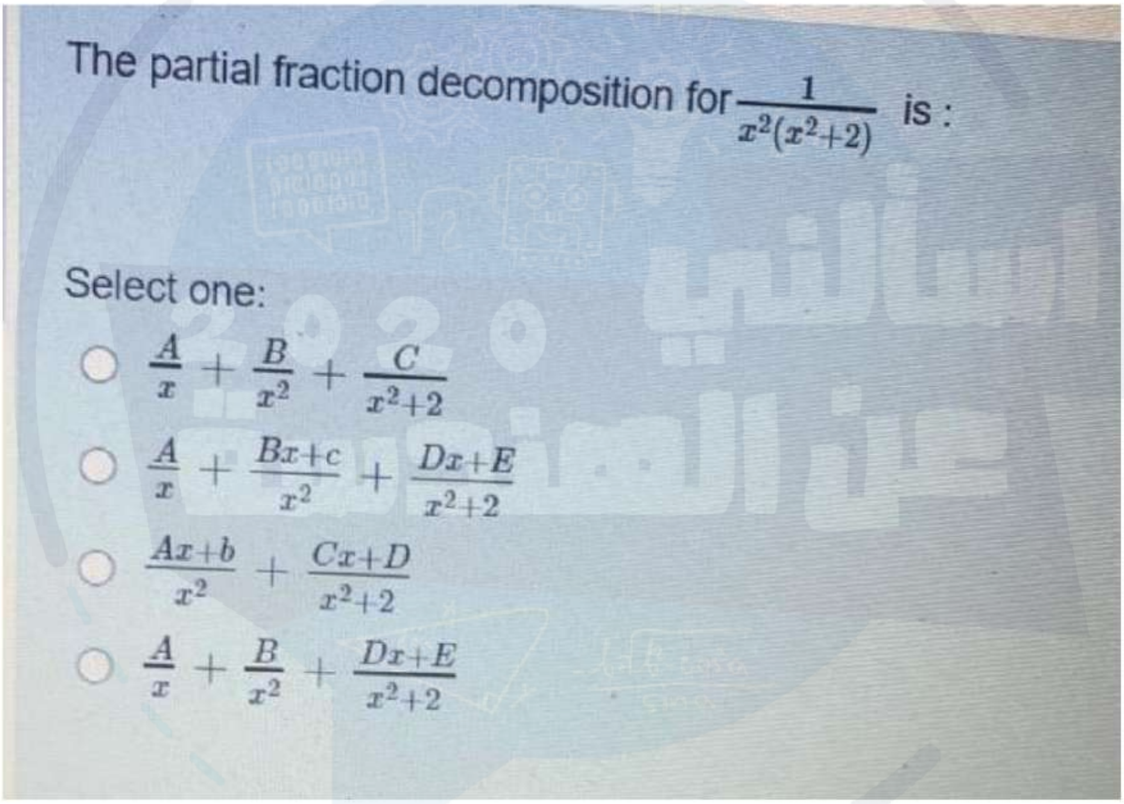
$x = 0 \,,\ x = 2$

$$\int_0^2 2x - x^2 . dx$$

$$\left. x^2 - \frac{x^3}{3} \right]_0^2$$

$$4 - \frac{8}{3} = \boxed{\frac{4}{3}}$$

$\underline{\underline{B}}$



The partial fraction decomposition for $\frac{1}{x^2(x^2+2)}$ is :

Select one:

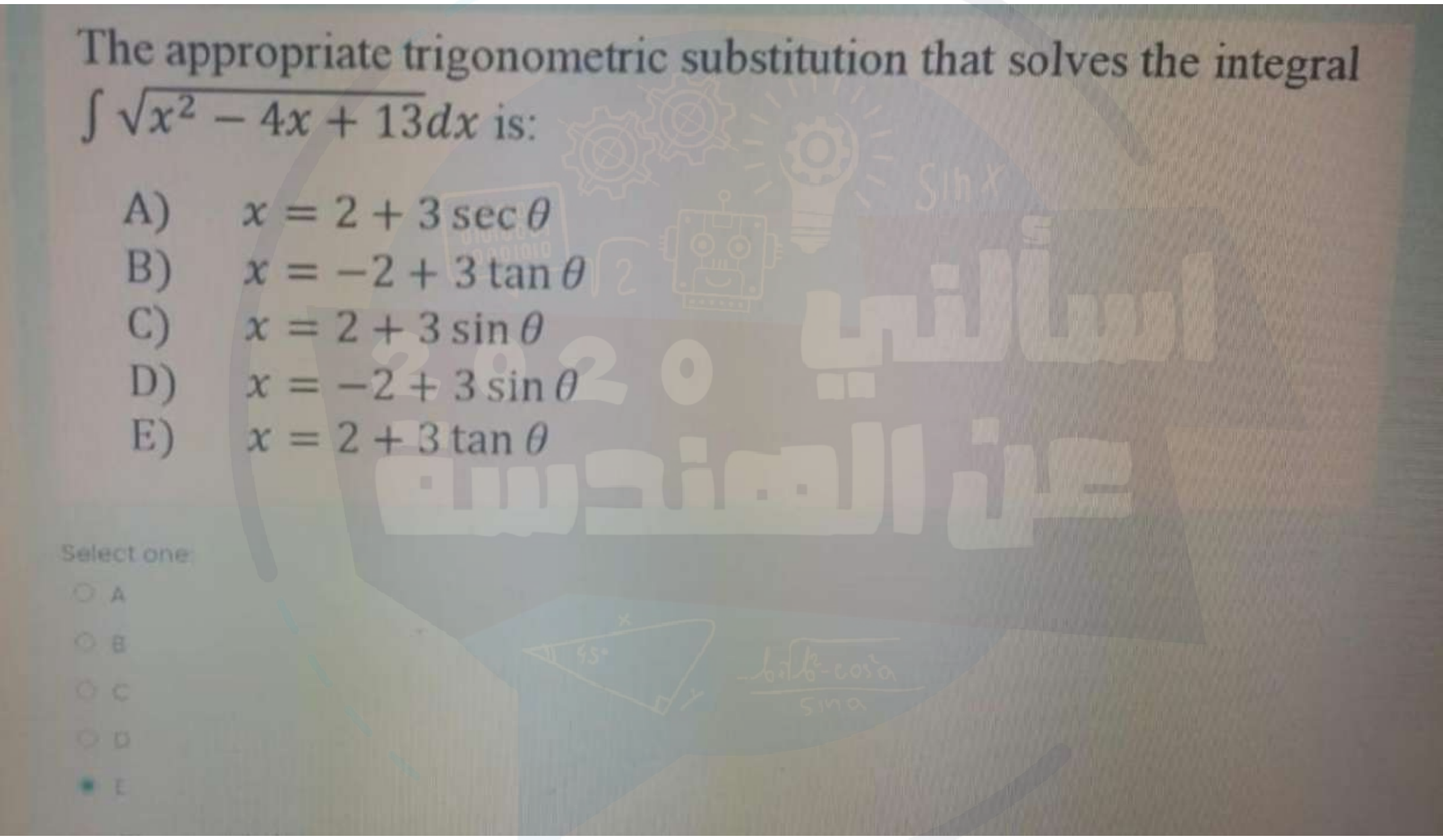
○ $\frac{A}{x}+\frac{B}{x^2}+\frac{C}{x^2+2}$

○ $\frac{A}{x}+\frac{Bx+c}{x^2}+\frac{Dx+E}{x^2+2}$

○ $\frac{Ax+b}{x^2}+\frac{Cx+D}{x^2+2}$

○ $\frac{A}{x}+\frac{B}{x^2}+\frac{Dx+E}{x^2+2}$

$$\frac{1}{x^2\ (x^2+2)} = \frac{A}{x} + \frac{B}{x^2} + \frac{Dx+E}{x^2+2}$$ Ⓓ



The appropriate trigonometric substitution that solves the integral $\int \sqrt{x^2 - 4x + 13}dx$ is:

A) $x = 2 + 3\sec\theta$
B) $x = -2 + 3\tan\theta$
C) $x = 2 + 3\sin\theta$
D) $x = -2 + 3\sin\theta$
E) $x = 2 + 3\tan\theta$

Select one:

