

JANUARY REGIONAL - ALGEBRA I ANSWERS

Answers:

1. -11

2. 41

3. 46 (or 46%)

4. $\frac{1}{4}$ (or .25 or 25%)

5. $\frac{35}{12}$ (or $2 \frac{11}{12}$)

6. 4

7. 1152

8. 141

9. 7

10. $\frac{y}{4+12y^2}$

11. $x - 2y = -5$

12. 75

13. 1.5 (or $\frac{3}{2}$ or $1 \frac{1}{2}$)

14. -7, 13

15. $40x + 16$

Team Round

- $$\frac{10 - 16(.5)}{26 - 3*8} + [16 - (100 - 81)] * 2^{(27-25)} \rightarrow \frac{2}{2} + [16 - 19]*2^2 \rightarrow 1 + (-3)*4 \rightarrow 1 - 12 \rightarrow -11$$
- Average the temperatures first: $(-40 + 0 + 20 + 40)/4 = 5$. Convert 5 from C to F. $F = (9/5)*5 + 32 = 41$.
- He pays (Reg. Price) $(.80)(.75)(.90) = .54$ (Reg. Price) = 46% off.
- There are 25 primes from 1 to 100 (1 is not prime) so $25/100 = 1/4$.
- Solve each equation, $p = 1$, $q = 1/2$, $r = 2/3$, $s = 3/4$, so $1 + 1/2 + 2/3 + 3/4 = 35/12$.
- $1/7 = .142857142857142857 \dots$ every sixth digit is 7 so the 48th digit is 7, so the 50th digit is 4.
- Write it out and cancel:

$$\frac{4*3*2*1*6*5*4*3*2*1*8*7*6*5*4*3*2*1}{5*4*3*2*1*7*6*5*4*3*2*1} \rightarrow \frac{4*3*2*1*6*8}{1} \rightarrow 1152.$$
- There are 13 numbers: 41, 42, 43, 43, 45, 45, 47, 48, 48, 48, 48, 50, 50 \rightarrow sum = 598 \rightarrow mean = $598/13 = 46$. Median = one in middle = 47, mode = the most = 48 $\rightarrow 46 + 47 + 48 = 141$.
- To be divisible by 9 the sum of the digits must be a multiple of 9. The sum of the digits is 47. The next multiple of 9 is 54. $54 - 47 = 7$.
- Start with $5x + 12xy^2 = x + y$
 Subtract x from both sides $4x + 12xy^2 = y$
 Factor out x on left $x(4 + 12y^2) = y$
 Divide both sides $x = y/(4 + 12y^2)$ (no need for restrictions on variables.)
- Perpendicular lines have slopes that are opposite reciprocals. $Y = -2x - 3$ has a slope of -2 so we need a slope of $1/2$. $Y - y_1 = m(x - x_1) \rightarrow y - 2 = 1/2(x + 1) \rightarrow y - 2 = 1/2x + 1/2 \rightarrow y = 1/2x + 5/2 \rightarrow 2y = x + 5 \rightarrow x - 2y = -5$.
- $(.20)(x) + (.30)(50) = (.24)(x + 50)$
 $.2x + 15 = .24x + 12$
 $3 = .04x$
 $75 = x$
- When the water reaches the top of the stream, $v = 0 \rightarrow 0 = -32t + 48 \rightarrow 32t = 48 \rightarrow t = 1.5$.
- Isolate abs. Value. $\rightarrow \text{Abs.}(6 - 2x) = 20 \rightarrow 6 - 2x = 20$ or $6 - 2x = -20 \rightarrow x = -7$ or $x = 13$, $\{-7, 13\}$
- Length of outside walkway = $12x + 2 + 2 = 12x + 4$
 Width of outside walkway = $8x + 2 + 2 = 8x + 4$
 Perimeter = $2(12x + 4) + 2(8x + 4) = 24x + 8 + 16x + 8 = 40x + 16$.