

A (۲,۵) $m = \frac{\Delta y}{\Delta x} = \frac{۴}{۳}$ $d = \frac{۴}{۳}x + 1$
 B (۰,۱)

$f'(x) = m = \frac{۴}{۳}$ ✓

(۲)

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(-۱,۱) $m = \frac{\Delta y}{\Delta x} = \frac{۱}{۳}$ $d = \frac{۱}{۳}x + \frac{۴}{۳}$
 (۲,۲)

$f'(x) = \frac{a}{\sqrt{ax-1}} = \frac{۱}{۳}$

$\frac{1}{3}x + \frac{4}{3} = \sqrt{ax-1} \rightarrow \frac{x^2}{9} + \frac{4}{9}x + \frac{16}{9} = ax-1 \rightarrow \frac{x^2}{9} + (\frac{4}{9}-a)x + \frac{16}{9} = 0$
 $\Delta = 0 \rightarrow (1-9a)^2 = 100 \rightarrow \begin{cases} a=2 \\ a=-\frac{4}{9} \end{cases} \rightarrow a=2$

$f(x) = \sqrt{2x-1} \rightarrow f(2) = 3$ ✓

(۲)

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$y = \frac{۳}{۴}x + \frac{n}{۴}$

$f'(x) = \frac{(۳x+m)(x+۲) - (x^2+mx+1)}{(x+۲)^2}$

$f'(1) = \frac{1+2m - (1+m)}{16} = \frac{۳+2m}{16} = \frac{۳}{۴} \rightarrow 2m+6 = 12 \rightarrow m=2$

$f(1) = \frac{۳+m}{۴} = 1 = \frac{۳}{۴} + \frac{n}{۴} \rightarrow n=1$ ✓

$m+n = 2+1 = 3$

(۲)

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$g(x) = \frac{۳}{۳+\sin x}$

$f(x) = \frac{\sin^2 x + 3\sin x + 9}{۳+\sin x}$

$(3g-f)(x) = \frac{-\sin^2 x - 3\sin x}{۳+\sin x} = -\sin x$

$(3g-f)'(x) = -\cos x$ ✓

$(3g-f)'(x) = -\cos \frac{\Delta x}{۳} = -\frac{1}{۳}$

(۲)

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$g(x) = \frac{1}{\sqrt{x^2}}$

$f(x) = -\frac{1}{\sqrt{2x}}$

$f \circ g(x) = -\frac{1}{\sqrt{2x \cdot \frac{1}{\sqrt{x^2}}}} = -x$

$(f \circ g(x))' = -1$ ✓

(۲)

۵