○ A
○ B
○ C
○ D
● E

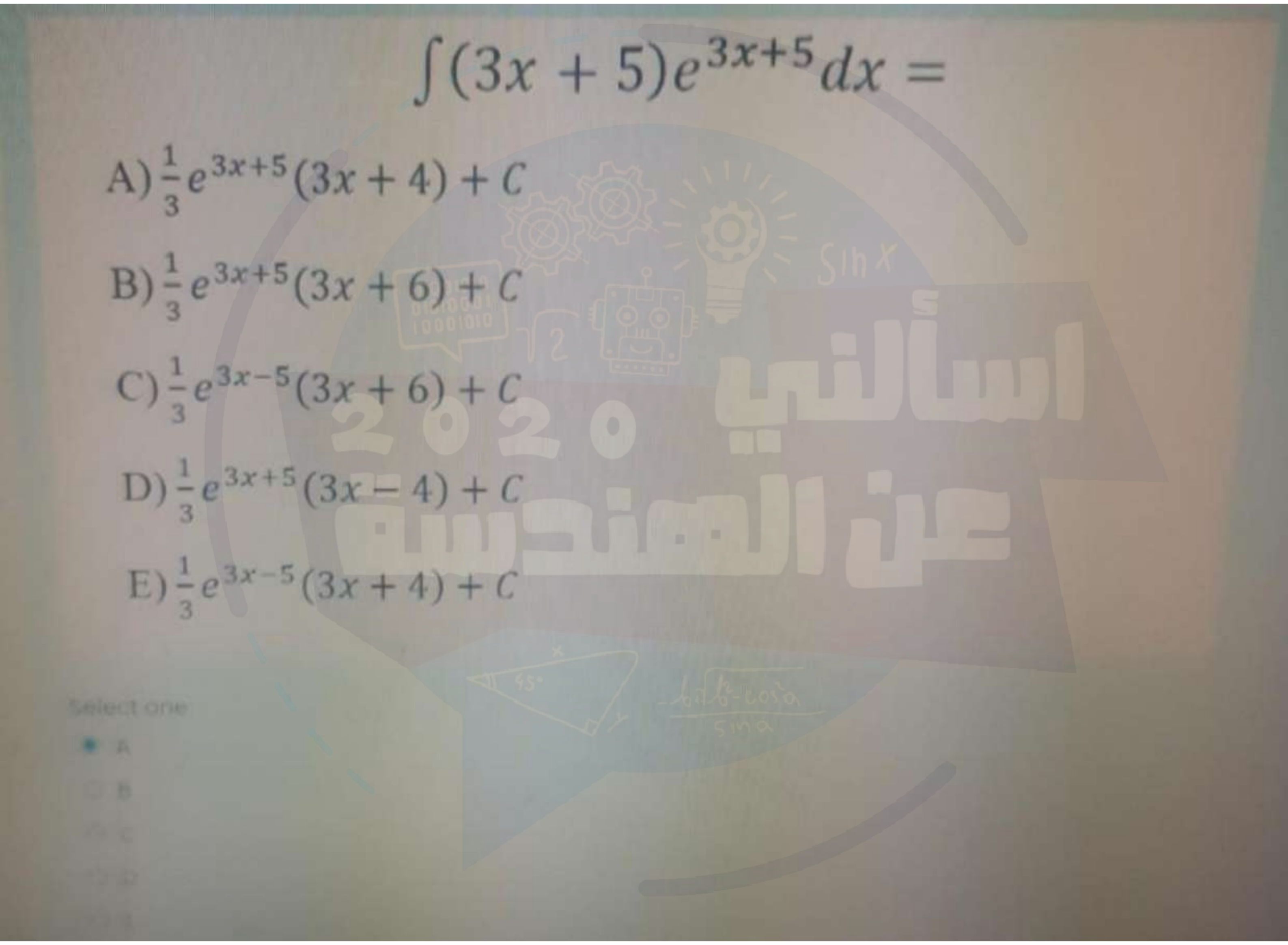
$\int \sqrt{x^2 - 4x + 13}\ dx$

$\Rightarrow x^2 - 4x + 13 + 4 - 4$

$= (x-2)^2 + 9$

$\rightarrow x - 2 = 3\tan\theta$

$\boxed{x = 2 + 3\tan\theta}$ Ⓔ



$$\int(3x+5)e^{3x+5}dx =$$

A) $\frac{1}{3}e^{3x+5}(3x+4)+C$

B) $\frac{1}{3}e^{3x+5}(3x+6)+C$

C) $\frac{1}{3}e^{3x-5}(3x+6)+C$

D) $\frac{1}{3}e^{3x+5}(3x-4)+C$

E) $\frac{1}{3}e^{3x-5}(3x+4)+C$

Select one:

● A

○ B

○ C

○ D

○ E

$\int (3x+5)\, e^{3x+5} \quad dx =$ $\Rightarrow y = 3x+5 \Rightarrow dy = 3dx$

let $u = y \qquad dv = e^{y}\, dy$

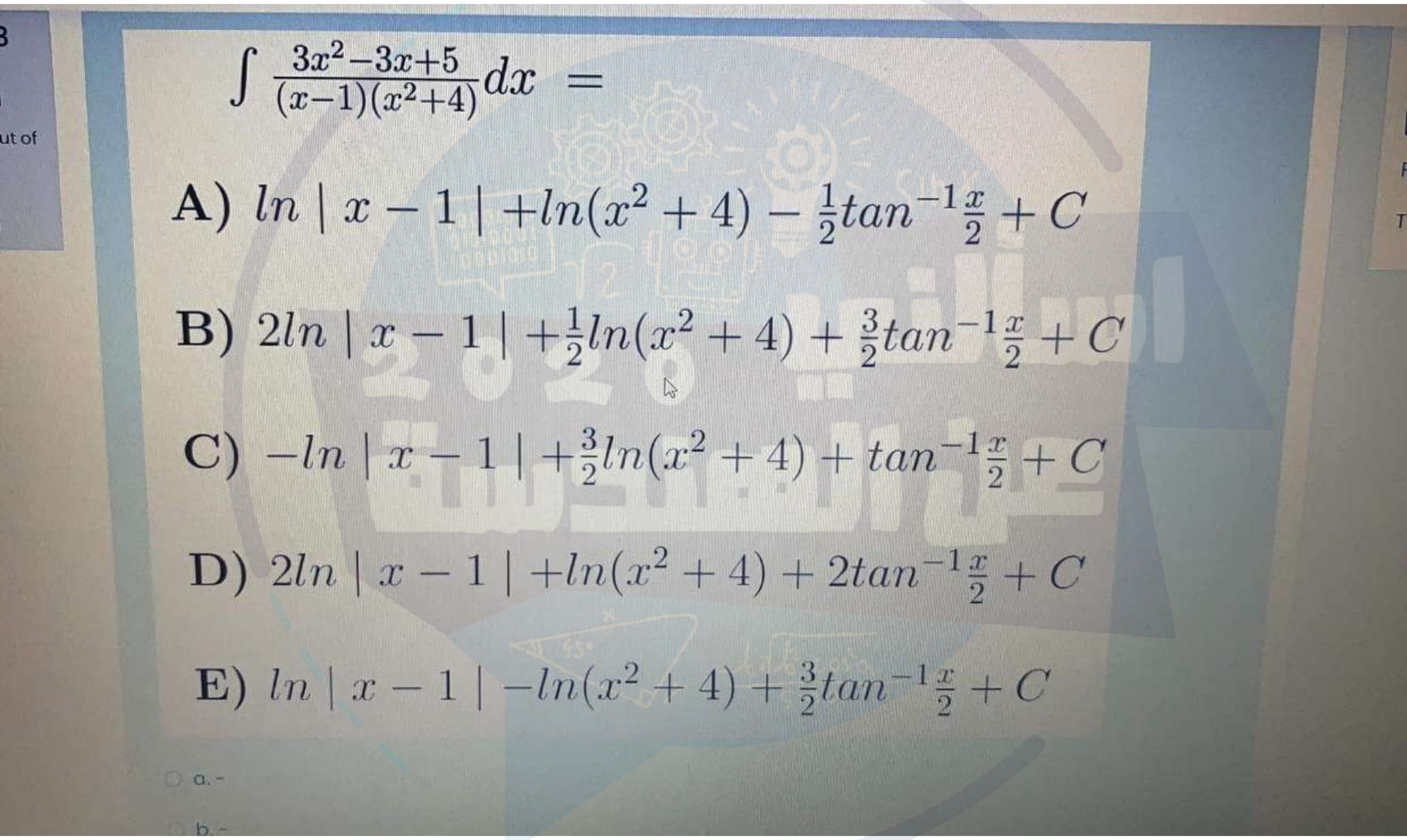
$du = dy \qquad v = e^{y}$

$= \int \frac{y}{3}\, e^{y}\, dy$

$= \frac{1}{3}\left[y e^{y} - \int e^{y}\, dy \right]$

$= \frac{1}{3}\left[y e^{y} - e^{y} \right] = \frac{1}{3} e^{y} (y-1) + C$

$= \frac{1}{3} e^{3x+5} (3x+4) + C$ Ⓐ



$$\int \frac{3x^2-3x+5}{(x-1)(x^2+4)}dx =$$

A) $ln \mid x-1 \mid +ln(x^2+4) - \frac{1}{2}tan^{-1}\frac{x}{2} + C$

B) $2ln \mid x-1 \mid +\frac{1}{2}ln(x^2+4) + \frac{3}{2}tan^{-1}\frac{x}{2} + C$

