Algebra I Regional Team Solutions

1.) $2+3+5+7+11+13+17+19+23+29+31+37+41=238$

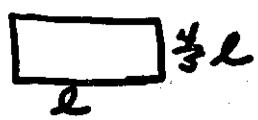
$\boxed{\text{Answer } 238-2=236}$

2.) $\dfrac{2^{6y+2}-2^{6y+3}}{2^{6y}} = \dfrac{2^{6y+2}}{2^{6y}} - \dfrac{2^{6y+3}}{2^{6y}} =$

$2^{2}-2^{3} = \boxed{\text{Answer } -4}$

3.) Let l = length

$\frac{4}{3}l$ = width



$l\left(\frac{4}{3}l\right)=2880$

$\left(\frac{3}{4}\right)\frac{4}{3}l^2 = 2880\left(\frac{3}{4}\right)$

$l^2=3600$

$l=60$

$l=60$

$\frac{4}{3}l=48 \rightarrow$

(6 in. drop)(2)

$60-12=\boxed{48}$

$48-12=\boxed{36}$

$\boxed{\text{Answers } 48 \,\&\, 36}$

4.) $-1.2x-.2[8-(4-6x)] = .8(x+1)$

$-1.2x-.2[8-4+6x] = .8x+.8$

$-1.2x-.2[4+6x] = .8x+.8$

$-1.2x-.8-1.2x = .8x+.8$

$-2.4x-.8 = .8x+.8$

$-3.2x = 1.6$

$\boxed{x=-.5 \text{ or } -\frac{1}{2}}$

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5.) $\begin{cases} 3x-17=-y \\ 8x-y=38 \end{cases}$

$3x+y=17$

$8x-y=38$

$11x=55$

$x=5$

$3(5)+y=17$

$15+y=17$

$y=2$

$(5,2)$
$x\ \ y$

$\begin{cases} 3p=4+2q \\ 4q=10-3p \end{cases}$

$3p-2q=4$

$(-)\ 3p+4q=10$

$-6q=-6$

$q=1$

$3p-2(1)=4$

$3p-2=4$

$3p=6$

$p=2$

$(2,1)$
$p\ \ q$

$\begin{cases} .2a-.5b=-1 \\ (-)\ .2a+.4b=4.4 \end{cases}$

$-.9b=-5.4$

$b=6$

$.2a-.5(6)=-1$

$.2a-3=-1$

$.2a=2$

$a=10$

$(10,6)$
$a\ \ b$

$\frac{x}{a}+\frac{y}{p}+\frac{b}{q} = \frac{5}{10}+\frac{2}{2}+\frac{6}{1} = \boxed{7\frac{1}{2}}$ Answ

6.) $b^5+36b=13b^3$

$b^5-13b^3+36b=0$

$b(b^4-13b^2+36)=0$

$b(b^2-9)(b^2-4)=0$

$b(b-3)(b+3)(b-2)(b+2)$

$\boxed{\text{Answer } 0, 3, -3, 2, -2}$

7.) (A) $3.21b-2.7b+6.57=3$

$.51b=-3.57$

$\boxed{b=-7}$

(B) $3[g+2(g-4)]=12$

$3[g+2g-8]=12$

$3[3g-8]=12$

$9g-24=12$

$9g=36$

$\boxed{g=4}$

(C) $2-\frac{2}{3}y-7=3$

$-\frac{2}{3}y=8$

$y=8\cdot-\frac{3}{2}$ $\boxed{y=-}$

(D) $\frac{1}{2}(y-6)=-9$

$\frac{1}{2}y-3=-9$

$\frac{1}{2}y=-6$ $\boxed{y=-1}$

$\dfrac{2A+B}{B-D} = \dfrac{2(-7)+4}{(-12)-(-12)} = \dfrac{-10}{0} =$

$\boxed{\text{Answer } \varnothing}$

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8.) $\left(\frac{x^2}{3y^3}\right)^2 \cdot \left(\frac{4x^2}{7y^4}\right)^3 \cdot \left(\frac{7y^4}{4x^5}\right)^2 \cdot \left(\frac{3y^3}{2}\right)^4$

$\frac{\cancel{x^4}}{\cancel{9}y^{\cancel{6}}} \cdot \frac{\overset{4}{\cancel{64}}\cancel{x^6}}{\underset{7}{\cancel{343}}\cancel{y^{12}}} \cdot \frac{\overset{1}{\cancel{49}}\cancel{y^8}y^2}{\underset{4}{\cancel{16}}\cancel{x^{10}}} \cdot \frac{\overset{9}{\cancel{81}}\cancel{y^{12}}}{\cancel{16}} = \boxed{\text{Answer } \frac{9y^2}{28}}$

(A.)

