Algebra I - 2010

1.) Multiply $(6x-5)(6x-5)$.

a) $36x^2+25$
b) $36x^2-60x+25$
c) $36x^2+60x-25$
d) $36x^2-22x+25$
e) $36x+25$

2.) Solve $9x \leq 54$.

a) $\{x|x \leq 45\}$
b) $\{x|x \geq 6\}$
c) $\{x|x \leq 6\}$
d) $\{x|x \geq -6\}$
e) $\{x|x \geq 45$

3.) If (a, b) is a solution to the system $\begin{cases} 3x-5y=-1 \\ 4x-2y=8 \end{cases}$ then a + 3b = ?

a.) 3 b.) 11 c.) -7 d.) 9 e.) 6

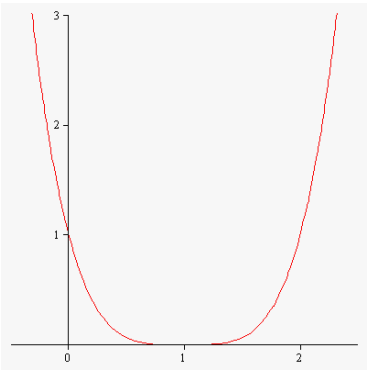
4.) What is the sum of the first 6 prime numbers?

a.) 29 b.) 41 c.) 35 d.) 42 e.) 37

5.) Simplify the following expression $(-4b^3)\left(\frac{1}{6}b^2\right)(-9b^4)$.

a.) $6b^{24}$ b.) $-6b^9$ c.) $6b^9$ d.) $6b^5$ e.) $-4b^9$

6.) Let f be the function represented by the graph below.
For what values of x is f(x) > 1?



a) $(-\infty, 0] \cup [2, \infty)$ b.) $(-\infty, 0) \cup (2, \infty)$ c.) $(-\infty, 0]$

d.) (0,2) e.) [0, 2]

7.) Simplify $\sqrt[3]{\frac{x^2}{9y}}$.

a.) $\frac{\sqrt[3]{9x^2y}}{9y}$ b.) $\frac{x\sqrt[3]{3y}}{3y}$ c.) $\frac{\sqrt[3]{3x^2y^2}}{9y}$ d.) $\frac{\sqrt[3]{x^2}}{3y}$

e.) $\frac{\sqrt[3]{3x^2y^2}}{3y}$

8.) Given that one x-intercept of the function $f(x) = 6x^3 + 17x^2 - 5x - 6$ is -3, find the other x-intercepts of f(x).

a.) $\frac{2}{3}, -\frac{1}{2}$ b.) $-\frac{2}{3}, \frac{1}{2}$ c.) $\frac{2}{3}, \frac{1}{2}$ d.) $-\frac{4}{3}, 1$

e.) $-\frac{1}{3}, \frac{1}{4}$

9.) Which line is perpendicular to 3x – 2y = 7 and has the same y-intercept as x – 3y – 12 = 0?

a.) $y = -\frac{3}{2}x + 4$ b.) $y = \frac{3}{2}x + 4$ c.) $y = -\frac{2}{3}x - 4$

d.) $y = \frac{2}{3}x + 4$ e.) $y = \frac{2}{3}x + 12$

10.) Perform the following operation $\frac{2x+1}{x^2+4x+4} - \frac{6x}{x^2-4} + \frac{3}{x-2}$.

a.) $\frac{-(x-5)}{(x+2)(x-2)}$ b.) $\frac{-(x-5)}{(x+2)^2}$ c.) $\frac{-(x+5)}{(x+2)(x-2)}$

d.) $\frac{-3x^2+2x+12}{(x+2)^2(x-2)}$ e.) $\frac{-(x+5)}{(x+2)^2}$

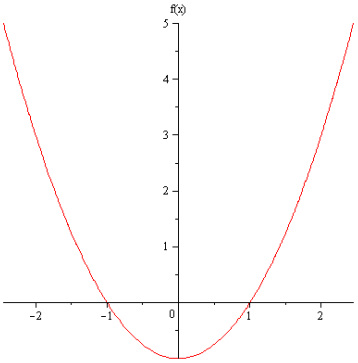
11.) Assume that Chanda can milk the cows in half the time it takes Edessa. If Chanda and Edessa can milk the cows in 45 minutes working together, how long would it take Edessa to milk the cows alone?

a.) 2 hr. 10 min. b.) 2 hr. 15 min. c.) 2 hr. 20 min.
d.) 2 hr. 25 min. e.) 2 hr. 30 min.