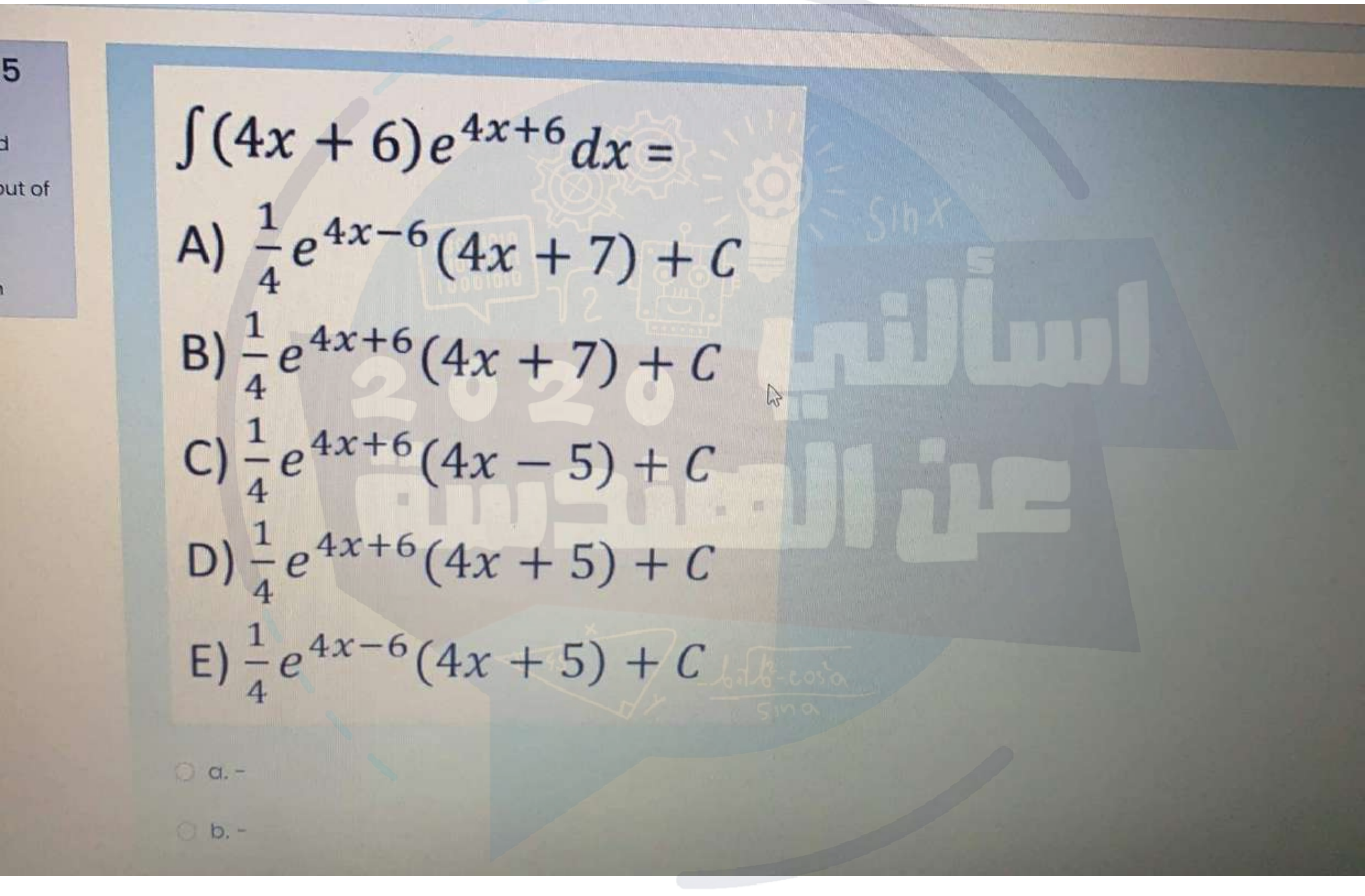
C) $-ln \mid x-1 \mid +\frac{3}{2}ln(x^2+4) + tan^{-1}\frac{x}{2} + C$

D) $2ln \mid x-1 \mid +ln(x^2+4) + 2tan^{-1}\frac{x}{2} + C$

E) $ln \mid x-1 \mid -ln(x^2+4) + \frac{3}{2}tan^{-1}\frac{x}{2} + C$

○ a. -

○ b. -



$\int (4x + 6)e^{4x+6}dx =$

A) $\frac{1}{4}e^{4x-6}(4x + 7) + C$

B) $\frac{1}{4}e^{4x+6}(4x + 7) + C$

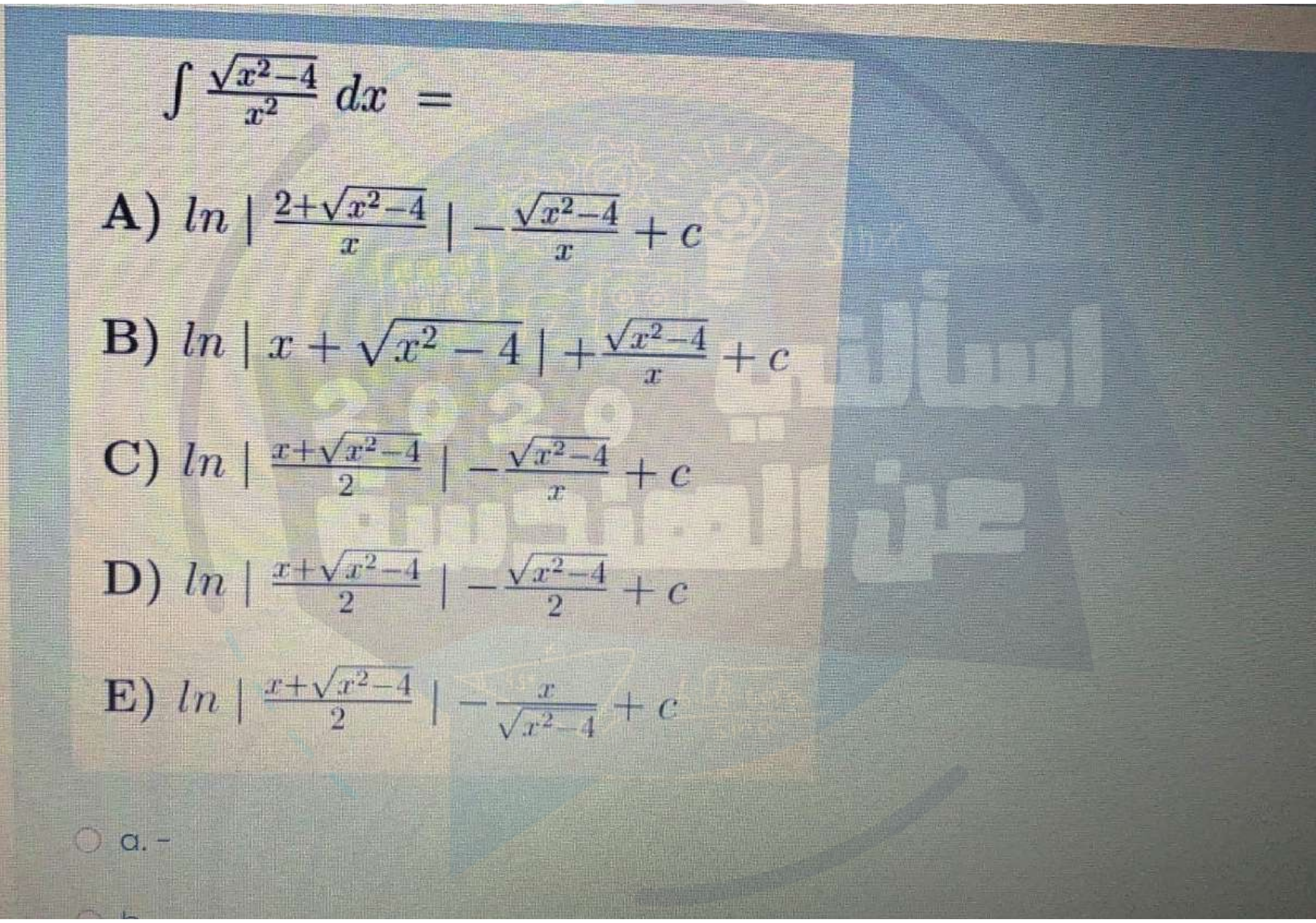
C) $\frac{1}{4}e^{4x+6}(4x - 5) + C$

D) $\frac{1}{4}e^{4x+6}(4x + 5) + C$

E) $\frac{1}{4}e^{4x-6}(4x + 5) + C$

○ a. -

○ b. -



$$\int \frac{\sqrt{x^2-4}}{x^2}\,dx =$$

A) $ln \left| \frac{2+\sqrt{x^2-4}}{x} \right| - \frac{\sqrt{x^2-4}}{x} + c$

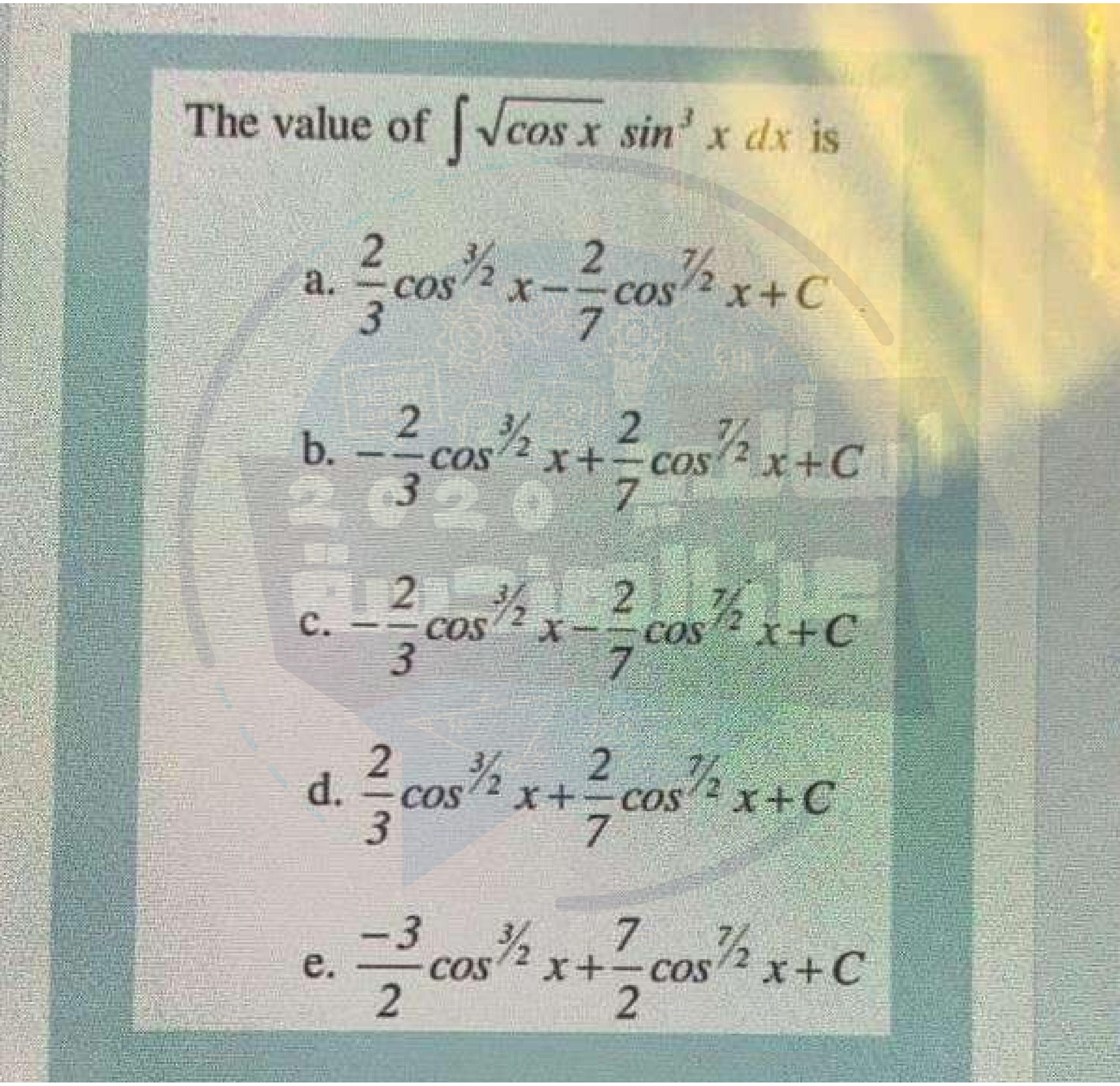
B) $ln \left| x + \sqrt{x^2-4} \right| + \frac{\sqrt{x^2-4}}{x} + c$

