

6.1

$$\textcircled{21} \frac{dy}{dx} = \sin(x^2) \quad , \quad y=5, x=1$$

$$y = \int_1^x \sin(t^2) dt + 5$$

$$\textcircled{19} \frac{dv}{dt} = 4 \sec t \tan t + e^t + 6t ; \quad \boxed{v=5, t=0}$$

$$\int dv = \int (4 \sec t \tan t + e^t + 6t) dt$$

$$v = 4 \sec t + e^t + 3t^2 + C$$

$$5 = 4 \sec 0 + e^0 + 3(0)^2 + C$$

$$5 = 4 + 1 + 0 + C$$

$$0 = C$$

$$\boxed{v = 4 \sec t + e^t + 3t^2}$$

$$\textcircled{5} \frac{dy}{dx} = 5^x \ln 5 + \frac{1}{x^2+1}$$

$$\int dy = \int \left(5^x \ln 5 + \frac{1}{x^2+1} \right) dx$$

$$\boxed{y = 5^x + \arctan x + C}$$

$$5^x + \tan^{-1} x + C$$



6.1
①⑤ $\frac{dy}{dx} = -\frac{1}{x^2} - \frac{3}{x^4} + 12$; $y=3, x=1$

$$\int dy = \int (-x^{-2} - 3x^{-4} + 12) dx$$

$$y = x^{-1} + x^{-3} + 12x + C$$

$$3 = 1^{-1} + 1^{-3} + 12(1) + C$$

$$3 = 1 + 1 + 12 + C$$

$$-11 = C$$

$$y = \frac{1}{x} + \frac{1}{x^3} + 12x - 11$$

⑤⑤ REVIEW: $1 \cdot -1 = -1$

$$2 \cdot -\frac{1}{2} = -1$$

$$x \cdot -\frac{1}{x} = -1$$

$$e^{(x-y)/2} \cdot -e^{(y-x)/2} = -e^{\frac{x-y}{2} + \frac{y-x}{2}} = -1$$

⑤⑦

$$\frac{\csc x}{\sin x}$$

$$= \frac{1}{\sin x}$$

$$\frac{dy}{dx} = -\sin x$$

$$\int dy = \int -\sin x dx$$

$$y = \cos x + C$$

$$\frac{1}{\sin x}$$

$$\cdot (-\sin x) = -1$$

6.1

$$\textcircled{53} \quad \frac{dy}{dx} = 2x+1 ; \underline{f(1)=3}$$

$$f(1.4)$$

OLD POINT	$\frac{dy}{dx}$	NEW X	NEW Y	NEW POINT
(1, 3)	3	1.1	$3+3(.1)$	(1.1, 3.3)
(1.1, 3.3)	3.2	1.2	$3.3+3.2(.1)$	(1.2, 3.62)
(1.2, 3.62)	3.4	1.3	$3.62+3.4(.1)$	(1.3, 3.96)
(1.3, 3.96)	3.6	1.4	$3.96+3.6(.1)$	(1.4, <u>4.32</u>)

$$\frac{dy}{dx} = 2x+1$$

$$\frac{4.36 - 4.32}{4.36} \times 100 = \boxed{.92\%}$$

$$\int dy = \int (2x+1) dx$$

$$y = x^2 + x + C \quad \rightarrow \quad y = x^2 + x + 1$$

$$3 = 1^2 + 1 + C$$

$$1 = C$$

$$y(1.4) = (1.4)^2 + 1.4 + 1$$

$$= 4.36$$

6.1
 (21) $\frac{dy}{dx} = \sin(x^2) \quad \& \quad y = 5 \text{ when } x = 1$

$$f(x) = \int_1^x \sin t^2 dt + 5$$

S. F. T. C

$$f(x) = \int_1^x t^2 (t-1) dt$$

$$f'(x) = x^2 (x-1)$$

(53) (x_n, y_n)	$\frac{dy}{dx} = 2x+1$	$x_n + \Delta x$	$y_n + \frac{dy}{dx} \Delta x$	(x_{n+1}, y_{n+1})
(1, 3)	3	1.1	$3 + 3(0.1)$	(1.1, 3.3)
(1.1, 3.3)	3.2	1.2	$3.3 + 3.2(0.1)$	(1.2, 3.62)
(1.2, 3.62)	3.4	1.3	$3.62 + 3.4(0.1)$	(1.3, 3.96)
(1.3, 3.96)	3.6	1.4	$3.96 + 3.6(0.1)$	(1.4, 4.32)

ACTUAL - CALC.
 ACTUAL

$$\int (2x+1) dx$$

$$f(x) = x^2 + x + C$$

$$1^2 + 1 + C = 3$$

$$C = 1$$

$$f(1.4) = 1.4^2 + 1.4 + 1$$

6.1

⑤ $\frac{dy}{dx} = 5^x \ln 5 + \frac{1}{x^2+1}$

$$\frac{d}{dx} 5^x$$

$$\underbrace{5^x \ln 5}$$

$$\int dy = \int \left(5^x \ln 5 + \frac{1}{x^2+1} \right) dx$$

$$y = 5^x + \tan^{-1} x + C$$

②④ $G'(s) = \sqrt[3]{\tan s} \quad G(0) = 4$

$$G(s) = \int_0^s \sqrt[3]{\tan t} dt + 4$$

$$\int_0^0 \sqrt[3]{\tan t} dt = 0$$

$m=1$
 45°

③③ $\frac{dy}{dx} = x + 2y$

$$-1 + 2(2) = 3$$

$$-1 + 2(1) = 1$$

$$-1 + 2(0) = -1$$

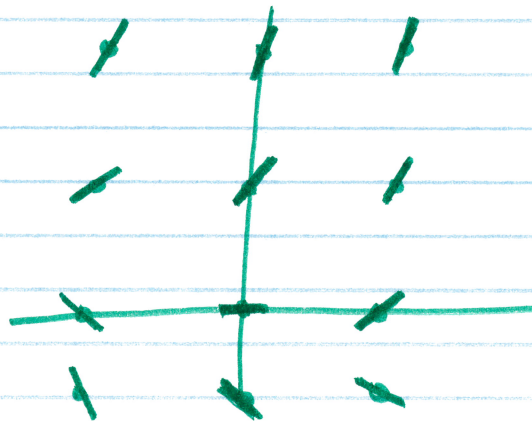
$$-1 + 2(-1) = -3$$

$$0 + 2(2) = 4$$

$$0 + 2(1) = 2$$

$$0 + 2(0) = 0$$

$$0 + 2(-1) = -2$$



$$1 + 2(2) = 5$$

$$1 + 2(1) = 3$$

$$1 + 2(0) = 1$$

$$1 + 2(-1) = -1$$

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(19) $\frac{dy}{dt} = 4\sec t \tan t + e^t + 6t$ $y=5, t=0$

$$\int dv = \int (4\sec t \tan t + e^t + 6t) dt$$

$$v = 4\sec t + e^t + 3t^2 + C$$

$$\boxed{v = 4\sec t + e^t + 3t^2}$$

$$5 = 4\sec 0 + e^0 + 3(0)^2 + C$$

$$5 = 4 + 1 + 0 + C$$

$$0 = C$$