Q-0

$A \to 3x < 12 \to x < 4 \; and \; 2x \ge 4 \to x \ge 2 \to 2 \le x < 4 \to 2 + 3 = 5$

$B \to \frac{4-3}{0--2} = \frac{n-4}{6-0} \to \frac{1}{2} = \frac{n-4}{6} \to 6 = 2n - 8 \to n = 7$

$C \to 2x \le -2 \to x \le -1 \; or \; 4x \le -8 \to x \le -2 \to greatest \; \text{int}\, eger \; -1$

$D \to 2^4 = 16$

$5 + 7 - 1 + 16 = 27$

1.

$(k-1)^2 = (k-4)(2k-2) \to k^2 - 8k + 7 = 0 \to k = 7$

$100N = 213.4\overline{34}$

$N = \quad 2.1\overline{34}$

$99N = 211.3 \to N = \frac{2113}{990}$

$\sqrt{7} + \sqrt{6} + 3 + \sqrt{8} + \sqrt{5} + 2 - \left(\sqrt{6} + \sqrt{5}\right) - \left(\sqrt{8} + \sqrt{7}\right) = 5$

7 +2113+990+5=3115

2.

$A - \frac{2+6+8}{36} = \frac{16}{36} = \frac{4}{9}$

$B - 7! - 2 \bullet 6! = 3600$

$C - \frac{4 \bullet 6}{6^3} = \frac{1}{9}$

$\left(\frac{4}{9}\right) \bullet 3600 \bullet 9 = 14400$

3.

$9^{\log_9 5} + 5^{\log_5 6} = 5 + 6 = 11$

$10^1 = x^2 + 3x \to x^2 + 3x - 10 = 0 \to (x+5)(x-2) = 0 \to x = 2$

$2^3 = \frac{x+6}{x-1} \to 8x - 8 = x + 6 \to 7x = 14 \to x = 2$

$x^2 \log 2 + 5x(1 - \log 5) - \log 2^6 = 0 \to x^2 + 5x - 6 = 0 \to (x+6)(x-1) = 0 \to 1 - 6 = -5$

$11 + 2 + 2 - 5 = 10$

4.

$(x+1)^2 = -12(y+3) \to V = (-1,-3) \to F(-1,-6) \to -6$

$4 - 7 + 25 = -9 = 13$

$c = 5 \to c^2 = 25 \to \frac{a}{b} = 2 \to a = 2b \to a^2 + b^2 = 25 \to 5b^2 = 25 \to b^2 = 5 \to b = \sqrt{5} \to a = 2\sqrt{5} \to 0 + 0 + 20 - 5 = 15$

$-6 + 13 + 15 = 22$

5.
A: $x+83=x^2-14x+49\to x^2-15x-34=0\to x=17$. $x=-2$ is extraneous.

B: $6-x+1+2\sqrt{6-x}=3-x\to 2\sqrt{6-x}=-4\to\varnothing$

C: $2(x-2)+x(x+2)=x^2+4\to 2x-4+x^2+2x=x^2+4\to 4x=8\to x=2\to\varnothing$

D: $y^2-9+30-5(y+3)=0\to y^2+21-5y-15=0\to y^2-5y+6=0\to y=2$. $y=3$ is extraneous.

$A-B-C+D=17-0-0+2=19$

6. A- $4\pi r^2=2\pi rh\to 2r=h$ Since the height of the sphere is twice the radius, the ratio is 1:1
B- $e=\sqrt[3]{512}=8\to s=\sqrt{4^2+4^2}=4\sqrt{2}$ The longest diagonal is just twice the side, so $8\sqrt{2}$
C= $\dfrac{\pi rl}{2\pi r^2}=\dfrac{\pi(8)(8\sqrt{2})}{2\pi(8^2)}=\dfrac{\sqrt{2}}{2}$

$1(8\sqrt{2})\left(\dfrac{\sqrt{2}}{2}\right)=8$

$A-25^{\frac{1}{8}}\bullet 125^{\frac{1}{4}}\bullet 25^{\frac{1}{6}}\bullet 625^{\frac{-1}{3}}=5^{\left(\frac{1}{4}+\frac{3}{4}+\frac{1}{3}-\frac{4}{3}\right)}=5^0=1$

$B-x=3^k\to 3x^2-82x+27=0\to(3x-1)(x-27)=0\to x=\dfrac{1}{3},27\to k=-1+3=2$

7. $C-3^{\frac{4}{3}}\bullet 3^{\frac{-4}{12}}\bullet 3^{\frac{3}{4}}\bullet 3^{\frac{1}{4}}\bullet 3^{\frac{3}{12}}\bullet\bullet 3^{\frac{3}{4}}=3^3=27$