C) $ln \left| \frac{x+\sqrt{x^2-4}}{2} \right| - \frac{\sqrt{x^2-4}}{x} + c$

D) $ln \left| \frac{x+\sqrt{x^2-4}}{2} \right| - \frac{\sqrt{x^2-4}}{2} + c$

E) $ln \left| \frac{x+\sqrt{x^2-4}}{2} \right| - \frac{x}{\sqrt{x^2-4}} + c$

○ a. -



The value of $\int \sqrt{\cos x}\ \sin^3 x\ dx$ is

a. $\frac{2}{3}\cos^{3/2} x - \frac{2}{7}\cos^{7/2} x + C$

b. $-\frac{2}{3}\cos^{3/2} x + \frac{2}{7}\cos^{7/2} x + C$

c. $-\frac{2}{3}\cos^{3/2} x - \frac{2}{7}\cos^{7/2} x + C$

d. $\frac{2}{3}\cos^{3/2} x + \frac{2}{7}\cos^{7/2} x + C$

e. $\frac{-3}{2}\cos^{3/2} x + \frac{7}{2}\cos^{7/2} x + C$

$$\int_{6}^{\infty} \frac{2dx}{x^2-1} =$$

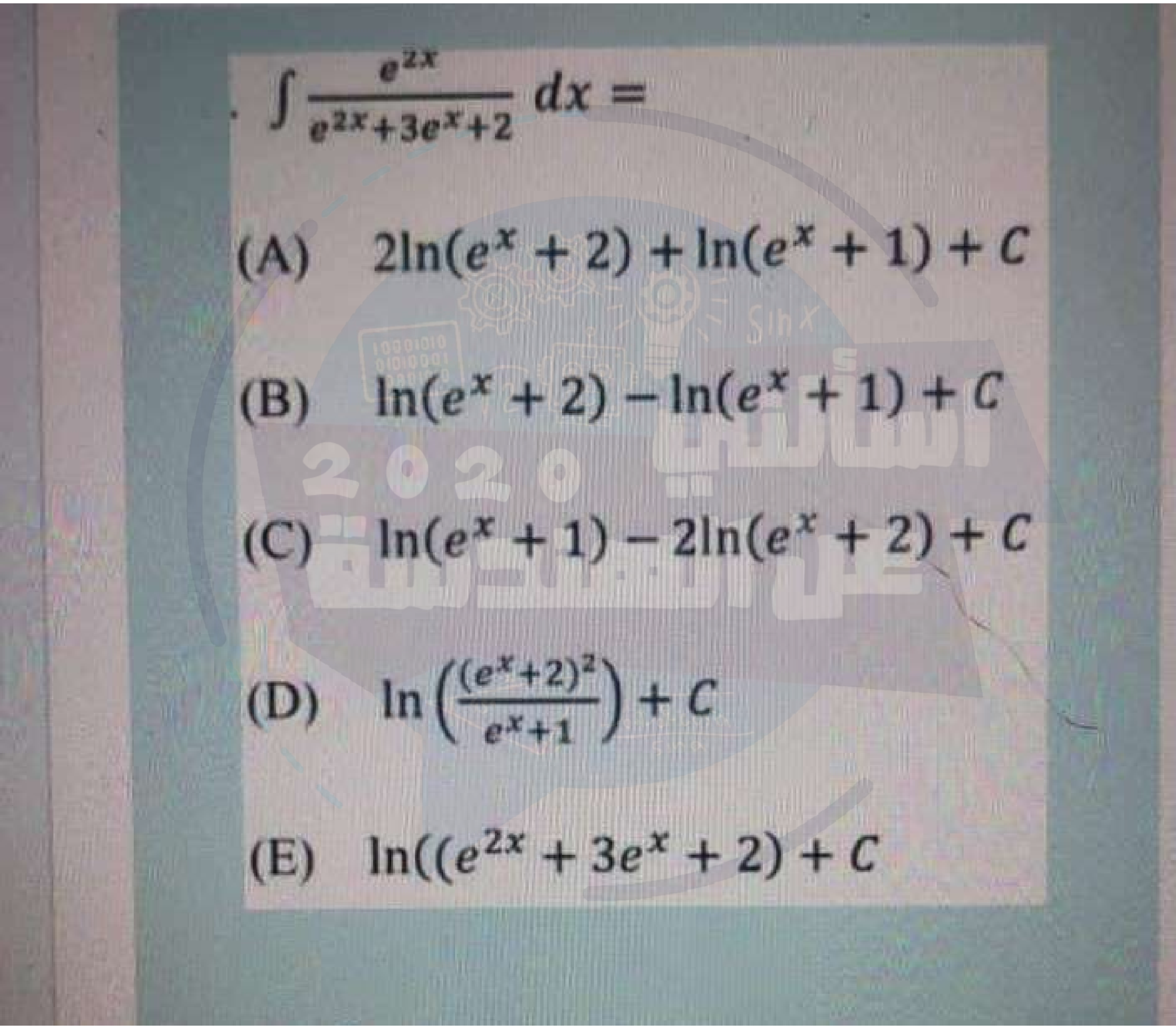
A. $\ln 3$

B. $\ln 2$

C. $\ln \frac{5}{3}$

D. $\ln \frac{3}{2}$

E. $\ln \frac{7}{5}$



. $\int \frac{e^{2x}}{e^{2x}+3e^{x}+2}\,dx =$

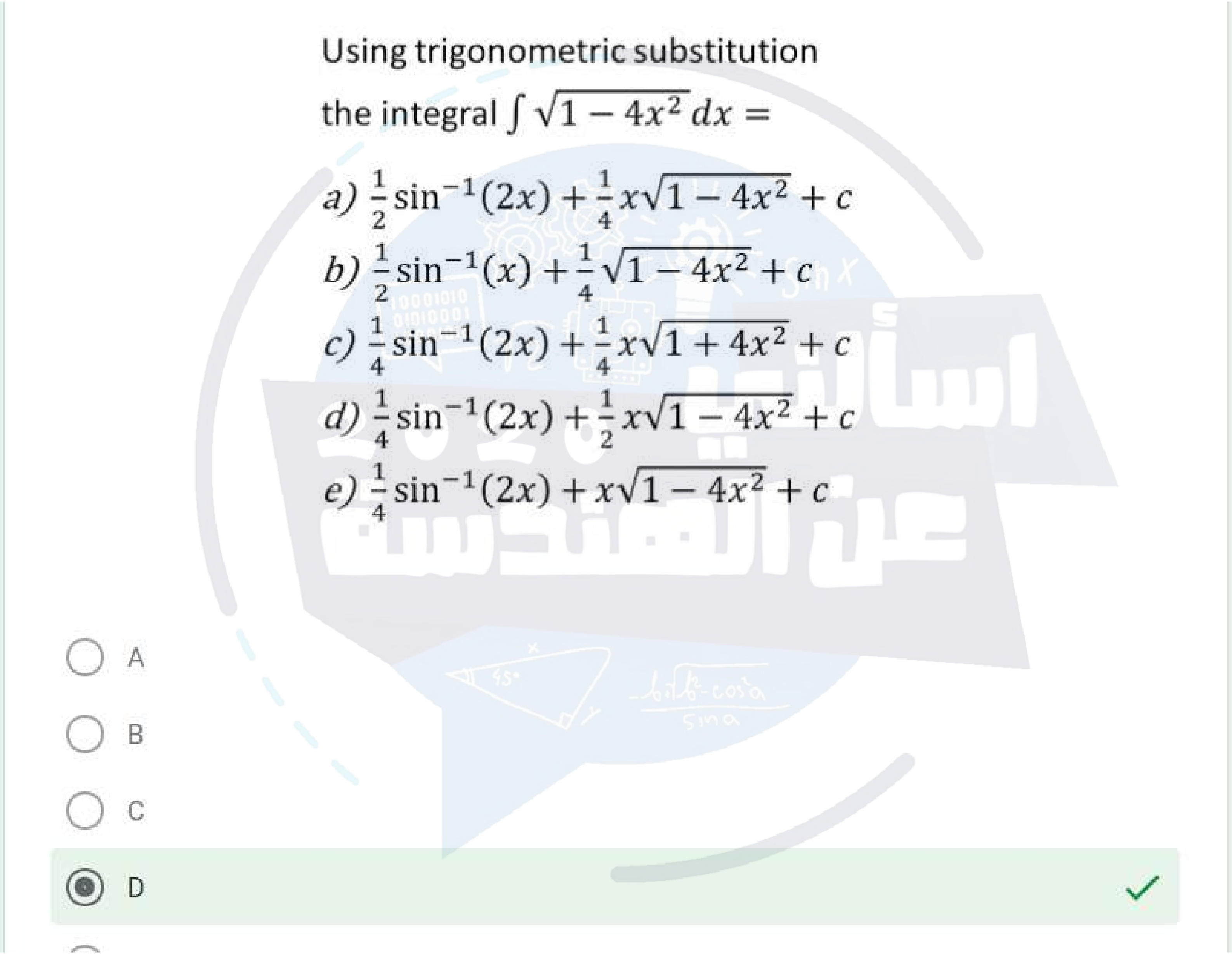
(A) $2\ln(e^{x} + 2) + \ln(e^{x} + 1) + C$

