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LATIHAN SOAL

JAWABAN:

1. Temukan turunan tingkat pertama dan kedua dari fungsi-fungsi ini:
   1) $y = -x^2 + 3$
      Turunan pertama = $y' = 2 \cdot (-1)x^{2-1} + 0 = -2x$
      Turunan kedua = $y'' = 1 \cdot (-2)x^{1-1} = -2$

   2) $y = x^2 + x + 8$
      Turunan pertama = $y' = 2 \cdot 1 \cdot x^{2-1} + 1 \cdot 1 \cdot x^{1-1} + 0 = 2x + 1$
      Turunan kedua = $y'' = 1 \cdot 2 \cdot x^{1-1} + 0 = 2$

   3) $s = 5t^3 - 3t^5$
      Turunan pertama = $s' = 3 \cdot 5 \cdot t^{3-1} - 5 \cdot 3 \cdot t^{5-1} = 15t^2 - 15t^4$
      Turunan kedua = $s'' = 2 \cdot 15 \cdot t^{2-1} - 4 \cdot 15 \cdot t^{4-1} = 30t - 60t^3$

   4) $w = 3z^7 - 7z^3 + 21z^2$
      Turunan pertama = $w' = 7 \cdot 3 \cdot z^{7-1} - 3 \cdot 7 \cdot z^{3-1} + 2 \cdot 21 \cdot z^{2-1} = 21z^6 - 21z^2 + 24z$
      Turunan kedua = $w'' = 6 \cdot 21 \cdot z^{6-1} - 2 \cdot 21 \cdot z^{2-1} + 1 \cdot 24 \cdot z^{1-1} = 126z^5 - 42z + 24$

2. Temukan turunan dari fungsi-fungsi trigonometri ini:
   1) $y = -10x + 3\cos x$
      y' $= 1 \cdot (-10) \cdot x^{1-1} + 3 \cdot (-\sin x) = -10 + (-3\sin x)$

   2) $y = \frac{3}{x} + 5\sin x$
      y' $= -1 \cdot 3 \cdot x^{-1-1} + 5 \cdot \cos x = -\frac{3}{x^2} + 5\cos x$

   3) $y = x^2 \cos x$
      y' $= 2 \cdot 1 \cdot x^{2-1}\cos x + x^2(-\sin x)$
      y' $= 2x\cos x - x^2 \sin x$

   4) $y = \sqrt{x}\sec x + 3$
      y $= x^{\frac{1}{2}}\sec x + 3$
      y' $= \frac{1}{2} \cdot 1 \cdot x^{\frac{1}{2}-1}\sec x + x^{\frac{1}{2}}\sec x \tan x + 0$
      y' $= \frac{1}{2\sqrt{x}}\sec x + \sqrt{x}\sec x \tan x$

3. Jika y = f(u) dan u = g(x), temukan dy/dx terhadap f'(g(x))g'(x):

1) $y = 6u - 9 \qquad u = \left(\frac{1}{2}\right)x^4$

$y' = 6 \cdot 4 \cdot \frac{1}{2} \cdot x^{4-3} + 0 = 12x^3$

2) $y = \sin u \qquad u = 3x + 1$

$y' = \cos u \cdot 1 \cdot 3 \cdot x^{1-1} + 0$

$y' = \cos u \cdot 3 = 3\cos(3x + 1)$

3) $y = \sqrt{u} \qquad u = \sin x$

$y' = \frac{1}{2\sqrt{u}}\cos x$

$y' = \frac{1}{2\sqrt{\sin x}}\cos x = \frac{\cos x}{2\sqrt{\sin x}}$