6. $\int_0^4 (x-1)^2\,dx$

$$\int_0^4 x^2 - 2x + 1 \, dx$$

$$\frac{1}{3}x^3 - x^2 + x + C \Big|_0^4$$

$$\frac{64}{3} - 16 + 4 + C$$

$$21.\overline{3} - 12$$

$$9.\overline{3} + C - (0 - 0 + 0 + C)$$

$$9.\overline{3}$$

11. $\int_{-1}^{1} 5^x\,dx$

$$\frac{d}{dx} 5^x = \ln(5)\,5^x$$

$$\int 5^x\,dx \longrightarrow \boxed{\frac{1}{\ln(5)} 5^x + C}$$

$$\frac{1}{\ln(5)} \cdot \ln(5)\, 5^x$$

$$5^x$$

$$\frac{1}{\ln(5)} 5^x + C \Big|_{-1}^{1}$$

$$\frac{1}{\ln(5)} 5^1 + C$$

$$\frac{5}{\ln(5)} + C - \left(\frac{1}{5\ln(5)} + C\right)$$

$$\frac{5}{\ln(5)} - \frac{1}{5\ln(5)} \qquad \frac{24}{5\ln(5)}$$

13. $\int_0^{\pi} (2\cos x - 2\sin x)\, dx$

$2\sin x + 2\cos x + C \Big|_0^{\pi}$

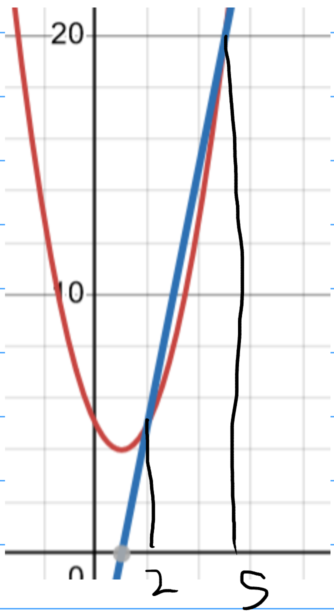
$(2\cdot 0 + 2(-1) + C) - (2\cdot 0 + 2(1) + C)$

-4

53. $y = x^2 - 2x + 5,\ y = 5x - 5.$

$\int_2^5 x^2 - 2x + 5\, dx$

$\frac{1}{3}x^3 - x^2 + 5x + C \Big|_2^5$



$\frac{125}{3} - 25 + 25 + C$

$\frac{125}{3} + C$

$\frac{8}{3} - 4 + 10 + C$

$\frac{8}{3} + 6 + C$

$\frac{26}{3} + C$

$\frac{125}{3} - \frac{26}{3} = \frac{99}{3} = 33$

$$\int_2^5 5x - 5 \, dx$$

$$\frac{5}{2}x^2 - 5x + C \Big|_2^5$$

$$\frac{125}{2} - 25 + C \qquad 10 - 10 + C$$

$$\frac{75}{2}$$

$$\frac{75}{2} - 33 = \frac{9}{2} \quad 4.5$$

$$\frac{\partial z}{\partial x}$$

$$\frac{\partial z}{\partial y}$$

$$z = x^2 - y$$

$$\frac{\partial z}{\partial x} = 2x$$

$$z = x^2 + xy + 2y^2 \qquad (2, 3)$$

$$\frac{\partial z}{\partial x} = 2x + y \qquad \begin{array}{l} 2(2)+3 \\ 4+3 = 7 \end{array}$$

$$\frac{\partial z}{\partial y} = x + 4y \qquad \begin{array}{l} 2+4(3) \\ 2+12 = 14 \end{array}$$

∂

1. $f(x, y) = x^3y^2 + 5y^2 - x + 7$

$$\frac{\partial f(x,y)}{\partial x} = 3x^2y^2 - 1$$

$\langle 3x^2y^2 - 1, x^3(2y) + 10y \rangle$

gradient

$\nabla f(x,y)$

$$\frac{\partial f(x,y)}{\partial y} = x^3(2y) + 10y$$

2. $f(x, y) = \cos(xy^2) + \sin x$

$$\frac{\partial f(x,y)}{\partial x} = -\sin(xy^2)\,y^2 + \cos x$$

$$\frac{\partial f(x,y)}{\partial y} = -\sin(xy^2)\,2xy$$

3. $f(x,y) = e^{x^2y^3}\sqrt{x^2+1}$

$$\frac{\partial}{\partial x} f(x,y) \quad e^{x^2y^3}(2xy^3)\sqrt{x^2+1}$$
$$+ \frac{1}{2}(x^2+1)^{-\frac{1}{2}}(2x)\, e^{x^2y^3}$$

$$\frac{\partial}{\partial y} f(x,y) \quad e^{x^2y^3}\left(x^2(3y^2)\right)\sqrt{x^2+1}$$

$$\langle 2, 3 \rangle$$

32. $f(x,y,z) = x^3y^2 + x^3z + y^2z$ $\quad 16x$

$$\frac{\partial}{\partial x} f(x,y,z) \quad 3x^2y^2 + 3x^2z$$

f_x

$$f_y = 2x^3y + 0 + 2yz$$

$$f_z = 0 + x^3 + y^2$$

$$\frac{\partial f(x,y)}{\partial x} = 3x^2y^2 - 1$$

$$\frac{\partial f(x,y)}{\partial y} = x^3(2y) + 10y$$

f_{xy}