(B) $\ln(e^{x} + 2) - \ln(e^{x} + 1) + C$

(C) $\ln(e^{x} + 1) - 2\ln(e^{x} + 2) + C$

(D) $\ln\left(\frac{(e^{x}+2)^{2}}{e^{x}+1}\right) + C$

(E) $\ln((e^{2x} + 3e^{x} + 2) + C$



Using trigonometric substitution

the integral $\int \sqrt{1-4x^2}\,dx =$

a) $\frac{1}{2}\sin^{-1}(2x)+\frac{1}{4}x\sqrt{1-4x^2}+c$

b) $\frac{1}{2}\sin^{-1}(x)+\frac{1}{4}\sqrt{1-4x^2}+c$

c) $\frac{1}{4}\sin^{-1}(2x)+\frac{1}{4}x\sqrt{1+4x^2}+c$

d) $\frac{1}{4}\sin^{-1}(2x)+\frac{1}{2}x\sqrt{1-4x^2}+c$

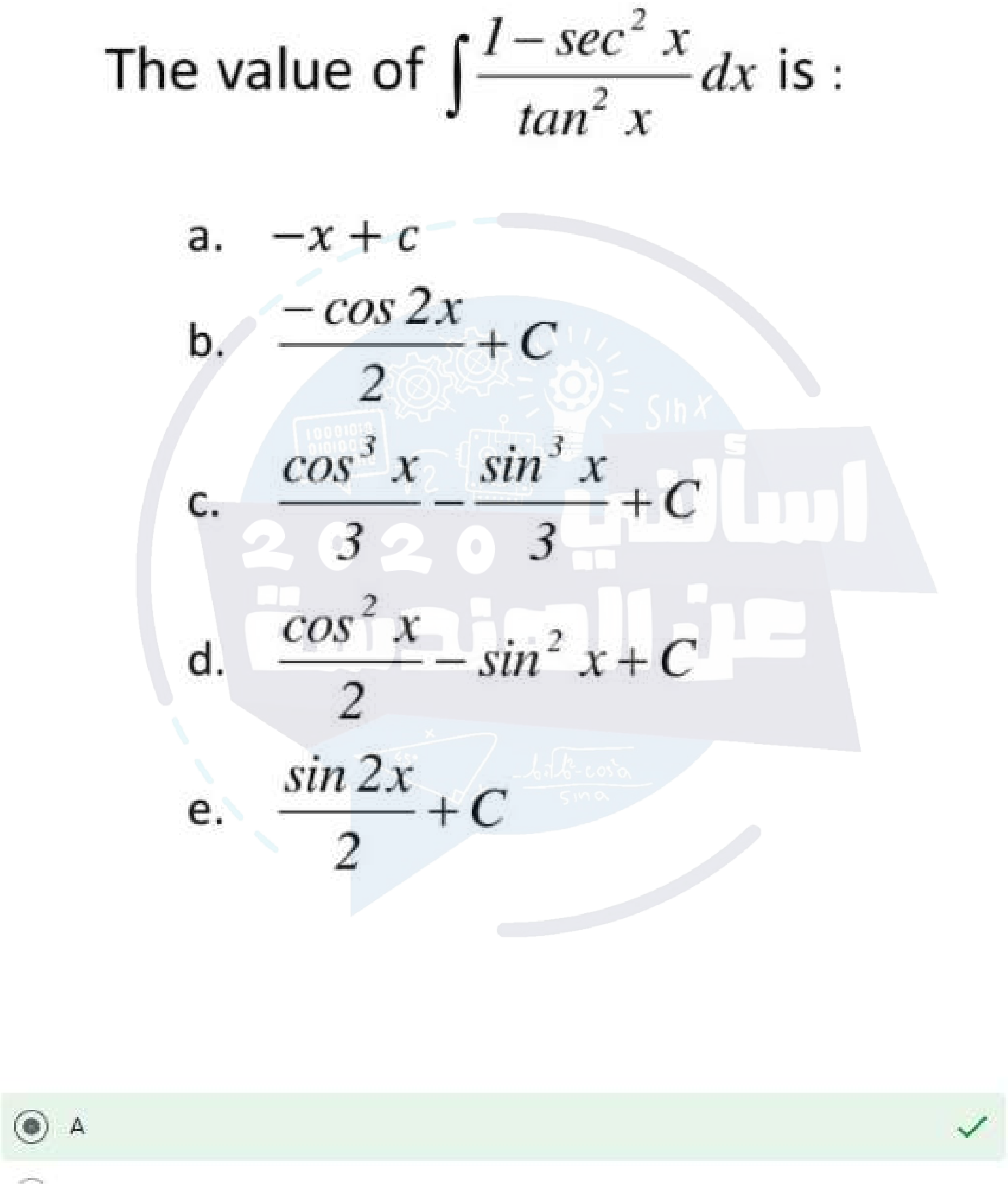
e) $\frac{1}{4}\sin^{-1}(2x)+x\sqrt{1-4x^2}+c$

○ A

○ B

○ C

● D ✓



The value of $\int \frac{1-\sec^2 x}{\tan^2 x}dx$ is :

a. $-x+c$

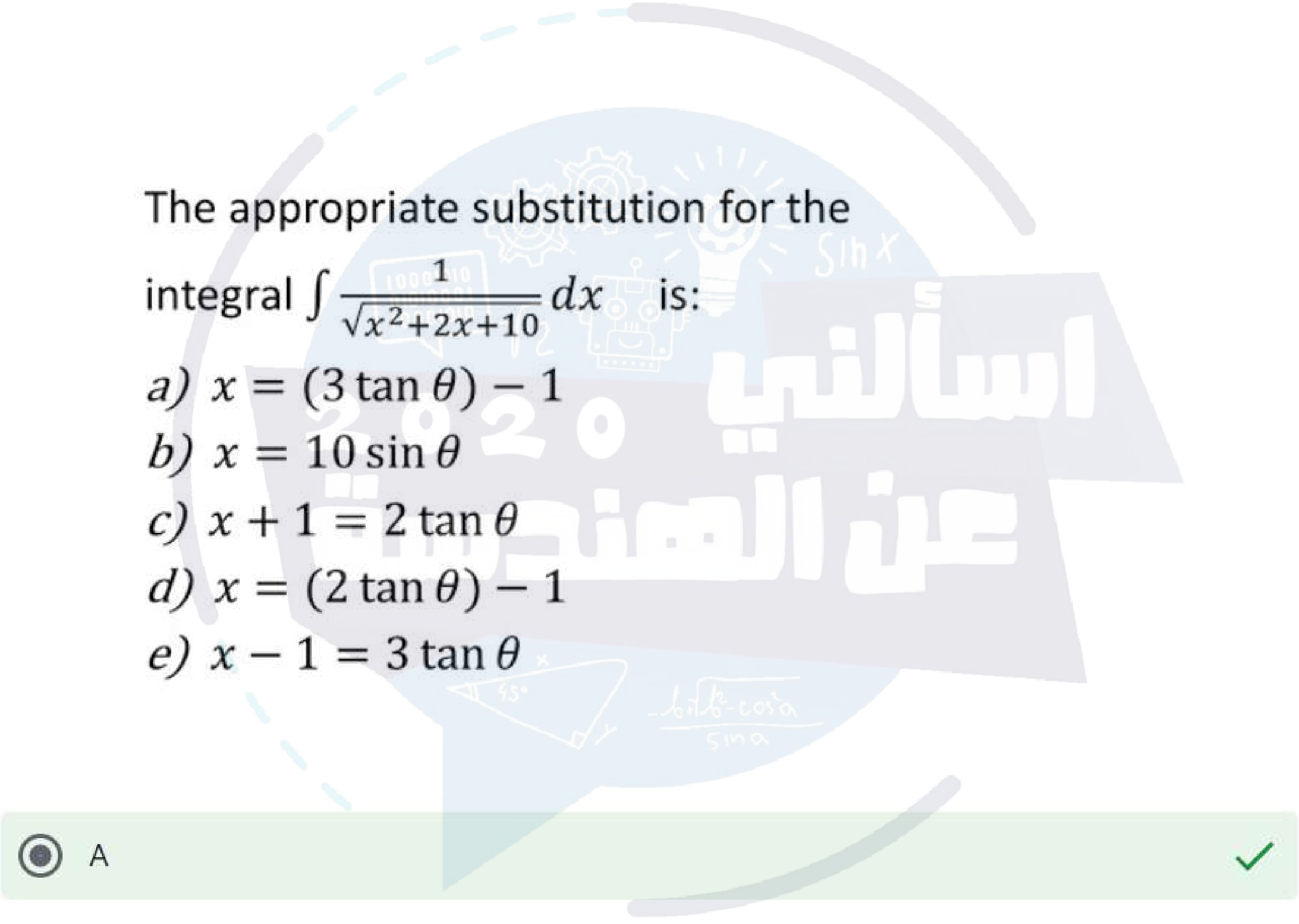
b. $\frac{-\cos 2x}{2}+C$

c. $\frac{\cos^3 x}{3}-\frac{\sin^3 x}{3}+C$

d. $\frac{\cos^2 x}{2}-\sin^2 x+C$

e. $\frac{\sin 2x}{2}+C$

● A ✓



The appropriate substitution for the integral $\int \frac{1}{\sqrt{x^2+2x+10}}\,dx$ is:

