4	$35\sqrt{14}$	15	4	198
10626	$7/12$	12	29	112
62919	2976	$-1/2$	$100°$	26
$40/21$	$1+\sqrt{3}$	$\sqrt{413}$	4536000	481
0	$36/13$	8	5	SCHOOL

1. $\sqrt{\sqrt{\sqrt{2025}+4}+9}=\sqrt{\sqrt{49}+9}=\sqrt{16}=4.$
2. $2\sqrt{224}-5\sqrt{126}+3\sqrt{2744}=8\sqrt{14}-15\sqrt{14}+42\sqrt{14}=35\sqrt{14}.$
3. Subtracting thrice the second from the first gives $-10b=-30$ gives $b=3$ and then $a=2$, and $3(a+b)=15.$
4. Dividing repeatedly by 2 gives 27, which has representation 11011 and 4 zeroes.
5. $a^3+b^3=(a+b)(a^2+b^2-ab)=(a+b)((a+b)^2-3ab)$. By Vieta's, this is $6(36-3\cdot 1)=198.$
6. $\frac{24\cdot 23\cdot 22\cdot 21}{4\cdot 3\cdot 2}=23\cdot 22\cdot 21=10626.$
7. The first term is $\frac{1}{3}$ and the common ratio is $\frac{3}{7}$. The sum is $\frac{1/3}{4/7}=\frac{7}{12}$.
8. Solving $x=\sqrt{132+x}$ gives $x=12.$
9. Note that $30^5=2700000$, which is very close. The base ends in 9, so the last digit of the root is 9 since this is a property of fifth powers. The value is 29.
10. The minimum value of $f(x)$ is x^2+x+1, which is 13 if $x=3$. Thus, $f(x)=x^2+x+2$ and $f(10)=112.$
11. The value is 62919.
12. $2013=3\cdot 11\cdot 61$, and the sum of the factors is $4\cdot 12\cdot 62=2976.$
13. $\frac{i}{2}-\frac{\sqrt{3}}{2}=\operatorname{cis}\frac{5\pi}{6}$, so $\left(\frac{i}{2}-\frac{\sqrt{3}}{2}\right)^{2024}=\operatorname{cis}\frac{5060\pi}{3}=\operatorname{cis}\frac{2\pi}{3}=-\frac{1}{2}+\frac{i\sqrt{3}}{2}$, whose real part is $-\frac{1}{2}$.
14. The angle of the minute hand is $120°$. The angle of the hour hand is $210°+\frac{30°}{3}=220°$ for a difference of $100°$.
15. The value is 8181008, whose sum of digits is 26.
16. $\log_{2187}81\cdot\log_{25}625\cdot\log_{343}16807=\frac{4}{7}\cdot 2\cdot\frac{5}{3}=\frac{40}{21}.$
17. -2 is a root, and dividing $x+2$ out gives $x^2-2x-2=0$. The positive root of this is $1+\sqrt{3}$.
18. $\begin{vmatrix}\hat{\imath} & \hat{\jmath} & \hat{k}\\ 3 & -1 & 2\\ -2 & 5 & 2\end{vmatrix}=(-2-10)\hat{\imath}+(-4-6)\hat{\jmath}+(15-2)\hat{k}=-12\hat{\imath}-10\hat{\jmath}+13\hat{k}.$
    $\sqrt{144+100+169}=\sqrt{413}.$
19. $8\cdot 5\cdot 18\cdot 9\cdot 20\cdot 1\cdot 7\cdot 5=80\cdot 81\cdot 700=56000\cdot 81=4536000.$
20. $\binom{6}{2}(x^2)^2\left(\frac{2}{x}\right)^4 1^0+\binom{6}{1,2,3}(x^2)^1\left(\frac{2}{x}\right)^2 1^3+1^6=15\cdot 16+60\cdot 4+1=240+240+1=481.$
21. For $n=1$ to 10, the last digit of n^{4k} is $\{1,6,1,6,5,6,1,6,1,0\}$ for a sum of 33. Multiplying by 202 and adding the first four terms again gives a last digit of $6+4\equiv 0$.
22. $\frac{3}{1/2+1/3+1/4}=\frac{3}{1/3+1/2}=\frac{36}{13}.$
23. The base triangle in the xz axis has area 6. The height in the y axis is 4, so the volume is 8.
24. Taken modulo 9, we have $5\cdot 6\equiv 3$. The sum of the digits on the RHS is 38, so solving $38+2A\equiv 3 \bmod 9$ gives $A=5.$
25. `10011 00011 01000 01111 01111 01100` gives the set $\{19,3,8,15,15,12\}$, or SCHOOL.