

Algebra 2 Individual - January Regional

- $2y+1=-8$ and $-2x+1=3$; $y=-\frac{9}{2}$ and $x=-1$ $x+y=-\frac{11}{2}$ [B]
- $AB=x$, $DE=3x$; $BC=12-x$; $AD=6$; $\frac{AB}{BC}=\frac{AD}{DE}$; $\frac{x}{12-x}=\frac{6}{3x}$; $3x^2=72-6x$; $x^2+2x-24=0$ [C]
($x+6)(x-4)=0$
 $x=4$)
- $x=\frac{y}{y+1}$, $xy+x=y$, $xy-y=-x$; $y=\frac{-x}{x-1}$ [C]
- $5x^3-2x^2+3x+x^3-2=6x^3-2x^2+3x-2$ [B]
- $mr-2mr-m=ms=2ms=-2r$; $m(-r-3ms-1)=-2r$; $m=\frac{2r}{r+3s+1}$ [A]
- $-5 \leq \frac{3x-2}{4} \leq 5$; $-20 \leq 3x-2 \leq 20$; $-18 \leq 3x \leq 22$; $-6 \leq x \leq \frac{22}{3}$; $-6+5+\dots+4+7=7$ [D]
- $12 \times 18 = \sqrt[3]{12 \cdot 18} = \sqrt[3]{2^3 \cdot 3^3} = 2 \cdot 3 = 6$; $6 \times 288 = \sqrt[3]{12^3} = 12$ [A]
- $2^{\frac{1}{2}} x^{\frac{2}{3}} y^{\frac{3}{2}} \div 4x^{-\frac{1}{3}} y^2 = \frac{\sqrt{2}}{4} \cdot x^{\frac{1}{2}} \cdot y^{-\frac{1}{2}} = \frac{\sqrt{2}x}{4\sqrt{y}} = \frac{x\sqrt{2y}}{4y}$ [A]
- $10+a=b$ and $4+3a=b$; $10+a=4+3a$; $6=2a$; $a=3$; $b=13$; $a+b=16$ [E]
- $x = \log 25 / \log 4 \approx 2.32192 \dots$ 2 [A]
- The sum of the slopes of asymptotes of any hyperbola is 0. [B]
- $x^2-4x+4 + y^2+8y+16 = -2+4+16=18$; $r^2=18$; $A=18\pi$ [A]
- Add like terms to get $8x+3y+z=8$; $16x+6y+2z=16$ [C]
- $f(\sqrt{5}) = (\sqrt{5}+3)^{\sqrt{5}}$; $f(f(\sqrt{5})) = \dots$ $f(5)=4$; $f(f(5)) = f(4)=7$ and $f(7)=6$ [C]
- $1995 \div 6$ has remainder 3; $1+2+3=6$ [D]
- $2\left(\frac{x}{x-2}\right) = \frac{2x}{2x-2}$; $\frac{2x}{x-2} = \frac{2x}{2x-2}$; $x-2=2x-2$; $x=0$ [A]
- $x-3y = 1-3(-2)=7$; $-3y=-x+7$; $y=\frac{1}{3}x-\frac{7}{3}$ $b=-\frac{7}{3}$ [E]
- $\log_3 \left(\frac{18}{25}\right)^2 = 2 \log_3 \frac{3^2 \cdot 2}{5^2} = 2(2 \log_3 3 + \log_3 2 - 2 \log_3 5) = 2(2 + \frac{x}{2} - 2y) = 4+x-4y$ [B]
- $(\sqrt{1+a} - \sqrt{1-a})^2 = 1+a - 2\sqrt{1-a} + 1-a = 2-2\sqrt{1-a}$
 $(2-2\sqrt{1-a})^2 = 4 - 8\sqrt{1-a} + 4(1-a) = 8-8\sqrt{1-a} - 4a$
 $2-2\sqrt{1-a} - (8-8\sqrt{1-a} - 4a) = -6 + 6\sqrt{1-a} + 4a$ [D]
- $b^2-4ac < 0$; $k^2-16k < 0$; $k(k-16) < 0$; $0 < k < 16$ [B]
- 1) $\frac{1-2}{1-1} \frac{2-1}{1-0}$ $x^2-x+1=0$; $x = \frac{1 \pm \sqrt{-3}}{2} = \frac{1 \pm i\sqrt{3}}{2}$ [B]
- $-14c^2 + 4c^4 - 192c^4 + 36c^2 = 22c^2 - 188c^4$ [C]
- $(x+2)^2(x-1)^2 - (x-3)^2(x+2)^2 = (x+2)^2[(x-1)^2 - (x-3)^2] =$
 $(x+2)^2(x^2-2x+1 - x^2+6x-9) = (x+2)^2(4x-8) = 4(x+2)^2(x-2)$ [C]
- $f(a+b) = ma+mb + b = ma + f(b)$ [C]
- $2x-10 = -\frac{3}{2}x+25$; $4x-20 = -3x+50$; $7x=70$; $x=10$; $2t=10$; $t=5$ [A]
- $(0,68), (2,84), (10,68)$ are points on the parabola $y = -x^2+10x+68$ obtained on a TI-82 using Quad Reg. $y = -(x^2-10x+25)+68+25$; $y = -(x-5)^2+93$ $(5,93)$ is vertex [D]
- $(x-1)(x^2+x+1) / 2(x^2+x-2) = \frac{x^2+x+1}{2(x+2)}$ [D]
- 3) $\frac{1-k}{1-3-k} \frac{-6}{3-3k} \frac{12k}{9+3k}$ $9+3k=0$ $k=-3$ [A]
- 1, II, IV [C]
- $x=2y-3$; $4y^2-12y+9+9y^2=37$; $13y^2-12y-28=0$; $(13y+14)(y-2)=0$; $-\frac{14}{13}+2 = \frac{12}{13}$ [B]