$D-(\sqrt{x}-3)(\sqrt{x}-1)=0\to x=9,1\to 9+1=10$

$1+2+27+10=40$

8. A. Draw a picture and you see there are 3 possibilities. They are(6,0), (0,8), (12,8): ans 34
B.-Draw yourself a picture and get ready to use the Pythagorean Theorem. Also remember that medians intersect 2/3 the way from the opposite side:

$$(2x)^2+y^2=9$$

$$x^2+(2y)^2=\frac{49}{4}$$

$$5x^2+5y^2=\frac{85}{4}\to 4x^2+4y^2=17\to\sqrt{17}$$

$\dfrac{A}{B^2}=\dfrac{34}{17}=2$

$5^4 < x^2 < 6^6 \rightarrow 5^2 < x < 6^3 \rightarrow 216 - 25 + 1 = 192$

$M = .5R \rightarrow O = \frac{2}{5}R \rightarrow O = \frac{4}{5}M \rightarrow M = \frac{5}{4}O \rightarrow 125$

9. $\frac{6}{5}(6.25) = 7.50 \rightarrow \frac{3}{4}x = 7.5 \rightarrow x = 10$

$8, \frac{20}{3}, 1 \rightarrow 8, \frac{100}{3}, 5 \rightarrow 1, \frac{100}{24}, 5 \rightarrow \frac{100}{24}x = 50 \rightarrow x = 12$

$192 + 125 + 10 + 12 = 339$

$b^2 - 4ac < 0 \rightarrow (4n+4)^2 - 4(1)(4n^2) < 0 \rightarrow 16n^2 + 32n + 16 - 16n^2 < 0$

$32n < -16 \rightarrow n < \frac{-1}{2} \rightarrow None$

10. $b^2 - 4ac > 0 \rightarrow 16 - 4(5n)(2) > 0 \rightarrow 16 - 40n > 0 \rightarrow n < \frac{2}{5} \rightarrow None$

$b^2 - 4ac = 0 \rightarrow 4n^2 - 4(1)(n+6) = 0 \rightarrow n^2 - n - 6 = 0 \rightarrow (n-3)(n+2) = 0 \rightarrow n = 3$

$0 + 0 + 3 = 3$

11.A- Several ways to do this. 2i is also a root so I will use long division!!

$2x^3 + 6x^2 + x - 9$

$x^2 + 4 \overline{)2x^5 + 6x^4 + Ax^3 + Bx^2 + 4x - 36}$

$2x^5 \quad 8x^3$

$6x^4 + (A-8)x^3 + Bx^2 + 4x - 36$

$A - 8 = 1 \quad B - 24 = -9 \rightarrow A = 9, B = 15$

$C \rightarrow (x-4)(x+16) \rightarrow 4, -16 \rightarrow 3x - 2 = x^2 - 4x + 10 \rightarrow x^2 - 7x + 12 \rightarrow x = 3, 4, 16 \rightarrow 3$

$D - 2(2^3) - 7(2)^2 + 5(2) + n = -2 \rightarrow 16 - 28 + 10 + 2 = -n \rightarrow n = 0$

$9 + 15 + 3 - 0 = 27$

12 Draw yourself a big angle and call angle JLZ,"x". Then angle WLJ equals x. Angle RLW equals 2x. Angle MLR equals 4x and angle ULM equals 8x. LF is irrelevant to the problem and just makes it more confusing. From this we get; $15x = 165 \rightarrow x = 11 \rightarrow \angle RLW = 2x = 22$

B= $x(21 + x) = 14^2 \rightarrow x^2 + 21x - 196 = 0 \rightarrow (x+28)(x-7) = 0 \rightarrow x = 7$

C= $(2\sqrt{15})^2 + 2^2 = x^2 \rightarrow 64 = x^2 \rightarrow x = 8 \rightarrow 8 - 6 = 2$

22+7+2=31

13. A. Rate times time equals distance:

$$ry = 3600 \to (r+60)(y-3) = 3600 \to \left(\frac{3600}{y}+60\right)(y-3) = 3600$$

$$3600 - \frac{10800}{y} + 60y - 180 = 3600 \to 60y^2 - 18 - y - 10800 = 0$$

$$y^2 - 3y - 180 = 0 \to (y-15)(y+12) = 0 \to y = 15$$

B. Rate times time equals distance: $1+\frac{b-c+2}{b+c} = \frac{2}{c} \to (b+c)c + c(b-c+2) = 2(b+c) \to$

$$bc + c^2 + bc - c^2 + 2c = 2b + 2c \to 2bc - 2b = 0 \to b(c-1) = 0 \to c = 1$$

(15)(1)=15

14. A= $\frac{3}{2}$

B= $\frac{1}{2}\left(\sqrt{3}\right)(8) = 4\sqrt{3}$

C= 360 always

D= $\frac{\left(3\sqrt{2}\right)^2\sqrt{3}}{4} = \frac{9\sqrt{3}}{2}$

Final Answer: $\frac{\frac{9\sqrt{3}}{2}\bullet\frac{3}{2}}{4\sqrt{3}(360)} = \frac{27\sqrt{3}}{4\left(\sqrt{3}\right)(360)} = \frac{3}{640}\bullet 1280 = 6$

Answers:

0. 27
1. 3115
2. 14400
3. 10
4. 22
5. 19
6. 8
7. 40
8. 2
9. 339
10. 3
11. 27
12. 31
13. 15
14. 6