Algebra I January Regional Individual Solutions

(14) $\frac{(2x-3)(x+1)}{(x+1)(x-1)} \cdot \frac{(x+1)(x-1)}{(x+1)(x+1)} \cdot \frac{-1(4x-1)(x+1)}{(3-2x)(1-x)}$

$\boxed{\frac{x+1}{1-x}}$ or $\boxed{A}$

(15) b = boys $\quad b+14$ = girls

$b+b+14=154$

$2b=140$

$b=70$

$\frac{70}{154} = \boxed{\frac{5}{11}}$ or $\boxed{D}$

(16) $(12x+5)(3x-4)$

$12+5+3-4 = \boxed{16}$ or $\boxed{B}$

(17) let x = time @ 96 Km/h

$x+\frac{1}{4}$ = time @ 60 Km/h

$96x = 60(x+\frac{1}{4})$

$96x = 60x+15$

$36x = 15$

$x = \frac{5}{12}$

distance $= 96x = 96 \cdot \frac{5}{12} = \boxed{40 \text{ km}}$ $\boxed{B}$

(18) x = time 2nd painter would need alone

$4(\frac{1}{10}) + 2(\frac{1}{10}) + 2(\frac{1}{x}) = 1$

$\frac{2}{x} = \frac{2}{5}$

$\boxed{x=5}$ or $\boxed{C}$

(19) $2\sqrt{128} - 3\sqrt{242} + 6\sqrt{72}$

$2\sqrt{64\cdot 2} - 3\sqrt{121\cdot 2} + 6\sqrt{2\cdot 36}$

$16\sqrt{2} - 33\sqrt{2} + 36\sqrt{2}$

$\boxed{19\sqrt{2}}$ $\boxed{E}$

(20) $\frac{x^{-4}y^{-6}}{x^{-12}y^{-6}} \cdot \frac{x^6y^{-6}}{x^6y^{-4}} = \boxed{y^8y^{-2}}$ A

(21) $\boxed{D}$

(22) $\frac{2(x+6)}{(x-3)(x+6)} - \frac{7x-3}{(x+6)(x-3)} = \frac{2x+12-7x+3}{LCD}$

$= \frac{-5x+15}{(x-3)(x+6)} = \frac{-5(x-3)}{(x-3)(x+6)} = \boxed{\frac{-5}{x+6}}$ A

(23) $x \neq -1, 4$

$x(x-4) - (x+1)(x+1) = 5$

$x^2-4x-x^2-2x-1=5$

$-6x=6$

$x=-1$

$\boxed{\emptyset}$ or $\boxed{D}$

(24) $x-y=7$

$x+y=37$

$2x=44$

$x=22$

$y=15$

$x\cdot y = \boxed{330} = \boxed{C}$

(25) $xy(x+y)-1(x+y)=24$

$(xy-1)(x+y)=24$

$6(x+y)=24 \Rightarrow x+y=4$

$x^2+y^2 = (x+y)^2 - 2xy$

$= 16-14 = \boxed{2}$ $\boxed{A}$

(26) $216 = 2^3\cdot 3^3$ $\quad 144 = 2^4\cdot 3^2$

$6\cdot 36$ $\quad 12\cdot 12$

$2\cdot 3 \quad 2^2\cdot 3^2$ $\quad 2^2\cdot 3 \quad 2^2\cdot 3$

GCF $= 2^3\cdot 3^2 = \boxed{72x^2y^2}$ C

(27) $(x-7)(x+2)=0$

$x=7,-2$ sum $= \boxed{5}$ D

(28) $\frac{7+\frac{2}{9}}{7-\frac{2}{9}} = \frac{70}{9}\cdot\frac{9}{56} = \boxed{\frac{5}{4}}$ or D

(29) $x^2+8x+\boxed{16} \Rightarrow \boxed{E}$

(30) $bx = a^2b$

$\boxed{x=a^2}$ $\boxed{A}$

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① $2+5\frac{1}{3}-5+9$

$\boxed{11\frac{1}{3}}$ or $\boxed{C}$

② $-6x+10+8-6x-3$

$\boxed{-12x+15}$ or $\boxed{D}$

③ $\boxed{A}$

④ $3+3n=2[3n+6-n-1]$

$3+3n=4n+10$

$\boxed{-7=n}$ or $\boxed{B}$

⑤ $1-2x>7$ or $1-2x<-1$

$-2x>6$ $\quad -2x<-2$

$\boxed{x<-3 \text{ or } x>1}$ $\boxed{C}$

⑥ A = Amy

$A+6$ = Jeff

$\frac{A+A+6}{2}=2A$

$2A+6=4A$

$6=2A$

$A=3$

Amy is 3, Jeff is 9 $\Rightarrow \boxed{27}$ or $\boxed{A}$

⑦ $x=4 \Rightarrow 12-2y=12 \Rightarrow \boxed{y=0}$

$x=-6 \Rightarrow -18-2y=12 \Rightarrow \boxed{y=-15}$ $\boxed{B}$

⑧ $|-2x-3|<7$ so

$-2x-3<7$ and $-2x-3>-7$

$-2x<10$ $\quad -2x>-4$

$x>-5$ and $x<+2$

integral values: $-4,-3,-2,-1,0,1$

sum is $\boxed{-9}$ or $\boxed{C}$

⑨ $m=\frac{3--1}{c--2}=\frac{-4}{5}$

$\frac{4}{c+2}=\frac{-4}{5}$

$-4c-8=20$

$-4c=28$

$\boxed{c=-7}$ or $\boxed{B}$

⑩ find slope: $\frac{3--2}{10-12}=\frac{-5}{2}$

$y=mx+b$

$3=\frac{-5}{2}(10)+b$

$\boxed{28=b}$ or $\boxed{B}$

⑪ $\frac{2a}{3}-\frac{b}{5}=2$

$\frac{2a}{3}+b=-1$

subtract the equations to cancel a terms

$-\frac{b}{5}-b=2--1$

$-\frac{6}{5}b=3$

$b=-\frac{5}{2}$

Substitute in 2nd eq: $\frac{2a}{3}-\frac{5}{2}=-1$

$\frac{2a}{3}=\frac{3}{2}$

$a=\frac{9}{4}$

$a-b=\frac{9}{4}-\frac{-5}{2}=\boxed{\frac{19}{4}}$ or $\boxed{C}$

⑫ C = # children

$2C-3$ = # adults

$C+2C-3=51$

$3C=54$

$C=18$

adults = 33

$\boxed{15}$ more adults than children

$=\boxed{E}$

⑬ $-10x^2+12x-20+3x^2-12x+8$

$\boxed{-7x^2-12}$ or $\boxed{D}$