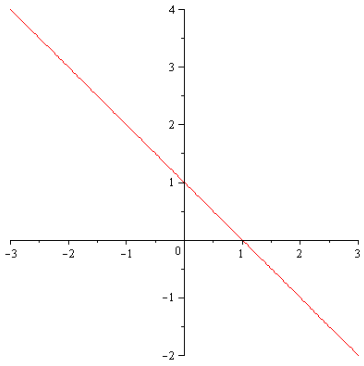
12.) Simplify: $\sqrt{(-2)^2} + 12 \div 2 - [2(-3)^2 + 1]$

a.) -15 b.) -29 c.) -11 d.) -33 e.) -14

13.) Let f and g be the functions represented by the graphs below. Find f(g(0)).



f(x)



g(x)

a.) 0 b.) -1 c.) 2 d.) 1 e.) -2

14.) Perform the indicated operation, assuming x, y ≠ 0. $\dfrac{(x^2y)^{-3}}{(x^4y^2)^{-2}}$

a.) $\dfrac{1}{x^3y^2}$ b.) x^8y c.) $\dfrac{y}{x^3}$ d.) x^2y e.) $\dfrac{1}{x^2y}$

15.) Which equation has the same vertex as the equation $y=-\frac{1}{2}x^2+2x+1$ and the same x-intercept as the line x + 3y = 1?

a.) $y=-3x^2-12x-9$ b.) $y=-3x^2+12x-9$ c.) $y=3x^2-12x+9$

d.) $y=-3(x+2)^2-3$ e.) $y=3(x-2)^2+3$

16.) The number of calories, c, a person burns varies directly with the time t (in minutes) the person spends performing an activity. If a 150-pound person can burn off 75 calories by sitting in class for 50 minutes, how long must that same person sit to burn off 645 calories?

a.) 7 hours 17 mins
b.) 7 hours 27 mins
c.) 16 hours 7 mins
d.) 16 hours 13 mins
e.) 7 hours 10 mins

17.) Find the domain of the function $f(x) = \frac{2x}{\sqrt{3-5x}}$.

a.) $(-\infty\ ,\ \frac{3}{5})$
b.) $(\frac{3}{5}, \infty)$
c.) $(-\infty, -\frac{3}{5})$
d.) $(-\frac{3}{5}, \infty)$
e.) $(-\frac{3}{5}, \frac{3}{5})$

18.) Given that y = f(x) goes through the point (4, -1),
y = f(x -1) + 3 goes through which point?

a.) (5, 2) b.) (3, 2) c.) (3, - 4) d.) (5, - 4) e.) (3, 4)

19.) Solve. $\frac{5}{w^2} - \frac{10}{w} + 2 = 0$

a.) $\frac{5 \pm 2\sqrt{15}}{2}$ b.) $\frac{5 \pm \sqrt{15}i}{2}$ c.) $\frac{5 \pm \sqrt{15}}{2}$

d.) $\frac{-5 \pm 2\sqrt{15}}{2}$ e.) $1 \pm \frac{\sqrt{15}i}{10}$

20.) Simplify the following expression $\frac{x - 3 + \frac{2}{x}}{x - 4 + \frac{3}{x}}$.

a.) $\frac{x-2}{x-3}$ b.) $\frac{x+2}{x+3}$ c.) $\frac{3x+2}{4x+3}$ d.) $\frac{x-3}{x-4}$ e.) $\frac{1}{1+\frac{1}{x}}$

21.) Solve for x in the equation $y = \frac{3x-4}{x+2}$.

a.) $\frac{4+2y}{3+y}$ b.) $\frac{-2(y+2)}{y-3}$ c.) $\frac{4-2y}{3-y}$

d. $2-\frac{4}{y}$ e.) $\frac{2y-4}{3-y}$

22.) Factor/Simplify $x^2 - x^2y^2 + y^2 + 2xy$.

a.) (x + x + y)(x - x- y)
b.) $(x+y)^2 - 2x^2y^2$
c.) $(x+y)^2 - xy$
d.) $(x-y)^2 - (xy)^2$
e.) none of the above

23.) Gary found a computer at Cheap'R'Us that was discounted 25 % off the manufacturer's suggested retail price and there was a mail-in-rebate for $300. If the new price, including the mail in rebate, is $1050 what was the suggested retail price for the computer?

a.) $1700 b.) $1687.50 c.) $1612.50 d.) $1750 e.) $1800

24.) Solve and write the solution set using interval notation: $\frac{x^2-4}{x+3} \geq 0$.

a.) $[-3,-2] \cup [2, \infty)$
b.) $(-\infty, -3] \cup (-2, 2]$
c.) $(-3, -2) \cup (2, \infty)$
d.) $(-\infty, -3) \cup (-2, 2)$
e.) $(-3, -2] \cup [2, \infty)$

25.) Farmer Nelson raises sheep and chickens; none of them are abnormal. In order to keep track of how many there are, she counts their feet. There are 88 feet, and there are 30 animals. How many sheep are there?

a. 16 b.28 c. 14 d. 7 e. 37

26.) Mr. Miller is 5 feet 6 inches tall. He starts to walk away from a street lamp that is 12 feet tall. How long is his shadow when he is 8 feet from the street lamp?

a. 6 feet
b. 6 feet 9 inches
c. 6 feet 6 inches
d. 6 feet 5 inches
e. 6 feet 3 inches