$a)\ x = (3\tan\theta) - 1$

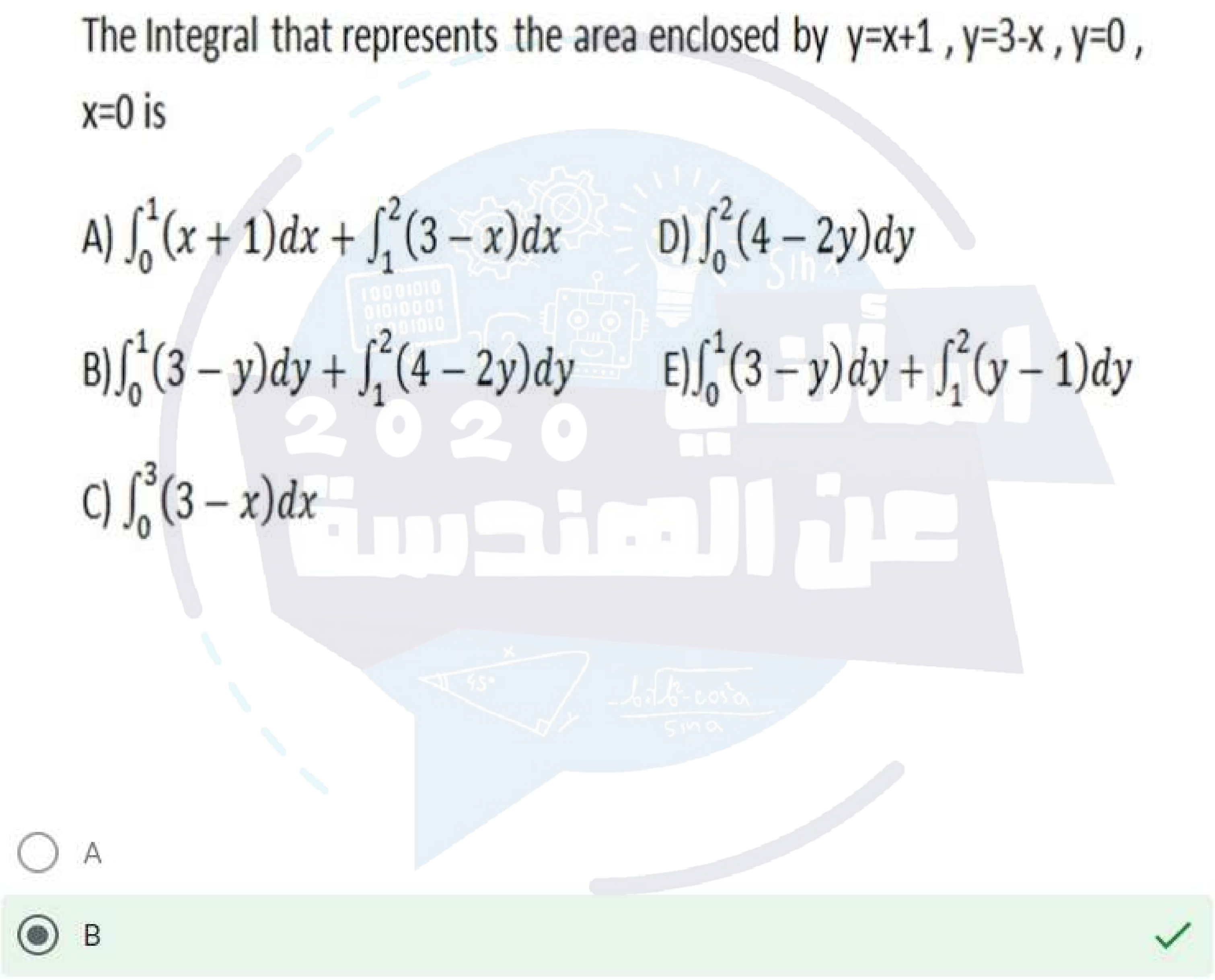
$b)\ x = 10\sin\theta$

$c)\ x + 1 = 2\tan\theta$

$d)\ x = (2\tan\theta) - 1$

$e)\ x - 1 = 3\tan\theta$

● A ✓



The Integral that represents the area enclosed by y=x+1 , y=3-x , y=0 , x=0 is

A) $\int_0^1 (x+1)dx + \int_1^2 (3-x)dx$

B) $\int_0^1 (3-y)dy + \int_1^2 (4-2y)dy$

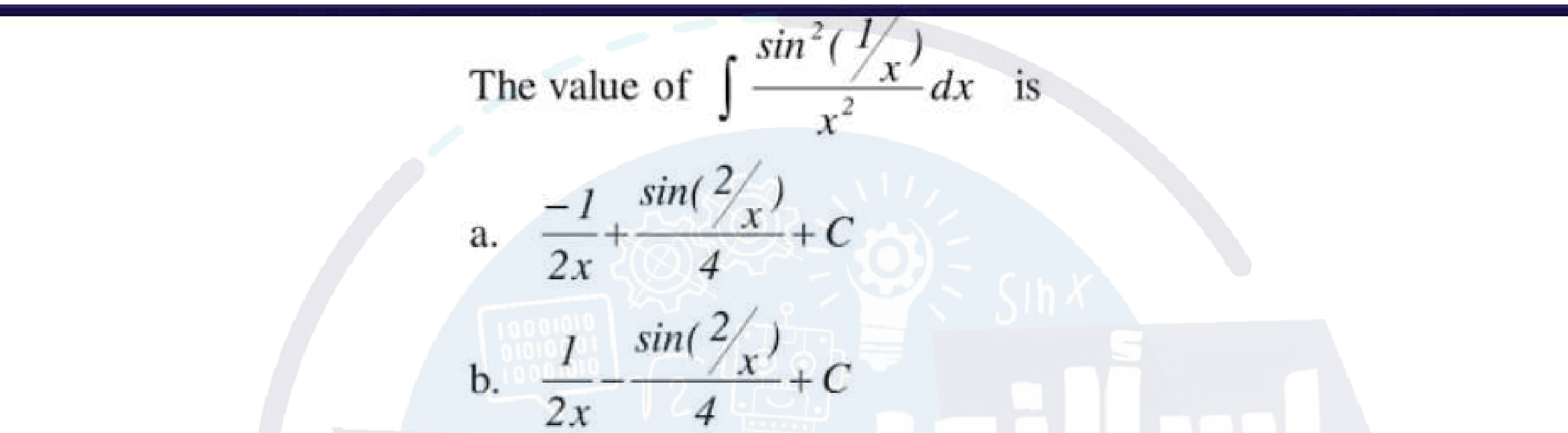
C) $\int_0^3 (3-x)dx$

D) $\int_0^2 (4-2y)dy$

E) $\int_0^1 (3-y)dy + \int_1^2 (y-1)dy$

○ A

● B ✓



The value of $\int \frac{\sin^2(1/x)}{x^2}\,dx$ is

a. $\frac{-1}{2x}+\frac{\sin(2/x)}{4}+C$

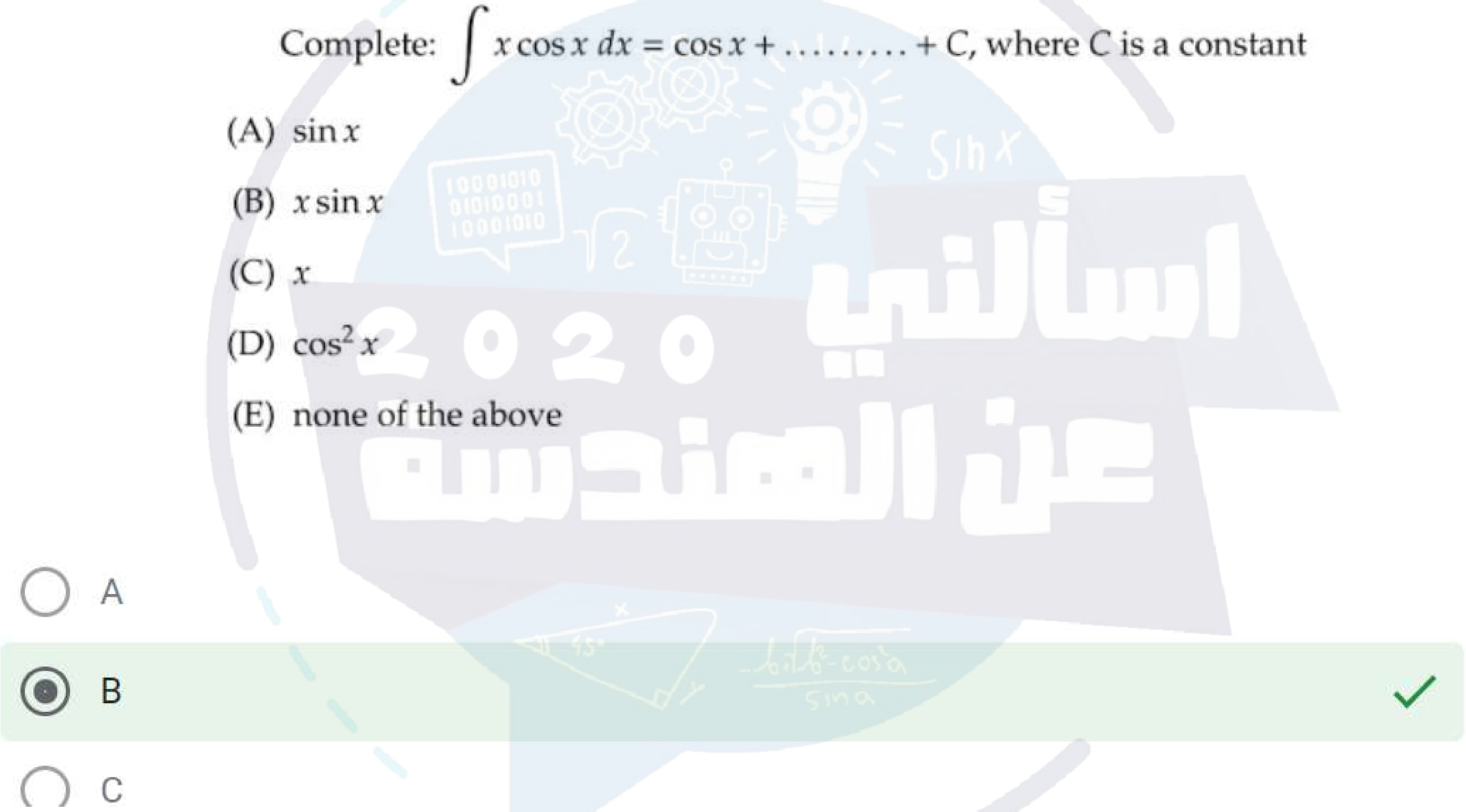
b. $\frac{1}{2x}-\frac{\sin(2/x)}{4}+C$

c. $\frac{-1}{2x}-\frac{\sin(2/x)}{4}+C$

d. $\frac{1}{2x}+\frac{\sin(2/x)}{4}+C$

