#1. Since $g(x) = x^2 - 49 = (x-7)(x+7) = 0$

$\Leftrightarrow x = +7$ or $-7$,

$g(x)$ vanishes at $x = \pm 7$, and at these values $\frac{f(x)}{g(x)}$ cannot be defined. Since $f(x)$ can be defined everywhere on the real line, the domain of $\frac{f(x)}{g(x)}$ is $\{x \in \mathbb{R} : x \neq \pm 7\}$ which is $\mathbb{R} - \{+7, -7\}$.

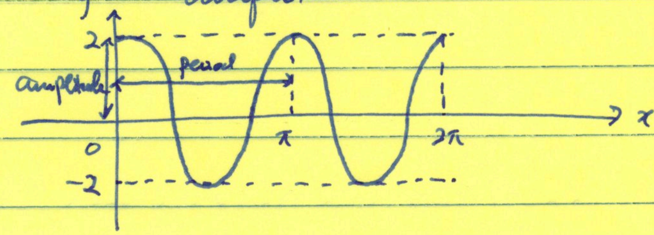
#2.

$A\cos(\omega x)$ In this case period $= \pi$

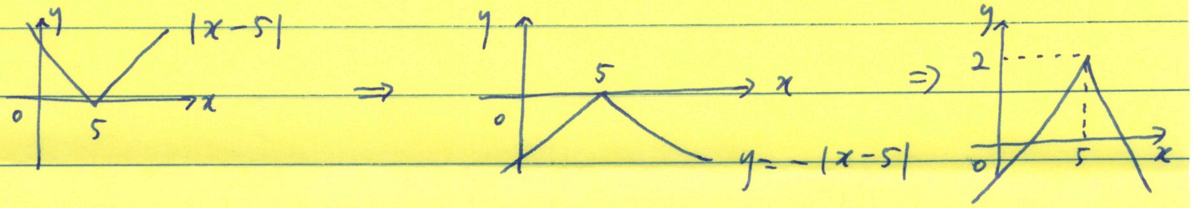
amplitude $= 2$.

amplitude $= |A|$

period $= \frac{2\pi}{|\omega|}$.




#3.




#4. A line is parallel to $y = 2 - \frac{3}{2}x$ if it has slope $-\frac{3}{2}$

$\begin{cases} \text{slope} : -\frac{3}{2} \\ \text{point} : (4, -2) \end{cases} \Rightarrow y = -\frac{3}{2}(x-4) - 2$.

$= -\frac{3}{2}x + 6 - 2$

$= \underline{-\frac{3}{2}x + 4}$.

#5. $y = 2x^2 - 16x + 24$

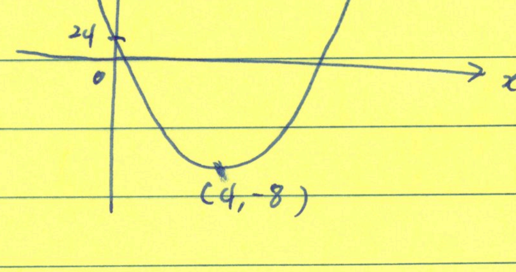
$= 2(x^2 - 8x) + 24$

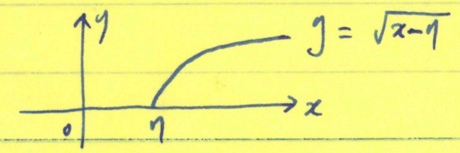
$= 2(x^2 - 8x + 16) - 32 + 24$

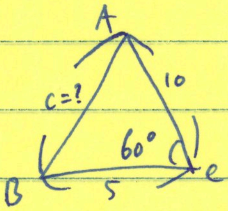
$= 2(x-4)^2 - 8$

Vertex $(4, -8)$.

minimum is $-8$ at $x = 4$.



#6. 


#7. 


$c^2 = a^2 + b^2 - 2ab\cos C$ (Cosine law)

$= 100 + 25 - 100 \cdot \frac{1}{2}$ (Recall: $\cos 60° = \frac{1}{2}$)

$= 125 - 50 = 75.$

$\underline{c = 5\sqrt{3}.}$ ✓

#8. It passed through $(3,0)$ and $(0,-15)$, and it's a straight line.

Slope : $\frac{0-(-15)}{3-0} = 5$

point : $(3,0)$

$\underline{y = 5(x-3).}$

#9. It pass through $(-2,3)$ as a vertex and crosses with $y$-axis at $(0,-1)$.