27.) Simplify: $\left(\frac{2x^{-3}y^{2}z^{\frac{1}{2}}}{6x^{4}y^{-3}z^{6}}\right)^{4}$

a. $\frac{2^{4}y^{16}}{3^{4}x^{4}z^{20}}$ b. $\frac{2^{4}x^{28}y^{16}}{3^{4}z^{26}}$ c. $\frac{y^{9}}{3^{4}x^{11}z^{\frac{19}{2}}}$

d. $\frac{y^{9}}{3^{5}x^{11}z^{\frac{19}{2}}}$ e. $\frac{y^{20}}{3^{4}x^{28}z^{22}}$

28.) Given A(-3, 8), find the coordinates of the point B such that C(5, -10) is the midpoint of the segment AB.

a. (13, -28) b. (7, -12) c.) (1, -1) d.) (12, -30) e.) (13, 28)

29.) Consider $x^{2}-8x-8=1$. The discriminant added to the smaller root (zero) is:

a.) 101 b.) 91 c.) 81 d.) 64 e.) 99

30.) If $|x - 2| < 3$, then $\frac{x+3}{2}$ falls within what interval?

a. $(-\infty, 4)$ b.) (-1, 4) c.) (-4, 4) d.) (1, 4) e.) $(4, \infty)$

31.) Given that $i = \sqrt{-1}$, find i^{35}.

a.) i b.) -i c.) 1 d.) -1 e.) none of the above

32.) Find $(2x-3)^3$.

a.) $8x^3 - 36x^2 - 54x - 27$
b.) $8x^3 + 36x^2 + 54x + 27$
c.) $8x^3 - 36x^2 + 36x - 27$
d.) $8x^3 - 36x^2 + 54x - 27$
e.) $8x^3 - 18x^2 - 36x + 27$

33.) An accountant must pay taxes and payroll bonuses to employees from the company's profits of $2,000,000. The total tax is 40% of the amount left after bonuses are paid, and the total paid in bonuses is 10% of the amount left after taxes. Find the total taxes paid.

a.) $125,000
b.) $750,000
c.) $1,075,000
d.) $1,153,846.15
e.) $800,000

34.) Simplify $\dfrac{2i}{3-5i}$

a.) $\frac{3}{8}i - \frac{5}{8}$
b.) $\frac{3}{17}i - \frac{5}{17}$
c.) $\frac{3}{17}i + \frac{5}{18}$
d.) $\frac{3}{8}i + \frac{5}{8}$
e.) $\frac{2}{3}i - \frac{2}{5}$

35.) John the frog leaps once in the form of a parabola given by $\boldsymbol{x^2 - 8x + 16 = -4y + 16}$ starting at (0,0). If distances are given in terms of inches, how high will he be able to jump?

a. 16 inches b. 8 inches c. 12 inches d. 4 inches e. 10 inches

36.) Consider a bag with 20 marbles with the following frequency color distribution. On a random draw, what is the probability of getting a red marble or an orange marble?

Color	**#**
Red	4
Blue	5
Green	3
Yellow	6
Orange	2

a. 6 b. .60 c.) .50 d.) .30 e.) .40

37.) One six-sided die is rolled and one sheet of colored paper (red, yellow, or blue) is selected at random. What is the probability that the number on the die is 5 or the sheet of paper is blue?

a.) 4/9 b.) 3/8 c.) 17/18 d.) ½ e.) 5/8

38.) Consider an equilateral triangle whose perimeter is 30 inches. What is its area?

a.) 300 in^2 b.) $10\sqrt{2}$ in^2 c.) $25\sqrt{3}$ in^2

d.) $\frac{25\sqrt{3}}{2}$ in^2 e.) $25\sqrt{3}$ cm^2

39.) Consider a drawer with eight black and 5 blue socks. What is the fewest number of random choices that would be required to be assured of a matching pair?

a.) 2 b.) 4 c.) 6 d.) 8 e.) none of these

40.) The ultraviolet, or UV, index is a measure issued daily by the National Weather Service that indicates the strength of the sun's rays in a particular locale. For those people whose skin is quite sensitive, a UV rating of 6 will cause sunburn after 10 minutes (Source: The Electronic Textbook of Dermatology found at www.telemedicine.org, January 2004). Given that the number of minutes it takes to burn, t, varies inversely as the UV rating, u, how long will it take a highly sensitive person to burn on a day with a UV rating of 4?

a.) 6.6 mins b.) 12 mins. c.) 12 mins d.) 15 mins e.) 18 mins

Algebra I - Key

1. b
2. c
3. d
4. b
5. c
6. b
7. e
8. a
9 c
10. e
11. b
12. c
13. a
14. d
15. b
16. e
17. a
18. a
19. c
20. a
21. b
22. e
23. e
24. e
25. c
26. b
27. e
28. a
29. e
30. d
31. b
32. d
33. a
34. b
35 d
36 d
37. a
38. **c** (original answer d was incorrect)
39. e
40. d