

Algebra 2 Team HHS Invitational 3/23/96

1. -3

2. 3

4. $\frac{7}{5}$ or 1.4 or $1\frac{2}{5}$

5. $t = \ln 5$

6. 4.5

7. 2

8. $1 + 7i$

9. 2.5

10. 48

11. 2

12. 7.5 or $\frac{15}{2}$

13. 10

14. 5

15. 2

1. $(2)(\frac{1}{2})(\frac{3}{2})(-2) = \boxed{-3}$

2. $1 + \frac{1}{1+x} = 2$

$\frac{1+x+1}{1+x} = 2$

$2+2x = x+2$

$x = 0$

$3 + \frac{0}{3} = \boxed{3}$

3. $\frac{a_1}{1-r} = \frac{\frac{2}{x}}{1-\frac{2}{x}} = \frac{2}{x-2} = 4$

$4x-8=2$

$4x=10$

$x = \boxed{2.5 \text{ or } \frac{5}{2}}$

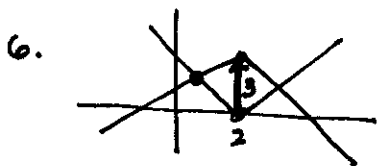
4. $A = \frac{3}{5}$

$B = \frac{3}{5} \cdot \frac{1}{2} = \frac{3}{10}$

$C = RB \text{ or } BR = \frac{3}{10} + \frac{2}{5} \cdot \frac{1}{2} = \frac{5}{10} = \frac{1}{2}$

$A+B+C = \boxed{\frac{7}{5} \text{ or } 1.4 \text{ or } 1\frac{2}{5}}$

5. $200 = k \cdot e^{\ln 2}$
 $200 = 2k$
 $100 = k$
 $100e^t = 500$
 $e^t = 5$
 $\boxed{t = \ln 5}$



Area of two Δ s =

$\frac{1}{2}(3)h + \frac{1}{2}3h = 3h$

$h = \text{distance from intersection to } 2 = x$

$h = 1.5$

$x-2 = 3-x+2$

$2x = 7$

$x = 3.5$

$3 \cdot 1.5 = \boxed{4.5}$

7. Sum of roots = $-\frac{b}{a}$ for $Ax^3 + Bx^2 + Cx + D$

Sum of prod taken two at a time = $\frac{c}{a}$

$A = \frac{3}{2}$
 $B = \frac{1}{2}$
 $\left. \begin{matrix} A = \frac{3}{2} \\ B = \frac{1}{2} \end{matrix} \right\} A+B = \frac{4}{2} = \boxed{2}$

8. ^{first part}
 $\frac{(2+i)(3+i)}{(3-i)(3+i)} = \frac{6+5i+i^2}{9-i^2} = \frac{5+5i}{10} = \frac{1+i}{2}$

$\frac{1+i}{2} \cdot (3+i)^2 = \frac{(1+i)(9+6i+i^2)}{2}$

$= \frac{8+6i(1+i)}{2} = \frac{(4+3i)(1+i)}{2} =$

$4+4i+3i-3 = \boxed{1+7i}$

9.

$OM = \sqrt{1.5^2 + 2^2} = \boxed{2.5}$

10. Curve = $-(x+2)(x-6) = y$

Ht = y-intercept = 12

width is when $-(x+2)(x-6) = 12$



$x^2 - 4x - 12 = -12$

$x(x-4) = 0$

$x=0 \quad x=4$

Rectangle = $4 \cdot 12 = \boxed{48}$

11. $3+4i = (a+bi)^2$

$3+4i = a^2 + 2abi + b^2i^2$

$3+4i = a^2 + 2abi - b^2$

$a^2 - b^2 = 3$ and $2ab = 4$

$ab = 2$

$a=2 \quad b=1$

$\boxed{2}$

12. $t \cdot r = d$

$\frac{5}{60} \cdot r = \frac{1}{2}$

$r = 6 \text{ mph}$

$6(\frac{2}{3}) = 4 \text{ mph}$

New rate = 10 mph

$10(\frac{3}{4}) = \boxed{7.5 \text{ or } \frac{15}{2}}$

13. $2(3)^2 - 3(3) + 1$

$\boxed{10}$

Algebra 2 Team continued

$$14. \frac{(x+1)\overbrace{(x-3)(x+3)}^{x^2-9}}{(x-3)(x-3)(x+3)} + \frac{4(x-3)^2}{(x-3)^2(x+3)} - \frac{1(x+3)}{(x-3)^2(x+3)} = \frac{Ax^3 + Bx^2 + Cx + D}{(x-3)^2(x+3)}$$

B = coefficient of $x^2 =$

5

$$15. \frac{\frac{n!}{r!(n-r)!}}{\frac{(n-1)!}{(r+1)!(n-1-r-1)!}} = \frac{\frac{n(n-1)(n-2)(\dots)}{r(r-1)(r-2)(\dots) \cdot (n-r)(n-r-1)(n-r-2)(\dots)}}{\frac{(n-1)(n-2)(\dots)}{(r+1)(r)(r-1)(r-2)(\dots) \cdot (n-r-2)(n-r-3)(\dots)}}$$

$$= \frac{n}{(n-r)(n-r-1)} \cdot \frac{1}{(r+1)} = \frac{\cancel{n}(r+1)}{(\cancel{n-r})(n-r-1)} = \frac{n}{n-r}$$

$$r+1 = n-r-1$$

$$2r - n = -2$$

$$n - 2r = \boxed{2}$$