e. $\frac{-1}{2}+\frac{\sin(2/x)}{4}+C$

◉ A ✓



Complete: $\int x \cos x \, dx = \cos x + \ldots\ldots\ldots + C$, where C is a constant

(A) $\sin x$

(B) $x \sin x$

(C) x

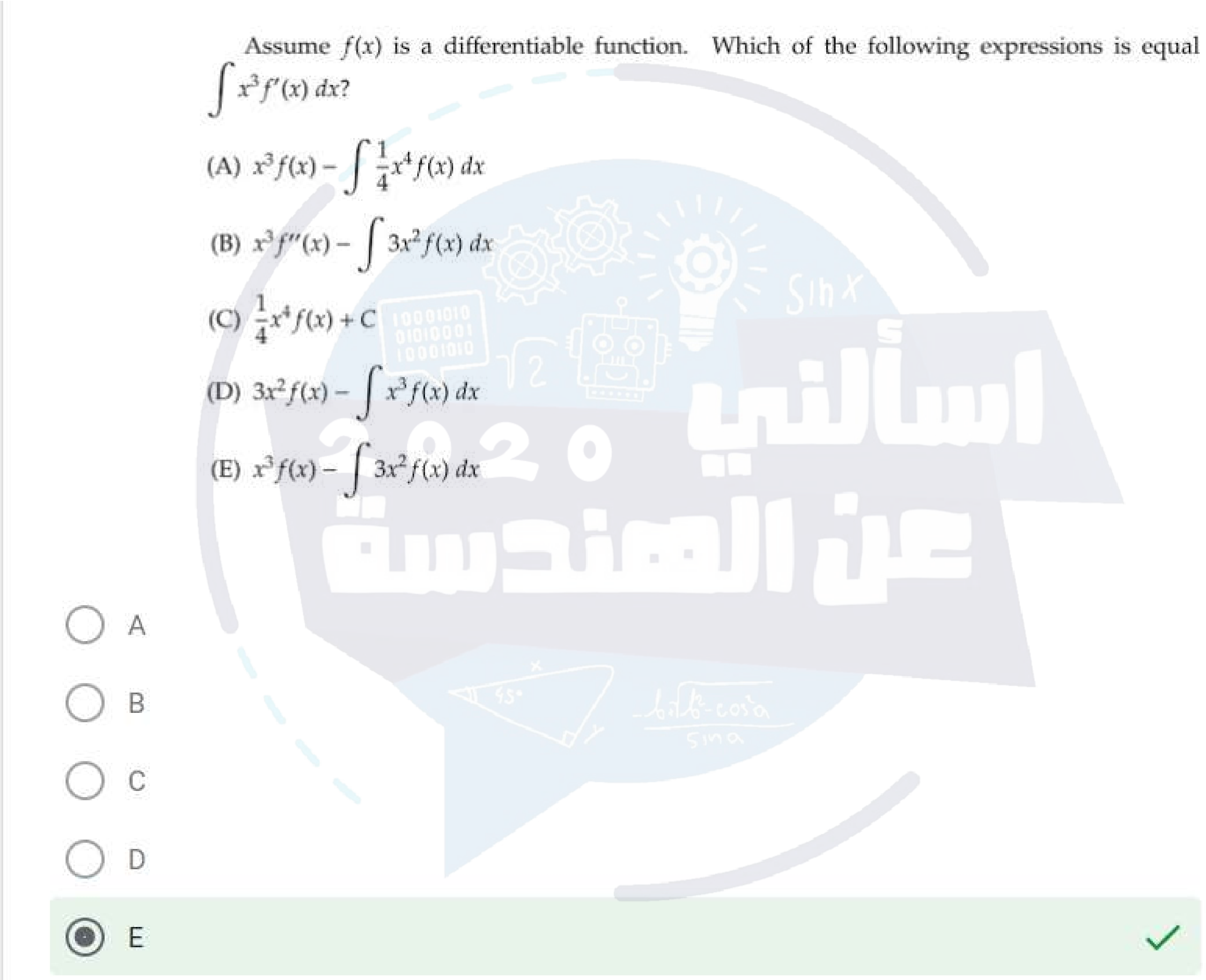
(D) $\cos^2 x$

(E) none of the above

○ A

● B ✓

○ C



Assume $f(x)$ is a differentiable function. Which of the following expressions is equal $\int x^3 f'(x)\,dx$?

(A) $x^3 f(x) - \int \frac{1}{4}x^4 f(x)\,dx$

(B) $x^3 f''(x) - \int 3x^2 f(x)\,dx$

(C) $\frac{1}{4}x^4 f(x) + C$

(D) $3x^2 f(x) - \int x^3 f(x)\,dx$

(E) $x^3 f(x) - \int 3x^2 f(x)\,dx$

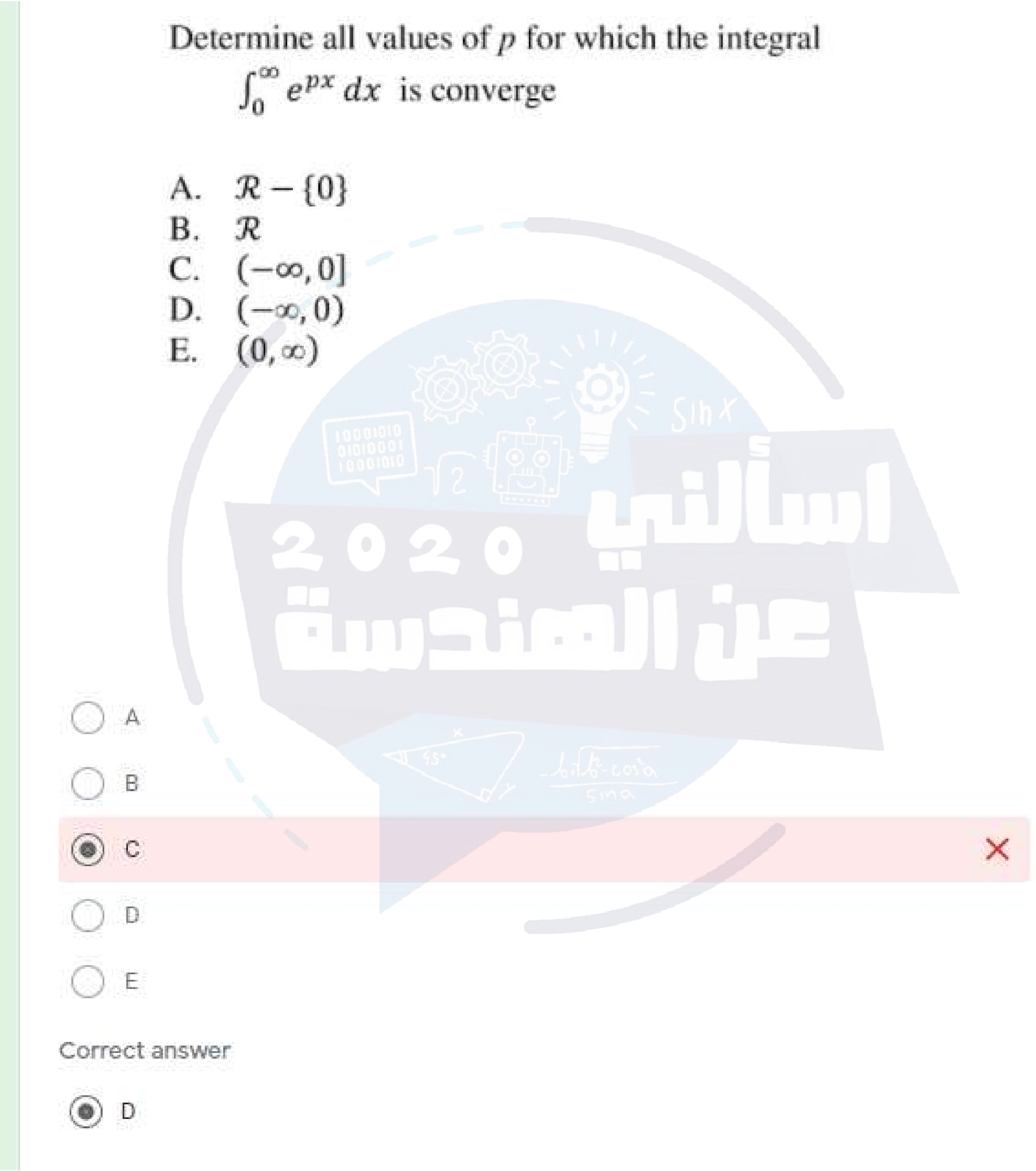
○ A

○ B

○ C

○ D

● E ✓



Determine all values of p for which the integral $\int_0^\infty e^{px}\,dx$ is converge

