

Pre calculus Bowl

FAMAT Regional

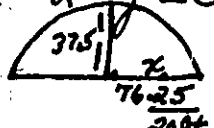
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Let's $\frac{3}{17}$

1. 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59

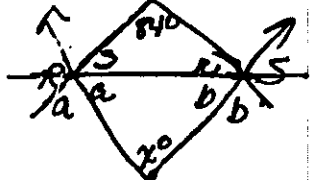
2. $\frac{\sin \theta \cdot \frac{\sin \theta}{\cos \theta} + \cos \theta}{\cos \theta} \cdot \frac{1}{\cos \theta} = \frac{\frac{\sin^2 \theta}{\cos \theta} + \cos \theta}{\cos \theta} \cdot \frac{1}{\cos \theta} = \frac{\frac{\sin^2 \theta + \cos^2 \theta}{\cos \theta}}{\cos \theta} = \frac{1}{\cos^2 \theta} = \sec^2 \theta$

3. $-2 \leq y \leq 3$ $-4 \leq y \leq 6$ $-3 \leq 2y+1 \leq 7$ $[-3, 7]$

4.  $\frac{2 \cdot 20}{76.25^2} + \frac{y^2}{37.5^2} = 1$ $\frac{56.25^2}{76.25^2} + \frac{y^2}{37.5^2} = 1$
 $y^2 = [1 - \frac{56.25^2}{76.25^2}] \cdot 37.5^2$ $y = 25.3$
 5. $\sqrt{6+36} = \sqrt{42} = 2\sqrt{13}$ $x^2+2x+1 + y^2+6y+9 = 5+1+9$ $(x+1)^2 + (y+3)^2 = 15$ $r = \sqrt{15}$ $\frac{11}{3} - \frac{4}{3} = \frac{7}{3}$

6.  $47 = 180$ $x = 45$ $\frac{\sin 135}{5} = \frac{\sin(22.5^\circ)}{x}$ $x = \frac{5 \sin(22.5^\circ)}{\sin 135^\circ} = 2.7$

7. $|t^3 + 2t^2 - 3t - 4|$ Use calculator $-1.286 < t < 1.199$
 $-3.080 < t < -2.912$

8.  $a + b + 84 = 180$ $a + 4 = 96$ $2a + 2b = 168$
 $2a = b + 84$ $a + b = 132 \therefore x = 48^\circ$


9. $8 = a + b + c$ $6 = 9a + 9 + c$ $-3 = 9a + c$
 $2 = a - b + c$ $2 = 5 - b$ $5 = a + c$
 $6 = 9a + 3b + c$ $-8 = 8a$

10. $2a + 2c = 10$ $a + c = 5$ $a = -1$ $c = 6$
 $r, r+1, 0$ $2r + r + 1 = 0$ $0(r)(r+1) = -30$ $-2r^3 - 2r^2 - r = -30$
 $0 = -2r - 1$ $(-2r-1)(r^2+r) = -30$ $-2r^3 - 3r^2 - r + 30 = 0$
 $2r^3 + 3r^2 + r - 30 = 0$
 $p = 2(3) + 2(-5) + 3(-3) = -19$ roots are 2, 3, -5 2 is the only real root

11. $x = c$ $\ln 2 = 5y$ $y = \frac{\ln 2}{5}$ $1 - 17 = -16$ $\frac{1}{2} \log_b x + 3 \log_b y = \frac{1}{2} a + 3c = \frac{a+6c}{2} = 20$
 $\sin x \cos \pi + \cos x \sin \pi = -\sin x$ $2 + \frac{1}{3} + \frac{1}{6} + \dots = \frac{2}{1-\frac{1}{6}} = \frac{2}{\frac{5}{6}} = \frac{12}{5} = 3$ $\therefore -1$

12. Initial area = 20 $(x+4)(x+5) = 240$ $x^2 + 9x - 220 = 0$ 11 seconds
 $(x-11)(x+20)$

13. $e^{\ln w^5} = 4^5$ $w = 4$ $2x + 5 = 4$ $4x - 1 = 10$ $9C4 = 35$
 $2x = -1$ $4x = 11$ $x = -\frac{1}{2}$ $x = \frac{11}{4}$

14. $\cos 90^\circ \cos \theta + \sin 90^\circ \sin \theta = a$ $0(\cos \theta) + 1(\sin \theta) = a$ $\sin \theta = a$
 $\cos \theta = \sqrt{1-a^2}$ 

15. Use graphing calculator to find A and z of $y = 2 \sin x + 5 \cos x$
 $A = 5.44$ $z = 1.2$ $\therefore 6.5$