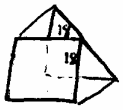
0. $\frac{x^2}{9}+\frac{y^2}{4}=36$

Center: $(0,0)$

$a^2=9,\ b^2=4$

$c^2=a^2-b^2=5$

$c=\sqrt{5} \Rightarrow \boxed{2\sqrt{5}}$

1. 

clearly, $m=1$, so the height of each pyramid must be $\boxed{18}$.

2. $f'=6x+\frac{9}{2}x^{-\frac{3}{2}}$

$f'\left(\frac{9}{4}\right)=\frac{27}{2}+\frac{9}{2}\cdot\frac{8}{27}=\frac{81+8}{6}=\boxed{\frac{89}{6}}$

3. $X=180-\frac{360}{15}=180-24=156$

$Y=\frac{15-12}{2}=90 \quad 90+156=\boxed{246}$

4. $(-8+6i\sqrt{3})\left(-\frac{\sqrt{3}}{2}-\frac{1}{2}i\right)$

$4\sqrt{3}+3\sqrt{3}-9i+4i$

$\boxed{7\sqrt{3}-5i}$

5. $A=2B$

$A=\sqrt{B}=2B$

$B=4B^2$

$0=4B^2-B=B(4B-1)$

~~$B\neq 0$~~ $B=\boxed{\frac{1}{4}}$

6. $\vec{A}=[3,-3,-15] \Rightarrow [1,-1,5]$

$\vec{B}=[-4,-8,-16] \Rightarrow [1,2,4]$

$\vec{A}\times\vec{B}=[-6,9,-3] \Rightarrow [2,-3,1]$

$\boxed{2x-3y+z=12}$

7. $\frac{1}{36}\cdot 2(3a+4)^6+C$

$\boxed{\frac{1}{9}(3a+4)^6+C}$

8. ~~$3^5\le A<3^6$~~ $3^4\le A<3^5$

~~$243\le A<729$~~ $81\le A<243$

$64=8^2<$ $<8^3=512$

$\boxed{3}$ digits

9. $14=2\cdot 7$

p^6q

$2^6\cdot 3$

$2^6\cdot 5$

$2^6\cdot 7=64\cdot 7=\boxed{448}$

10. $-\frac{1}{3}\frac{1}{4}\cos^3(4\theta)\Big|_{\pi/4}^{\pi/3}$

$-\frac{1}{3}\frac{1}{4}\left(\left(-\frac{1}{2}\right)^3-(-1)^3\right)=\frac{1}{34}\left(-\frac{1}{8}+1\right)=\frac{-7}{96}$

$u=\cos^3(4\theta)$

$du=3\cos^2(4\theta)\cdot-\sin(4\theta)\cdot 4$

11. $\sin^2 15+\cos^2 75=2\cos^2 75=\cos 150+1$

$=\frac{-\sqrt{3}}{2}+1=\boxed{\frac{2-\sqrt{3}}{2}}$

12. $2W$ $4W$
$5R$ $3R$

$\frac{5}{8}W$
$\frac{2}{7}W$
$\frac{4}{8}W$
$\frac{5}{7}B$

$\frac{10}{10+20}=\boxed{\frac{1}{3}}$

13. $r=3\frac{x}{r}$

$r^2=3x=x^2+y^2$

$0=x^2-3x+y^2$ circle

$\left(x^2-\frac{3}{2}\right)^2+y^2=\frac{9}{4}\Rightarrow\boxed{\frac{9}{4}\pi}$

14. $y=2^x$ $72y^{th}-y^2=512$

$y^2-72y+512=0$

$(y-64)(y-8)=0$

$y=64,8\Rightarrow r=\boxed{3,\frac{3}{2}}$

15. $\frac{x}{3}\le\frac{2x+1}{4}$ $\frac{x}{3}<3-\frac{x}{2}$

$4x\le 6x+3$ $2x<18-3x$

$-3\le 2x$ $5x<18$

$-\frac{3}{2}\le x$ $x<\frac{18}{5}$

$\frac{2x+1}{4}<3-\frac{x}{2}$

$2x+1<12-2x$

$4x<11$

$x<\frac{11}{4}$

$\boxed{-\frac{3}{2}\le x<\frac{11}{4}}$

16. $\binom{9}{4}\binom{5}{3}4!3!$

$(9\cdot8\cdot7\cdot6)(5\cdot4\cdot3)=\frac{9!}{2}$

$=36\cdot5040$

5040
36
30240
151200
$\boxed{181440}$

17. $X\Rightarrow AB\Rightarrow 10A+B$

$Y=10B+A$

$10A+B=30B+3A-2$

$7A=29B-2$

$B=2\Rightarrow A=8$ $\boxed{82}$