A. $\mathcal{R}-\{0\}$
B. $\mathcal{R}$
C. $(-\infty, 0]$
D. $(-\infty, 0)$
E. $(0, \infty)$

○ A

○ B

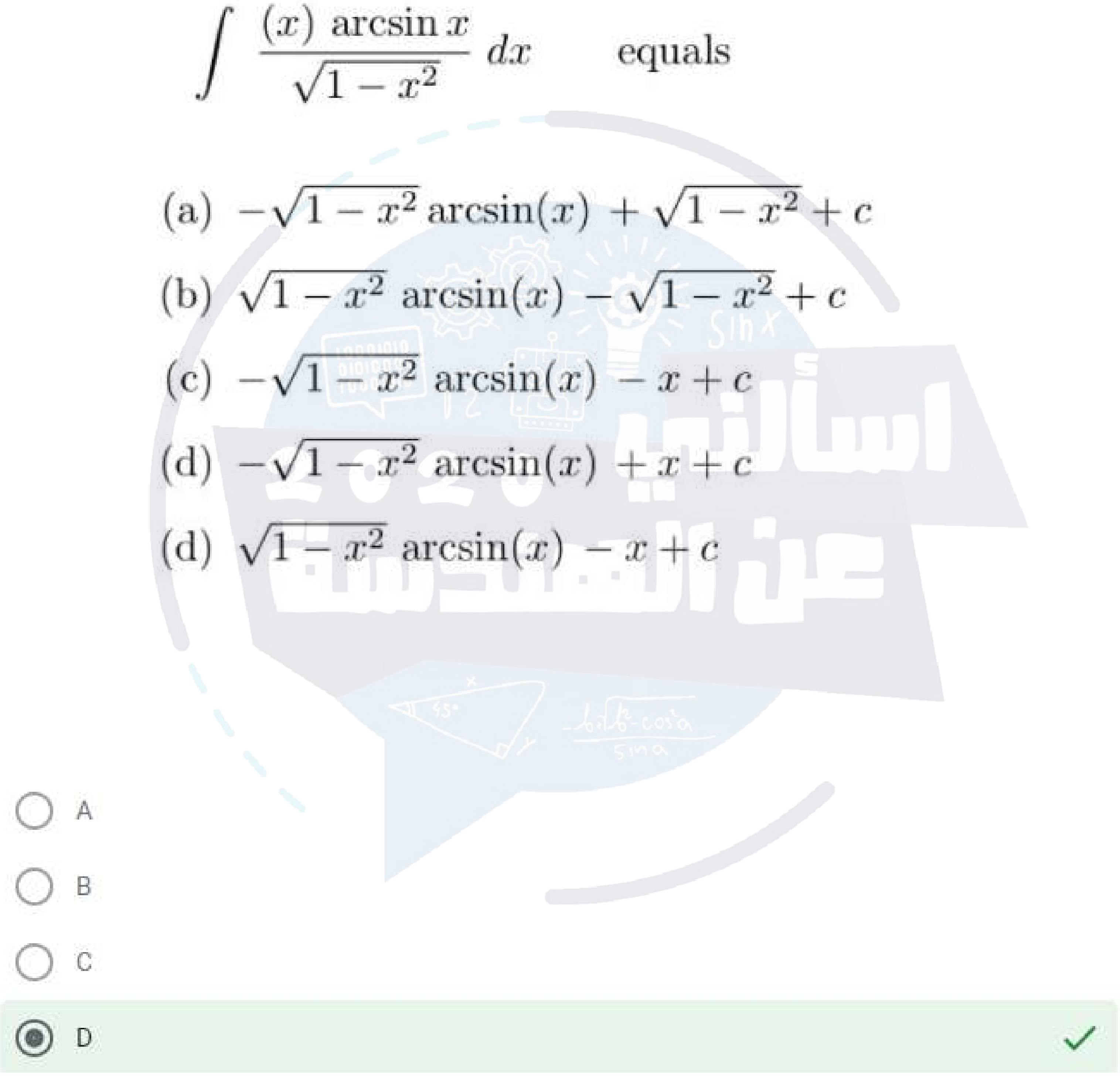
● C ✕

○ D

○ E

Correct answer

● D



$$\int \frac{(x)\arcsin x}{\sqrt{1-x^2}}\,dx \qquad \text{equals}$$

(a) $-\sqrt{1-x^2}\arcsin(x) + \sqrt{1-x^2} + c$

(b) $\sqrt{1-x^2}\arcsin(x) - \sqrt{1-x^2} + c$

(c) $-\sqrt{1-x^2}\arcsin(x) - x + c$

(d) $-\sqrt{1-x^2}\arcsin(x) + x + c$

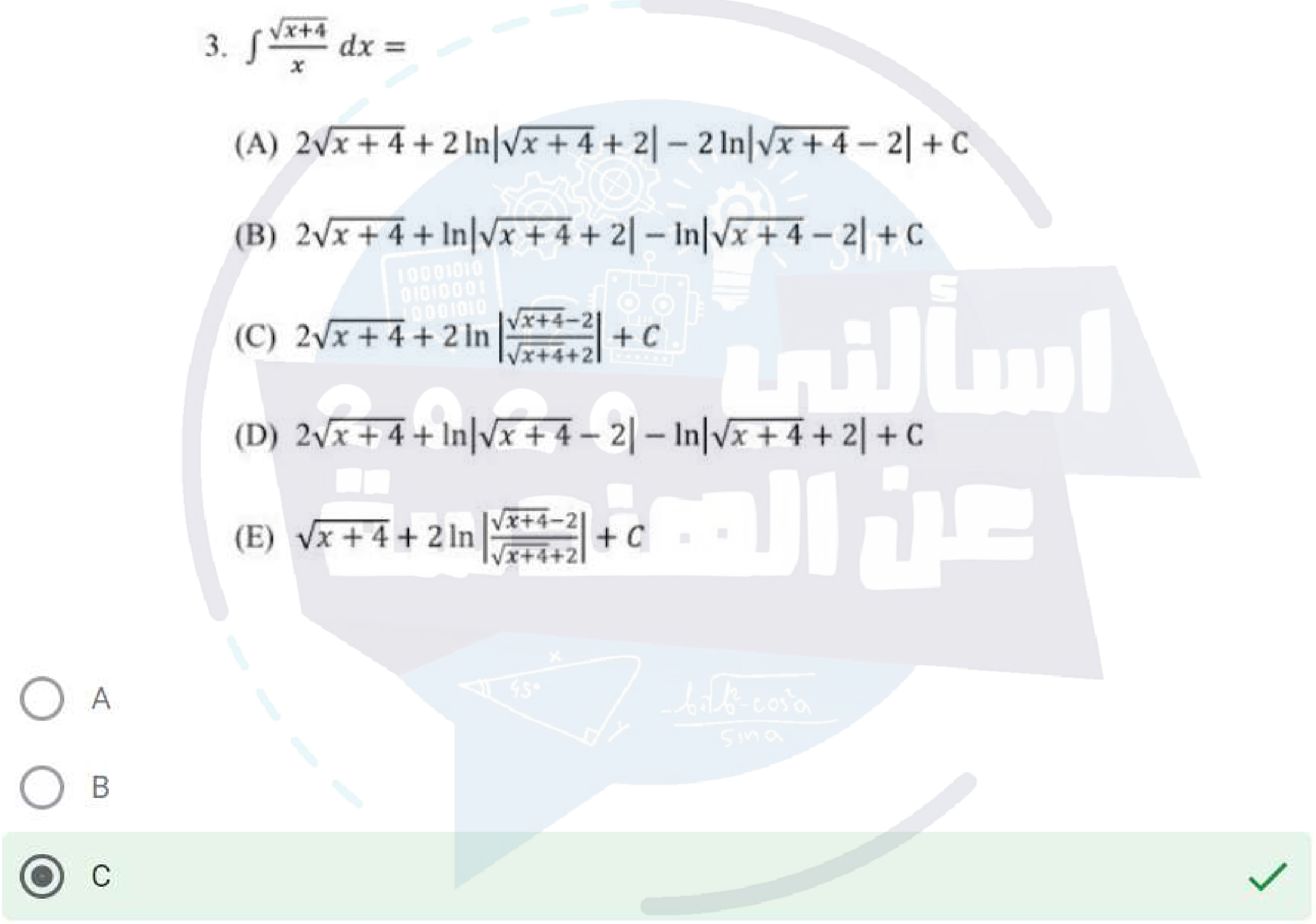
(d) $\sqrt{1-x^2}\arcsin(x) - x + c$

○ A

○ B

○ C

● D ✓



3. $\int \frac{\sqrt{x+4}}{x}\,dx =$

(A) $2\sqrt{x+4} + 2\ln\left|\sqrt{x+4}+2\right| - 2\ln\left|\sqrt{x+4}-2\right| + C$

(B) $2\sqrt{x+4} + \ln\left|\sqrt{x+4}+2\right| - \ln\left|\sqrt{x+4}-2\right| + C$

(C) $2\sqrt{x+4} + 2\ln\left|\frac{\sqrt{x+4}-2}{\sqrt{x+4}+2}\right| + C$

(D) $2\sqrt{x+4} + \ln\left|\sqrt{x+4}-2\right| - \ln\left|\sqrt{x+4}+2\right| + C$

(E) $\sqrt{x+4} + 2\ln\left|\frac{\sqrt{x+4}-2}{\sqrt{x+4}+2}\right| + C$

○ A

○ B

● C ✓