واجب مقرر ١٠٤ ريض

حل بعض الأسئلة

لا يكتب في هذا الهامش

① $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ $\quad \frac{(x-1)^2}{36} + \frac{(y-1)^2}{20} = 1$

$h=1$, $k=1$, $a^2=36 \Rightarrow a=6$

$b^2=20 \Rightarrow b=\sqrt{20}$

$a>b$

The major axis is parallel to x-axis

$c^2 = a^2 - b^2 = 36 - 20 = 16 \Rightarrow c = \sqrt{16} = 4$

$F(h \pm c, k) = F(1 \pm 4, 1)$

$F_1(5, 1)$, $F_2(-3, 1)$

② $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$ $\quad \frac{(x-1)^2}{9} + \frac{(y-1)^2}{25} = 1$

$h=1$, $k=1$, $a^2=9 \Rightarrow a=3$

$b^2=25 \Rightarrow b=5$

$b>a$

The major axis is parallel to y-axis

$\Rightarrow c^2 = b^2 - a^2 = 25 - 9 = 16 \Rightarrow c=4$

$F(h, k \pm c) = F(1, 1 \pm 4)$

$F_1(1, 5)$, $F_2(1, -3)$

لا يكتب في هذا الهامش

③ $(x+1)^2 = -4(y-1)$ The axis of symmetry is parallel to y-axis

$(x-h)^2 = -4a(y-k)$

$-h=1 \Rightarrow (h=-1)$ $\quad -4a=-4$

$(k=1)$ $\quad (a=1)$

$F(h, k-a) = F(-1, 1-1) = F(-1, 0)$

④ $2y^2 - 4y + 8x + 10 = 0$

$y^2 - 2y + 4x + 5 = 0$ (divide by 2)

$y^2 - 2y = -4x - 5$

$y^2 - 2y + 1 = -4x - 5 + 1$ Completing square

$(y-1)^2 = -4x - 4$

$(y-1)^2 = -4(x+1)$

$(y-k)^2 = -4a(x-h)$

$k=1, \; h=-1, \; a=1$

$F(h-a, k) = F(-1-1, 1) = F(-2, 1)$

لا يكتب في هذا الهامش

(5) $(x+1)^2 = -4(y-1)$

$(x-h)^2 = -4a(y-k)$

$h=-1,\ k=1,\ a=1$

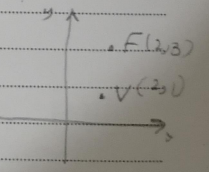
D: $y = k+a \Rightarrow y=2$

(6) (A) The x-term in the two points is 2

$\Rightarrow$ the axis of symmetry is parallel to y-axis

(B) From the y-term in two points,

the parabola opens upwards.



$(x-h)^2 = 4a(y-k)$

$V(h,k) = (2,1) \Rightarrow h=2,\ k=1$

$F(h,k+a) = (2,3) \Rightarrow 1+a=3 \Rightarrow a=2$

$\Rightarrow (x-2)^2 = 8(y-1)$

(7) (A) The x-term in the foci is -1

$\Rightarrow$ the transverse axis is parallel to y-axis

$\Rightarrow \frac{(y-k)^2}{b^2} - \frac{(x-h)^2}{a^2} = 1$

$F_1(h,k+c) = (-1,4) \Rightarrow h=-1,\ k+c=4$

$F_2(h,k-c) = (-1,-6) \Rightarrow h=-1,\ k-c=-6$

The Length of transverse $= 2b = 8 \Rightarrow b=4$

$c^2 = a^2+b^2 \Rightarrow a^2 = 25-16 = 9 \Rightarrow a=3$

$k+c=4$

$k-c=-6$

$2k=-2$

$\Rightarrow k=-1$

$\Rightarrow c=5$

لا يكتب في هذا الهامش

(8) A is an upper triangular matrix

$\Rightarrow det(A) = 1 \times 2 \times 5 \times 2 = 20$

(9) A is a lower triangular matrix

$\Rightarrow det(A) = 1 \times (-3) \times 2 \times 5 = -30$

(10) $2\begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix} - 3\begin{bmatrix} 4 & 1 \\ 5 & -1 \end{bmatrix}$

$= \begin{bmatrix} 4 & 2 \\ -2 & 6 \end{bmatrix} - \begin{bmatrix} 12 & 3 \\ 15 & -3 \end{bmatrix} = \begin{bmatrix} -8 & -1 \\ -17 & 9 \end{bmatrix}$

(15) $B+C = \begin{bmatrix} 5 & 0 \\ 1 & 4 \\ 0 & 11 \end{bmatrix} + \begin{bmatrix} -2 & 0 \\ 0 & 7 \\ 5 & -3 \end{bmatrix} = \begin{bmatrix} 3 & 0 \\ 1 & 11 \\ 5 & 14 \end{bmatrix}$

(18) Not possible

(31) $\frac{1}{3}\int 3\sec^2(3x-5)\,dx = \frac{1}{3}\tan(3x-5)+c$

(32) $\int \frac{dx}{\sqrt{16-x^2}} = \int \frac{dx}{\sqrt{4^2-x^2}} = \sin^{-1}\left(\frac{x}{4}\right)+c$

(37) $\int x\sqrt{x^2+1}\,dx = \int x\,(x^2+1)^{\frac{1}{2}}\,dx$ $\quad \begin{cases} u = x^2+1 \\ du = 2x\,dx \\ \frac{du}{2x} = dx \end{cases}$

$\int x\,u^{\frac{1}{2}}\,\frac{du}{2x} = \frac{1}{2}\int u^{\frac{1}{2}}\,du = \frac{1}{2}\frac{u^{\frac{3}{2}}}{\frac{3}{2}}+c$