

① $(x-5)^2 + (y+6)^2 = 81$ CENTER: $(5, -6)$ RADIUS: 9

② $m_1 = \frac{1}{5}$ so $m_2 = -\frac{1}{m_1} = -5$ AND $M = (11, 6)$ $y = -5x + 61$

③ $(-\infty, -5] \cup (0, 4) \cup (4, 6]$

④ SOLVING $\frac{x^2(x+3)}{(4-x)(4+x)} > 0$ GIVES $(-\infty, -4) \cup (-3, 0) \cup (0, 4)$

⑤ $-\sin x$

⑥ $\sin 75^\circ = \sin 45^\circ \cos 30^\circ + \cos 45^\circ \sin 30^\circ = \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2} = \frac{\sqrt{6} + \sqrt{2}}{4}$

⑦ a) $\boxed{31}$ b) $\boxed{10}$ c) $\boxed{\frac{4}{3}}$

⑧ $\frac{f(x+h) - f(x)}{h} = \frac{\sqrt{5(x+h)^2 + 8} - \sqrt{5x^2 + 8}}{h}$, WHICH SIMPLIFIES TO $\frac{10x + 5h}{\sqrt{5(x+h)^2 + 8} + \sqrt{5x^2 + 8}}$

⑨ $9 \ln x + \frac{1}{2} \ln(x^2 + 4) - \frac{1}{4} \ln(x-3) - 7 \ln(5x+1)$

⑩ $x = 1$ OR $x = e^2$ OR $x = e^{-2}$

⑪ MAXIMIZE $A = xy = 120x - \frac{2}{5}x^2$ TO GET $x = 150$ FT AND $y = 60$ FT

⑫ $\frac{f(t) - f(x)}{t - x} = \frac{\frac{1}{2t^3 + 3} - \frac{1}{2x^3 + 3}}{t - x}$, WHICH SIMPLIFIES TO $\frac{-2(t^2 + tx + x^2)}{(2t^3 + 3)(2x^3 + 3)}$

⑬ MINIMIZE $d^2 = (x-5)^2 + (y-0)^2 = 2x^2 - 12x + 47$ TO GET $x = 3$ AND $y = 5$

⑭ $2\sin^2 \theta - \cos \theta - 2 = 0$ GIVES $2(1 - \cos^2 \theta) - \cos \theta - 2 = 0$,

so $2\cos^2 \theta + \cos \theta = 0$ OR $(\cos \theta)(2\cos \theta + 1) = 0$

1) $\cos \theta = 0$ GIVES $\theta = \frac{\pi}{2}$ OR $\theta = \frac{3\pi}{2}$

2) $\cos \theta = -\frac{1}{2}$ GIVES $\theta = \frac{2\pi}{3}$ OR $\theta = \frac{4\pi}{3}$
($\pi - \pi/3$) ($\pi + \pi/3$)

⑮ a) $\frac{7x^2(5x+6)}{2\sqrt{5x+7}}$ b) $\frac{2x(x-12)(x+12)}{(x^2+48)^3}$

⑯ a) $y = -f(x) - 4$

b) $y = f(5-x)$

c) $x = f(y-5)$

17) a) $\cos \theta = \boxed{-\frac{1}{\sqrt{10}}}$

c) $\cos 2\theta = \cos^2 \theta - \sin^2 \theta = \boxed{-\frac{4}{5}}$

b) $\sin \theta = \boxed{-\frac{3}{\sqrt{10}}}$

d) $\sin 2\theta = 2 \sin \theta \cos \theta = \boxed{\frac{3}{5}}$

18) a) Let $\theta = \sin^{-1} \frac{3}{7}$, so $\sin \theta = \frac{3}{7}$ AND $\cos 2\theta = 1 - 2 \sin^2 \theta = \boxed{\frac{31}{49}}$

b) $\boxed{3 \sin^{-1} \frac{x}{2} - 5x \sqrt{4-x^2}}$

19) $A = \frac{1}{2} xy$ where $\frac{y}{x} = \frac{9}{x-5}$, so $y = \frac{9x}{x-5}$ AND $\boxed{A = \frac{9}{2} \left(\frac{x^2}{x-5} \right)}$

