1.	6	8.	-33
2.	$-\frac{328}{25}$ or equivalent	9.	0
3.	$-\frac{5}{48}$	10.	-1973
4.	5700π	11.	$-522+10\sqrt{3}$
5.	$\sin x$	12.	$\frac{18}{5}$ or equivalent
6.	-30	13.	916
7.	$\frac{5}{4}y$	14.	$-180\pi\sqrt{17}$

1. $x^2+4x+4=A\left(x^2+2\right)+\left(Bx+C\right)\left(x-1\right)\quad A=3\rightarrow B=-2\rightarrow C=2$

$$\frac{x^2\left(x-2\right)+\left(x-2\right)}{\left(x-6\right)\left(x+1\right)}=\frac{\left(x^2+1\right)\left(x-2\right)}{\left(x-6\right)\left(x+1\right)}\rightarrow 2VA$$

$$\frac{5x^2\left(2x-3\right)+1\left(2x-3\right)}{9x^2\left(2x-3\right)+4\left(2x-3\right)}=\frac{\left(5x^2+1\right)\left(2x-3\right)}{\left(9x^2+4\right)\left(2x-3\right)}\rightarrow 0VA$$

$$\frac{\left(15x-2\right)\left(3x+4\right)}{4\left(15x^2-17x+2\right)}=\frac{\left(15x-2\right)\left(3x+4\right)}{\left(15x-2\right)\left(x-1\right)}\rightarrow 1VA$$

$3-2+2+2+0+1=6$

2. $\sin x\cos y+\sin y\cos x=\frac{-3}{5}\bullet\frac{24}{25}+\frac{7}{25}\bullet\frac{4}{5}=\frac{-44}{125}$

$$\frac{\tan x-\tan y}{1+\tan x\tan y}=\frac{\frac{5}{12}-\frac{-5}{12}}{1-\frac{5}{12}\bullet\frac{-5}{12}}=\frac{120}{119}$$

$$1-4\theta+7+10\theta=90\rightarrow 6\theta=82\rightarrow\theta=\frac{41}{3}$$

$$\frac{169ABC}{44}=\frac{-328}{25}$$

3. A=Ratio of coefficients of highest power terms $\rightarrow \frac{\sqrt{4x^2}}{x} = \frac{2x}{x} = 2$

B= $1^2 + 4 = 5$

C= $\frac{\left(\frac{1}{x+4} - \frac{1}{4}\right)}{x} \bullet \frac{4(x+4)}{4(x+4)} = \frac{4-(x+4)}{4x(x+4)} = \frac{-1}{4(x+4)} = \frac{-1}{16}$

D= $\frac{3-\sqrt{x+6}}{3-x} \bullet \frac{3+\sqrt{x+6}}{3+\sqrt{x+6}} = \frac{9-(x+6)}{(3-x)(3+\sqrt{x+6})} = \frac{1}{3+\sqrt{x+6}} = \frac{1}{6}$

$ABCD = \frac{-5}{48}$

4. A = $\frac{20rev}{\sec} \bullet \frac{60\sec}{\min} \bullet \frac{2\pi rad}{1rev} = 2400\pi$

B = $\frac{1rev}{42\sec} \bullet \frac{60\sec}{1\min} \bullet \frac{330\pi}{1rev} = 3300\pi$

$A + B = 5700\pi$

5. $\frac{\sin(2x+x) - \sin(2x-x)}{\cos(2x-x) + \cos(2x+x)} = \frac{\sin 2x\cos x + \cos 2x\sin x - \sin 2x\cos x + \cos 2x\sin x}{\cos 2x\cos x + \sin 2x\sin x + \cos 2x\cos x - \sin 2x\sin x}$

$\frac{2\cos 2x\sin x}{2\cos 2x\cos x} = \frac{\sin x}{\cos x} = \tan x$

$\frac{\tan x}{\csc x + \cot x} \bullet \frac{\csc x - \cot x}{\csc x - \cot x} = \frac{\frac{1}{\cos x} - 1}{1} + 1 = \sec x$

$\frac{A}{B} = \frac{\tan x}{\sec x} = \sin x$

6. $\cos A = \frac{Y^2 + Z^2 - X^2}{2YZ} = \frac{X^2}{2X^2} = \frac{1}{2} \rightarrow A = 60$

$x^2 - 6x + 9 + y^2 - 8y + 16 = -21 + 9 + 16 \quad (x-3)^2 + (y-4)^2 = 4$

Use distance formula to find distance from point to center. This distance is $2\sqrt{2}$. The radius is 2. This forms a 45-45-90 right triangle so the answer is 90.