Use: $y = a(x-p)^2 + q$ with $p = -2$, $q = 3$
and solve for "a" using $(0,-1)$

$y = a(x+2)^2 + 3$

$-1 = a(0+2)^2 + 3 \quad \Rightarrow \quad \underline{y = -(x+2)^2 + 3}$

$-4 = 4a$

$a = -1$

#10. $y = 18e^{.07x}.$

inverse: $x = 18e^{.07y} \iff \ln\frac{x}{18} = 0.07y \cancel{\ln e}^{=1}$

So, $\underline{y = \frac{100}{7}\ln\frac{x}{18}.}$

Domain : $\underline{\{x \in \mathbb{R} : x > 0\}}.$

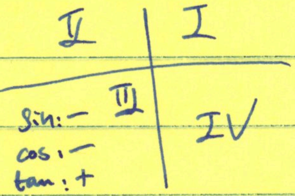
#11. $f(x+h) = 15(x+h) - 1$

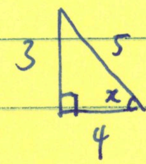
$f(x) = 15x - 1$

$f(x+h) - f(x) = 15h.$

$$\frac{f(x+h) - f(x)}{h} = \frac{15h}{h} = \underline{\underline{15}}.$$

#12.



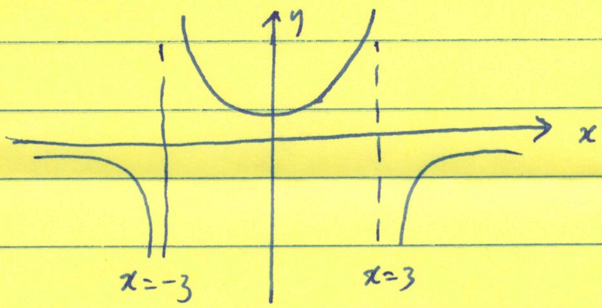




$$\underline{\underline{\tan x = \frac{3}{4}}}.$$

#13. $\sin(a+b) = \sin a \cos b + \cos a \sin b$

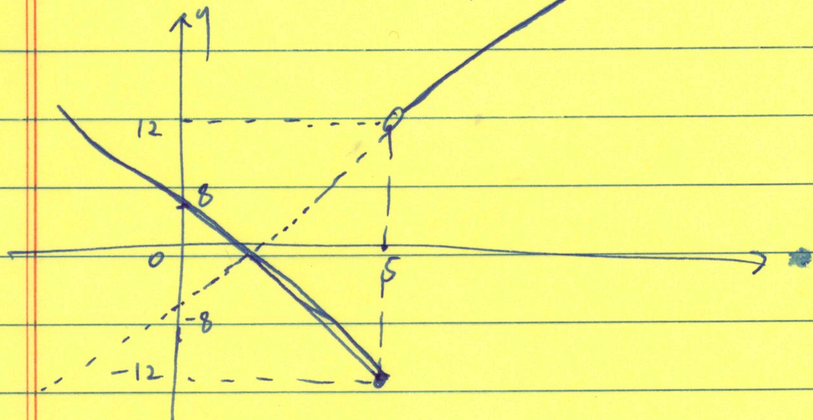
$\sin(a + \frac{3\pi}{2}) = \sin a \cdot 0 + \cos a \cdot (-1) = -\cos a$ ✓

#14.




#15. At $x=5$, $8 - 4x\big|_{x=5} = 8 - 20 = -12.$

$4x - 8\big|_{x=5} = 20 - 8 = 12.$



price, sales

#16. $\begin{cases} (5, 210) \\ (6, 200) \end{cases} \Rightarrow \begin{cases} \text{slope} : -10 \\ \text{point} : (5, 210) \end{cases}$ $y = -10(x-5) + 210.$

$= -10x + 50 + 210.$

$= -10x + 260.$

Revenue = price × sales

$= x(-10x + 260)$

$= -10x^2 + 260x$

$= -10(x^2 - 26x)$

$= -10(x^2 - 26x + 13^2 - 13^2)$

$= -10(x-13)^2 + 13^2 \times 10$

So the revenue is maximized when $\underline{\underline{x = 13}}$.

#17. (1) $P(t) = 1400 \cdot 2^{\frac{t}{12}}.$

(2) $4200 = 1400 \cdot 2^{t/12}$

$\frac{\cancel{42}\cancel{6}3}{\cancel{14}\cancel{2}} = 2^{\frac{t}{12}}$ $\Leftrightarrow$ $3 = 2^{\frac{t}{12}}$

$\underline{\underline{12 \log_2 3 = t.}}$ //