9.) Let x = # of \$3 tickets
y = # of \$5 tickets
$3x$ = Value of \$3 tickets
$5y$ = Value of \$5 tickets

$x = 2\frac{1}{4}y$
$5y = 3x - 350$
$5y = 3\left(\frac{9}{4}y\right) - 350$
$5y = \frac{27}{4}y - 350$
$5y = 6.75y - 350$
$-1.75y = -350$
$y = 200$

(B)

Let x = 1st integer
$x+1$ = 2nd integer
$x+2$ = 3rd intege
$x+3$ = 4th intege

$3[x+(x+1)] - [(x+2)+(x+3)]$
$3[2x+1] - [2x+5] = 50$
$6x+3-2x-5=50$
$4x-2=50$
$4x=52$
$x=13$

Largest integer is $(x+3) = 16$

$\boxed{\text{Answer} \quad A-B = 200-16 = 184}$

10.) Substitute $c = \frac{1}{x}$, $d = \frac{1}{y}$ in $\frac{2}{x} - \frac{1}{y} = -8$

$\frac{4}{x} + \frac{3}{y} = -6$

(-2) $2c - 1d = -8$
$4c + 3d = -6$

$-4c + 2d = 16$
$4c + 3d = -6$
$5d = 10$

$\frac{1}{y} = 2$
$1 = 2y$
$\boxed{\frac{1}{2} = y}$

$\frac{2}{x} - \frac{1}{\left(\frac{1}{2}\right)} = -8$
$\frac{2}{x} - 2 = -8$
$\frac{2}{x} = -6$
$2 = -6x$

$\boxed{x = -\frac{1}{3}}$

$2(x-y) =$
$2\left(-\frac{1}{3} - \frac{1}{2}\right) =$
$2\left(-\frac{5}{6}\right) = -\frac{5}{3}$

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14.) $A = 35^2 - 36^2 = (35+36)(35-36) = (71)(-1) = \boxed{-71}$

$B = 26^2 - 25^2 = (26+25)(26-25) = (51)(1) = \boxed{51}$

$C = 45^2 - 43^2 = (45+43)(45-43) = (88)(2) = \boxed{176}$

$D = 33^2 - 31^2 = (33+31)(33-31) = (64)(2) = \boxed{128}$

$$\frac{a+b+d}{c} = \frac{-71+51+128}{176} = \frac{108}{176} = \frac{27}{44}$$

$\boxed{\text{Answer } \frac{27}{44}}$

15.) $$4 + \cfrac{1}{4 + \cfrac{1}{\left[4 + \cfrac{1}{4 + \frac{1}{4} = \frac{17}{4}}\right]}} =$$

$$\left[4 + \frac{1}{\frac{17}{4}}\right] = 4 + \frac{4}{17} = 4\frac{4}{17}$$

$$4 + \frac{1}{\left[4 + \frac{1}{4\frac{4}{17}}\right]} = 4 + \frac{1}{\frac{72}{17}} = 4 + \frac{17}{72}$$

$$4 + \frac{1}{4\frac{17}{72}} = 4 + \frac{1}{\frac{305}{72}} = 4 + \frac{72}{305}$$

$\boxed{\text{Answer } 4\frac{72}{305} \text{ or } \frac{1292}{305}}$

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11.) A. $(5,6)(-7,9) = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9-6}{-7-5} = \frac{3}{-12} = \boxed{-\frac{1}{4}}$

B. $y = 4x + b$
$(3) = 4(2) + b$
$3 = 8 + b$
$\boxed{-5 = b}$

C. $-2x + y = -8$
$-2x + (0) = -8$
$-2x = -8$
$\boxed{x = 4}$

D. $x + y = 3$
$y = -1x + 3$
$\boxed{\text{slope} = -1}$

$BD - AC = (-5)(-1) - (-\frac{1}{4})(4) = \boxed{\text{Answer } 5 + 1 = 6}$

12.) $$\frac{\frac{1}{a} + \frac{1}{b}}{\frac{2}{3a} + \frac{2}{3b}}$$

$$\left(\frac{1}{a} + \frac{1}{b}\right) \div \left(\frac{2}{3a} + \frac{2}{3b}\right)$$

$$\frac{b+a}{ab} \div \frac{2b+2a}{3ab}$$

$$\frac{\cancel{b+a}}{\cancel{ab}} \cdot \frac{3\cancel{ab}}{2\cancel{(b+a)}} = \boxed{\text{Answer } \frac{3}{2}}$$

13) $(((4^3)^2)^2)^4 =$

4^{48}

$4^1 = 4$
$4^2 = 16$ } Patter[n] ever[y] 2
$4^3 = 64$
$4^4 = 256$ }

$48 \div 2 = 24$ No Remain[der]

thus it must end in $\boxed{6 \text{ - Answe[r]}}$ Remainder 1 would give you a 6.