

Algebra I Regional January

Individual Answers

1. C
2. E
3. A
4. C
5. D
6. A
7. D
8. A
9. D
10. C
11. B
12. B
13. D
14. C
15. B
16. D
17. A
18. B
19. E
20. D
21. A
22. A
23. B
24. D
25. A
26. A
27. D
28. B
29. B
30. D

Team Answers

1. -11
2. 3072
3. $\frac{3}{8}$
4. 9
5. 2
6. 300
7. 6
8. -9
9. $\{0, \frac{1}{6}\}$
10. 4
11. (0,4)
12. 0
13. $(3x-5)(3x+1)(3x-1)$
14. \$1.5 million
15. 10

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Individual Solutions Continued

D 27. difference of 2 squares
 $(3x-2+3x+2)(3x-2-3x-2)$
 $(6x)(-4) = -24x$

B 28.
$$\begin{cases} 3x-2y = -38 \\ 2x+6y = 26 \end{cases}$$

$$\begin{aligned} 6x-4y &= -76 \\ -6x-18y &= -78 \\ \hline -22y &= -154 \\ y &= 7, x = -8 \\ x+y &= -1 \end{aligned}$$

B 29. orig price x , reduced $0.8x$
 $0.8x + y = 1.12x$
 $y = .32x$ or $\textcircled{32\%}$

D 30. $x^2 + 4x - 96 = x^2 + ax + b$
 $a = 4, b = -96$
 $a \cdot b = \textcircled{-384}$

Team Solutions

-11 $\textcircled{1}$ $3x-2=10, 2y-4 \div 2 = -8$
 $x=4, 2y-2=-8$
 $y=-3$
 $z = 4 \cdot -3 = -12$
 $4-3-12 = \textcircled{-11}$

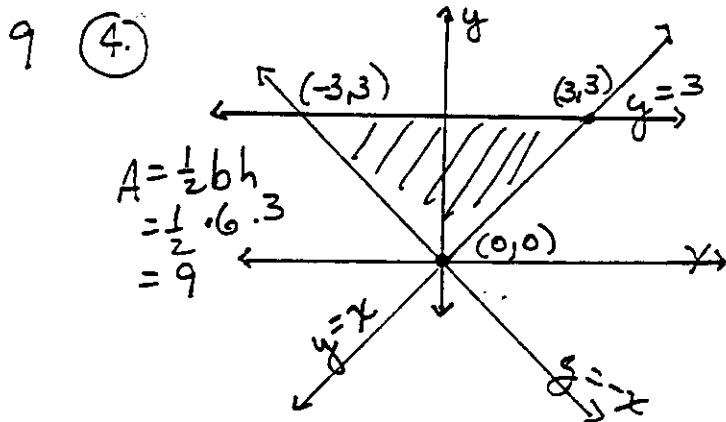
3072 $\textcircled{2}$ $4(8n = 1\frac{1}{2}k) \Rightarrow 32n = 6k$
 $6k = 1f, 32n = 1f$
 $8f = 4d, 256n = 4d$ or
 $64n = d$
 $12d = 1b, 768n = 1b$
 $4b = 4(768) = 3072n$

$\frac{3}{8}$ $\textcircled{3}$ $2 \Delta 3 = \frac{2^3}{3^2} = \frac{8}{9}$

$2 \Delta 1 = \frac{2^1}{1^2} = 2$

$\frac{8}{9} \otimes 2 = \frac{8 \cdot 8 - 2}{9 \cdot 3}$

$$= \frac{\frac{8}{9} \cdot 2}{\frac{16}{9}} = \frac{2}{3} \text{ or } \frac{18}{48} \textcircled{\frac{3}{8}}$$



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

$4x - 5 - 6x + 3(3-x) = 2 - x$
 $-2x - 5 + 9 - 3x = 2 - x$
 $-5x + 4 = 2 - x$
 $-4x = -2$
 $x = \frac{1}{2}$

Reciprocal is 2.

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Team Solutions

300

to	x	3	3x
return	x+10	2 1/2	5/2(x+10)

Distances are equal.
 $3x = \frac{5}{2}x + 25$
 $x = 50$, One way is $3x$ or 150.
 Total distance is 300.

6 (7.)

$1^2 = 1$	$6^2 = 36$
$2^2 = 4$	$7^2 = 49$
$3^2 = 9$	$8^2 = 64$
$4^2 = 16$	$9^2 = 81$
$5^2 = 25$	$0^2 = 0$

-9 (8.)

$$3^{x+y} = 3^4 \quad 3^{x-y} = 3^5$$

$$x+y = 4$$

$$x-y = 5$$

$$2x = 9$$

$$x = \frac{9}{2}, y = \frac{1}{2}; -\frac{1}{2}$$

{0, 1/6} (9.)

$$(3x-4)(2x+3) - 3(3x-4) = (4x-3)(3x-5)$$

$$6x^2 + x - 12 - 9x + 12 = 12x^2 - 29x + 15 + 20x - 15$$

$$-6x^2 + x = 0$$

$$6x^2 - x = 0$$

$$x(6x-1) = 0$$

$$x = 0, \frac{1}{6}$$

4 (10.)

	lbs	price per lb	Total Cost
C	2	10.50	21
P	x	7	7x
A	8-x	9	72-9x
total	10	8.10	81

$$21 + 7x + 72 - 9x = 81$$

$$x = 6$$

peanuts 6 lbs, almonds 2 lbs
 4 more pounds of peanuts than almonds

(0, 4) (11.)

line to $x - 2y = 5$
 passing through $(-2, 3)$
 gives the equation
 $x - 2y = -8$
 so y-intercept is:
 $x - 2y = -8$
 $-2y = -x - 8$
 $y = \frac{1}{2}x + 4$

0 (12.)

$$(2x^3 + 3ax^2 + 6x - 4) - (x^3 + x^2 - 7x + b)$$

$$x^3 + 3ax^2 - x^2 + 13x - 4 - b$$

equals

$$x^3 + 8x^2 + cx - 5$$

$$3ax^2 - x^2 = 8x^2$$

$$3a - 1 = 8 \quad -4 - b = -5$$

$$a = 3, \quad b = 1$$

$$13x = cx$$

$$13 = c$$

$$4a + b - c = 12 + 1 - 13 = 0$$

(13.)

$$(27x^3 - 45x^2 - 3x + 5)$$

$$9x^2(3x - 5) - (3x - 5)$$

$$(3x - 5)(9x^2 - 1)$$

$$(3x - 5)(3x + 1)(3x - 1)$$

1.5 (14.) Total amount put in \$80 million
 B's share is $\frac{25}{80}$ or $\frac{5}{16}$.

$$\frac{5}{16} (4.8) = 1.5 \text{ million}$$

10 (15.)

$$\left(\sqrt[3]{125^{\frac{1}{9}}}\right) \left(\sqrt[5]{4^{.25}}\right)$$

$$\left(125^{\frac{1}{27}}\right) \left(4^{\frac{1}{20}}\right)$$

$$(125)^{\frac{1}{3}} (4^{\frac{1}{2}})$$

$$5 \cdot 2 = 10$$