ALGEBRA 2 IND. SOLUTIONS REGIONAL 2-9-91

1. $3 + \frac{a}{3} = 6\frac{2}{3}$

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

$\frac{a}{3} = \frac{11}{3}$ (B)

$a = 11$

2. $\frac{5x}{2y} = 12$, $5x = 24y$

$\frac{24y - 6y}{2y} = \frac{18y}{2y} = 9$ (C)

3. $|-3x+1| > 5$

$-3x+1 > 5$ $\quad -3x+1 < -5$

$-3x > 4$ $\quad -3x < -6$

$x < \frac{-4}{-3}$ or $x > 2$

(D)

4. $x^2 - 2x - 5 \div x - 2$

$R(x) = 2^2 - 2(2) - 5$

$R(x) = -5$ (A) = 3

5. A: $(-1, 3)$ B $(4, -2)$

$\left(\frac{-1+4}{2}, \frac{3+-2}{2}\right)$

$\left(\frac{3}{2}, \frac{1}{2}\right)$ (A)

6. $6x^2 + 3x - 3 = 0$

$3(2x^2 + x - 1) = 0$

$3(2x-1)(x+1) = 0$

$x = \frac{1}{2}$ $\quad x = -1$ (B)

7. $g[p(x)] = 3(2x-3)^2 + 1$

$3(4x^2 - 12x + 9) + 1$

$12x^2 - 36x + 27 + 1$

$12x^2 - 36x + 28$ (E)

8. $|5 - 12i|$

$\sqrt{5^2 + (-12)^2} = \sqrt{169} = 13$

(C)

9. $3x^2 + x - 2 \geq 0$

$(3x-2)(x+1) \geq 0$

$3x \geq 2$ $\quad x + 1 \leq 0$

$x \geq \frac{2}{3}$ or $x \leq -1$ (B)

10. $3iy = -2x + 4 + 6i$

$-2x = -4$ $\quad x = 2$

$3iy = 6i$ $\quad y = 2$

$(2, 2)$ (C)

11. $\left(\frac{3}{4}\right)^{x^2+1} = \left(\frac{16}{9}\right)^{x}$

$\left(\frac{3}{4}\right)^{x^2+1} = \left(\frac{3}{4}\right)^{-2x}$

$x^2 + 1 = -2x$ (B)

$x^2 + 2x + 1 = 0$ $\quad x = -1$

12. $2x^2 - 3x + k$ $\quad b^2 - 4ac > 0$

$(-3)^2 - 4(2)(k) > 0$

$9 - 8k > 0$ $\quad -8k > -9$

$k < \frac{9}{8}$ (A)

Ind. solutions for Alg 2 Ind. 2-9-91

13. $-x^2+7x-12>0$

$x^2-7x+12<0$

$(x-4)(x-3)<0$

$3<x<4$ (C)

14. $\begin{bmatrix}2&5\\3&8\end{bmatrix}^{-1}$ $2\cdot8-3\cdot5=16-15=1$

$+1\begin{bmatrix}8&-5\\-3&2\end{bmatrix}=\begin{bmatrix}8&-5\\-3&2\end{bmatrix}$ (D)

15. $f(x)=3^x-8$

$x=3^y-8$

$x+8=3^y$

$\log_3(x+8)=y$ (D)

16. $2435_6=2\cdot6^3+4\cdot6^2+3\cdot6+5\cdot6^0=$

$599_{10}=1\cdot8^3+1\cdot8^2+2\cdot8^1+7\cdot8^0$

$=1127_8$ (D)

17. $8^{\sqrt{3}+\sqrt{5}}\cdot16^{\sqrt{12}+\sqrt{20}}$

$2^{3(\sqrt{3}+\sqrt{5})}\cdot2^{4(2\sqrt{3}+2\sqrt{5})}$

$2^{3\sqrt{3}+3\sqrt{5}}\cdot2^{8\sqrt{3}+8\sqrt{5}}$

$2^{11\sqrt{3}+11\sqrt{5}}$ (A)

18. $f(x)=\log_5 x$ then

$f(5x)=\log_5 5x$ $f(\frac{x}{5})=\log_5\frac{x}{5}$

$\log_5 5x-\log_5\frac{x}{5}=\log_5\frac{5x}{\frac{x}{5}}=$

$\log_5 25=2$ (C)

19. $3x+2y-z=4$

$2x+5y-2z=5$

$4x+2y+12z=27$

$\frac{2}{3}\cdot(9x+9y+9z)=(36)\frac{2}{3}$

$6x+6y+6z=24$ (B)

20. $x_1+x_2=-\frac{b}{a}$ $x_1\cdot x_2=\frac{c}{a}$

$x_1=r^k$ $x_2=2r$

$-\frac{b}{a}=3r$ $k=3r$ $\frac{c}{a}=2r^2$ $\frac{c}{a}=18$

$2r^2=18$ $r=\pm3$ $k=\pm9$

(E)

21. $\frac{x}{9}+\frac{x}{12}-\frac{x}{15}=1$

$20x+15x-12x=180$

$x=7\frac{19}{23}$ hrs.

(A)

22. $3.00+.20p=$ ticket price

$500-25p=$ # of tickets sold

$\therefore$ Income $=(500-25p)\cdot(3.00+.20p)$

$y=1500+25p-5p^2$ Complete square

$=-5(p-\frac{5}{2})^2+\frac{6125}{4}$ $(2.5, 3125)$

Total increase is $.20(2.5)=\$.50$

New ticket price is $\$3.50$

(B)

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23. $(4\log_K x)(\log_4 K) = 12$

$4\left(\frac{\log x}{\log K}\right)\left(\frac{\log K}{\log 4}\right) = 12$

$\frac{\log x}{\log 4} = 3$

$\log_4 x = 3$

$x = 64$ (D)

24. Characteristic of $\log_8 5000$

$3^7 = 2401 \quad 3^8 = 7203$

$\therefore$ char $= 7$

(B)

25. $V(3,5)$ focus $(3,2)$

$(x-h)^2 = 4p(x-h)$

$p = -3$

$(x-3)^2 = -12(y-5)$

(C)

26. $\frac{1}{p} + \frac{1}{r} = \frac{1}{q}$

$\frac{1}{p} = \frac{1}{q} - \frac{1}{r}$

$\frac{1}{p} = \frac{r-q}{qr}$

$p = \frac{qr}{r-q}$ (A)

27. $\sqrt[6]{16} \div \sqrt[6]{4}$

$2^{\frac{4}{6}} \div 2^{\frac{2}{6}} = 2^{\frac{2}{6}} = \sqrt[6]{4}$

(B)

28. How many fourths is $26\frac{2}{3}\% = \frac{80}{300}$

$x \cdot \frac{1}{4} = \frac{80}{300}$

$\frac{1}{4}x = \frac{4}{15} \quad x = \frac{16}{15}$ (D)

29. $\frac{6}{4+\sqrt{2}} \cdot \frac{4-\sqrt{2}}{4-\sqrt{2}}$

$\frac{24-6\sqrt{2}}{14} = \frac{12-3\sqrt{2}}{7}$

(D)

30.

1	1	2	−1	c	k
		1	3	2	c+2
	1	3	2	c+2	0

$k + c = -2$

−1	1	2	−1	c	k
		−1	−1	2	−c−2
	1	1	−2	c+2	0

$k - c = 2$ (A)

$k + c = -2$

$2k = 0 \quad k = 0 \quad c = -2$