10) $3[g(x)]^2 \cdot g'(x)$

$3 \cdot (-3)^2 \cdot 6$

KEY

K	Find the rate of change of $y=(4x^3+7x^2+1)^2$ at $x=-1$.	-16	✓
N	$f(x)=\sqrt{x^2+2x+8}$ find the instantaneous rate of change at 2	¾	✓
O	$f(x)=\dfrac{3x+2}{x-1}$ find f'(0)	-5	✓
W	$f(x)=\dfrac{1}{3}x\sqrt{x^2+5}$ find f'(2)	13/9	✓
L	Find the average rate of change of $g(x)=x^2+e^x$ [0, 1]	E	✓
I	A particle's motion is modeled by the function $x(t)=x^2-4x-3$. Find the average velocity on the interval [0, 3]	-1	✓
M	Find where the function $\ln(x^2-3x+5)$ has a horizontal tangent	3/2	✓
I	$s(t)=3x^4-8x^3+6x^2+3$. When does the particle change directions on the interval [-10, 10]	0	✓
T	$f(x)=\dfrac{1}{9}(3x+1)^3$ find f''(1)	24	✓
S	G(5)=-3, g'(5) = 6, h(5) = 3 and h'(5) = -2, find f'(5) if $f(x)=[g(x)]^3$	162	✓

$f'(x) =$

1) $2(4x^3+7x^2+1)^1 \cdot (12x^2+14x)$

$2(-4+7+1) \cdot (12-14)$

$2(4) \cdot -2$

$8 \cdot -2 = -16$

2) $f(x)=(x^2+2x+8)^{1/2}$

$f'(x)=\frac{1}{2}(x^2+2x+8)^{-1/2} \cdot (2x+2)$

$\frac{1}{2}(4+4+8)^{-1/2} \cdot (6)$

$\frac{1}{2\sqrt{16}} \cdot 6 = \frac{6}{8} = \frac{3}{4}$

3) $f'(x)=\dfrac{(x-1)(3)-(3x+2)(1)}{(x-1)^2} = \dfrac{3x-3-3x-2}{(x-1)^2}$

$\dfrac{\cancel{0}-3-\cancel{0}-2}{1} = -5$

4) $\frac{1}{3}x \cdot (x^2+5)^{1/2}$

$f'(x)=\frac{1}{3}x\left[\frac{1}{2}(x^2+5)^{-1/2} \cdot 2x\right]$

$+ (x^2+5)^{1/2} \cdot \frac{1}{3}$

$\frac{2}{3}\left[\frac{1}{6} \cdot 4\right]$

$+ \cancel{3 \cdot \frac{1}{3}}$

1

$\frac{2}{3}\left(\frac{2}{3}\right)+1$

$\frac{4}{9}+1$

$\frac{13}{9}$

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5) $\frac{g(1)-g(0)}{1-0}$ $\quad g(x)=x^2+e^x$

$\frac{1+e-1}{1} = \frac{e}{1} = e$

6) $\frac{x(3)-x(0)}{3-0} = \frac{-6-(-3)}{3} = -1$

7) $\frac{1}{x^2-3x+5} \cdot 2x-3$

$2x-3=0$

$x=\frac{3}{2}$

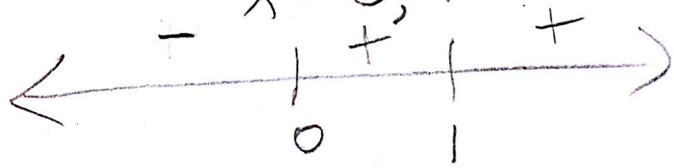
8) $s(t) = 3x^4-8x^3+6x^2+3$

$v(t) = 12x^3-24x^2+12x=0$

$12x(x^2-2x+1)=0$

$12x(x-1)(x-1)=0$

$x=0, 1$



9) $f(x)=\frac{1}{9}(3x+1)^3$

$f'(x)=\cancel{\frac{1}{3}}(3x+1)^2 \cdot \cancel{3}$

$f''(x) = 2(3x+1) \cdot 3 = 6(3x+1)$

$f''(1) = 6(3+1) = 24$

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