60 – 90 = – 30

7. A = $\left(\log_2 - 3\right)\left(\log_2 x + 2\right) = 0 \to x = 8$ and, $\frac{1}{4}$ so product is 2.

B = $2 - \log_2\left(x-2\right) = -1 + \log_2 x \to 3 = \log_2\left(x^2 - 2x\right)$

$8 = x^2 - 2x \to \left(x-4\right)\left(x+2\right) \to x = 4 \to y = 1$

C = $\frac{\log 32}{\log_{x^2} x} \bullet \frac{\log_{x^2} 16}{\log 32} = y = \frac{\log_{x^2} 16}{\frac{1}{2}}$

$y = 2\log_{x^2} 16 \to 2\log_{x^2} 2^4 \to y = 8\log_{x^2} 2 \;\to \frac{y}{8} = \log_{x^2} 2 \to 5\log_{x^2} 2 \to \frac{5}{8}y$

$1 \bullet 2 \bullet \frac{5}{8}y = \frac{5}{4}y$

8. $\begin{vmatrix} 1 & 2 & -1 & 1 \\ 3 & 4 & 2 & 0 \\ -2 & -3 & 5 & 0 \\ 2 & 1 & -1 & 0 \end{vmatrix} = -\begin{vmatrix} 3 & 4 & 2 \\ -2 & -3 & 5 \\ 2 & 1 & -1 \end{vmatrix} = -34$

$\begin{pmatrix} 1 & 1 & -1 \\ -3 & 2 & -1 \\ 3 & -3 & 2 \end{pmatrix}$ sum equals 1.

– 34 + 1 = – 33

9. $2x - y = 6 \to 2x = y + 6 \to x = \frac{y+6}{2}$ $4\left(\frac{x+6}{2}\right)^2 - 8\left(\frac{x+6}{2}\right) + 1 = x^2 + 12x + 36 - 4x - 24 + 1$

$x^2 + 8x + 13 \to \frac{-b}{a} = -8$

$\left(x^2 - 9\right)\left(x^4 - 3x^2 - 4\right) = \left(x-3\right)\left(x+3\right)\left(x^2-4\right)\left(x^2+1\right) \to 4$

$\left(x^2 + x - 2 - \left(x^2 - x - 6\right)\right)\left(x^2 + x - 2 + x^2 - x - 6\right)$ $\left(2x+4\right)\left(2x^2 - 8\right) = 4\left(x+2\right)\left(x-2\right)\left(x+2\right)$

The absolute value of the difference between the largest and smallest is 4. – 8 + 4 + 4 = 0

10. Square both sides and you get: $x-y+2\sqrt{xy}i=9+4\sqrt{5}i$ real component must be equal so $x-y=9$

$\sqrt{5^2+2^2}\bullet\sqrt{2^2+5^2}=29$

$i^{2010}=i^2=-1\rightarrow-2010$

$5-x-4i-yi=2\rightarrow5-x=2\rightarrow x=3\rightarrow y=-4\rightarrow-1$

9 + 29 – 2010 – 1 = – 1973

11. Probably best to go to rcisθ form to answer this. $\left(\sqrt{3}^2+1^2\right)=4\rightarrow\sqrt{4}=2\rightarrow2^9=512=r$

$\tan\theta=\frac{y}{x}=\frac{1}{-\sqrt{3}}\rightarrow\arctan\frac{1}{-\sqrt{3}}\rightarrow\theta=150\ ;\ 9\bullet150=1350\rightarrow1350-1080=270\rightarrow(0,-i)$

$512(0-i)=0-512i$

$20\left(\cos\frac{11\pi}{6}+\sin\frac{11\pi}{6}\right)=20\left(\frac{\sqrt{3}}{2}-\frac{1}{2}i\right)=10\sqrt{3}-10i$

0 – 512 +10$\sqrt{3}$ -10 = – 522 + 10$\sqrt{3}$

12. $y^2-6y+9=-8x-25+9\rightarrow(y-3)^2=-8(x+2)$: The area of the triangle formed will be equal to $\frac{1}{2}p(4p)=2p^2$ where "p" is the distance from the vertex to the focus. Since $4p=8\rightarrow p=2\rightarrow$ area equals 8.

$9\left(x^2-2x+1\right)+25\left(y^2-6y+9\right)=-9+9+225$ $\frac{(x-1)^2}{25}+\frac{(y-3)^2}{9}=1\rightarrow a=5\rightarrow b=3\rightarrow c=4$

The area of the rectangle will be: $\frac{2b^2}{a}\bullet2c=\frac{4b^2c}{a}=\frac{144}{5}$

$\frac{\frac{144}{5}}{8}=\frac{18}{5}$

13. Treat 450-499 as one case and 500-699 as another: $1 \bullet 4 \bullet 6 + 2 \bullet 6 \bullet 6 = 96$

$3 \bullet 2 \bullet 1 \bullet 5 \bullet 4 \bullet 3 \bullet 2 \bullet 1 = 720$

${}_{10}C_3 - {}_{6}C_3 = 120 - 20 = 100$

96 + 720 + 100 = 916

14. $\cos\theta = \dfrac{1+2+0}{\sqrt{6} \bullet \sqrt{2}} = \dfrac{\sqrt{3}}{2} \rightarrow \theta = \dfrac{\pi}{6}$

Draw a triangle in QII since the inverse of Cotangent being negative is in that quadrant. The triangle is a 1, 4 and $\sqrt{17}$ triangle. $\csc\theta = \dfrac{\sqrt{17}}{1} = \sqrt{17}$

Since "r" is the distance from the pole r = 12. The angle is 270 but since the directions asked for negative angle we must go with – 90 degrees.

$\dfrac{\pi}{6} \bullet \sqrt{17} \bullet 12 \bullet -90 = -180\pi\sqrt{17}$