20) a)
$$\begin{array}{r} x^2 - 3x + 1 \overline{) \begin{array}{r} x^3 + 5x^2 \\ x^3 - 3x^2 + x \\ \hline 8x^2 - x \\ 8x^2 - 24x + 8 \\ \hline 23x - 8 \end{array}} \end{array}$$

so $y = x + 8 + \frac{23x-8}{x^2-3x+1}$ AND

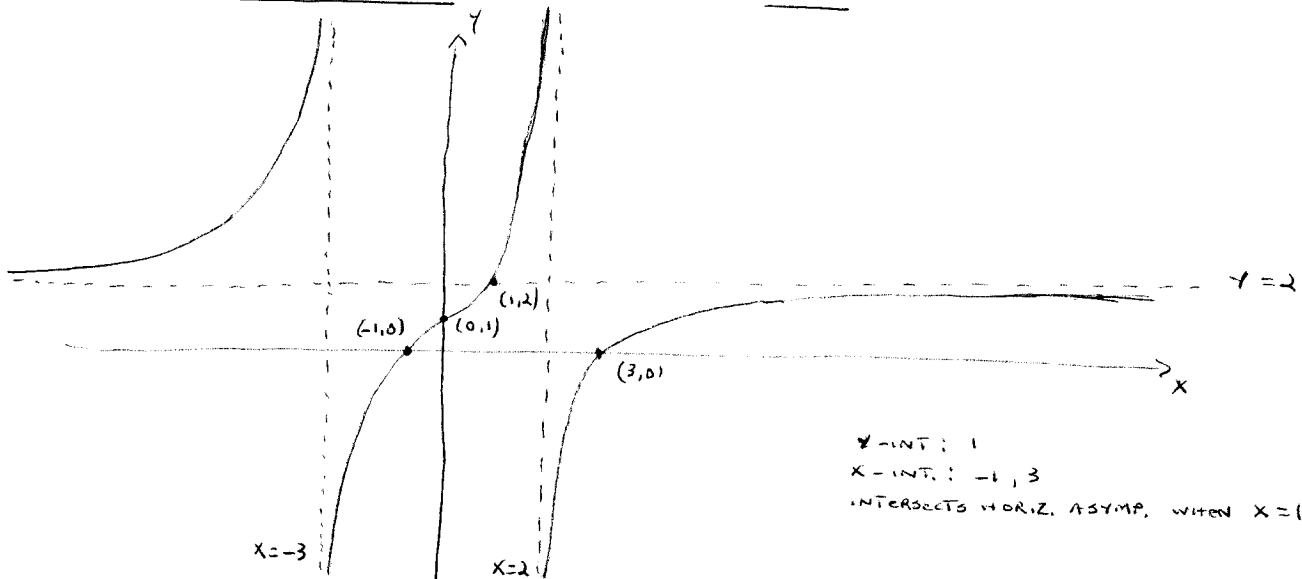
$\boxed{y = x + 8}$ is the slanted asymptote.

b) $y = 5 \cos \frac{\pi}{6} x$

21) $\boxed{\frac{1}{2} (1 + \cos 8\theta) + \frac{1}{2} (1 - \cos 6\theta)}$

22) MAXIMIZE $A = 2\pi x = 400\pi - 2\pi r^2$ TO GET $\boxed{r = \frac{100}{\pi} \text{ M}}$ AND $\boxed{x = 100 \text{ M}}$

23) a) VERTICAL: $x = -3, x = 2$ HORIZONTAL: $y = 2$



Y-INT: 1
X-INT: -1, 3
INTERSECTS HORIZ. ASYMPT. WHEN $x = 1$

24) $y = ce^{kt} = 9e^{kt}$ WHEN $t = 11, y = 7$; so $9e^{11k} = 7$ AND $k = \frac{1}{11} \ln \frac{7}{9}$ so

$y = 9e^{\left(\frac{1}{11} \ln \frac{7}{9}\right)t} = 9 \left(\frac{7}{9}\right)^{\frac{t}{11}}$

SOLVING $y = .6(9)$ GIVES $T = \boxed{\frac{11 \ln .6}{\ln \frac{7}{9}} \text{ YRS}}$