ALGEBRA 2 TOPIC LIST & REVIEW SHEETS BY VERB

Solve

- Radical equations
- Quadratic equations
- Systems of equations
- Polynomial equations
- Rational equations
- Exponential & log equations

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1. Solve for x: $\sqrt{8x-23}+1=x$

$-1 \quad -1$

$(\sqrt{8x-23})^2=(x-1)^2$

$8x-23=x^2-2x+1$

$0=x^2-10x+24$

$0=(x-6)(x-4)$

$x=6 \quad | \quad x=4$

$\{6,4\}$

2. Given: $h(x)=0.5x^3+x^2-1.2x+2$ and $k(x)=-|0.8x|+5.2$. State the solutions to the equation $h(x)=k(x)$, rounded to the nearest hundredth.

2nd | TRACE | 5

*3 intersections

$x=-1.30$

$x=-2.59$

$x=1.48$

3. Which value, to the nearest tenth, is NOT a solution of p(x) = q(x) if $p(x)=x^3+3x^2-3x-1$ and $q(x)=3x+8$?

a. 4.7

b. 2.1

c. -1.1

d. -3.9

2nd | TRACE | 5

4. What are the roots, in simplest form, of the equation $4x^2+98=0$?

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$x=\frac{0\pm\sqrt{(0)^2-4(4)(98)}}{2(4)}$

$x=\frac{0\pm\sqrt{-1568}}{8}$

$x=\frac{0\pm28i\sqrt{2}}{8}$

$x=\frac{\pm7i\sqrt{2}}{2}$

5. Solve the following system of equations for x, y, and z:

$$x + 3y + 5z = 45$$
$$6x - 3y + 2z = -10$$
$$-2x + 3y + 8z = 72$$

get rid of y

$6x - 3y + 2z = -10$
$x + 3y + 5z = 45$
$7x + 7z = 35$

$6x - 3y + 2z = -10$
$-2x + 3y + 8z = 72$
$4x + 10z = 62$

$4(7x + 7z = 35)$
$-7(4x + 10z = 62)$
$28x + 28z = 140$
$-28x - 70z = -434$
$-42z = -294$
$z = 7$

$4x + 10(7) = 62$
$4x + 70 = 62$
$4x = -8$
$x = -2$

$6(-2) - 3y + 2(7) = -10$
$-12 - 3y + 14 = -10$
$-3y + 2 = -10$
$-3y = -12$
$y = 4$

$\{(-2, 4, 7)\}$

6. Determine the solution set for $\sqrt{56 - x} = x$.

$(\sqrt{56 - x})^2 = (x)^2$
$56 - x = x^2$
$0 = x^2 + x - 56$
$0 = (x + 8)(x - 7)$
$x = -8, 7$

$\{7\}$

7. Solve for x: $x^2 + 2x = -5$

$x^2 + 2x + 5 = 0$
$x = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(5)}}{2(1)}$
$x = \frac{-2 \pm \sqrt{-16}}{2}$
$x = \frac{-2 \pm 4i}{2}$
$x = -1 \pm 2i$

8. Which value is not in the solution set of the system shown below:

$$a + 5b - c = -20$$
$$4a - 5b + 4c = 19$$
$$-a - 5b - 5c = 2$$

a. -2
b. 2
c. 3
d. -3

$5a + 3c = -1$
$-6c = -18$
$c = 3$
$5a + 9 = -1$
$5a = -10$
$a = -2$
$-2 + 5b - 3 = -20$
$5b - 5 = -20$
$5b = -15$
$b = -3$

9. Algebraically determine the values of x that satisfy the given system: $y = -2x + 1$, $y = -2x^2 + 3x + 1$

$-2x^2 + 3x + 1 = -2x + 1$

$0 = 2x^2 - 5x$

$0 = x(2x - 5)$

$x = 0 \quad | \quad x = \frac{5}{2}$

$x = 0, \frac{5}{2}$

4 roots

10. Find the zeros for $x^4 - 4x^3 - 9x^2 + 36x = 0$ algebraically.

$(x^4 - 4x^3) + (-9x^2 + 36x) = 0$

$x^3(x-4) - 9x(x-4) = 0$

$(x-4)(x^3 - 9x) = 0$

$(x-4) \times (x^2 - 9) = 0$

$x = 4, 0, \pm 3$

11. What is the solution set of $\frac{3x+25}{x+7} = \frac{3}{x} + 5$?

a. {3/2, 7}
b. {7/2, -3}
c. {-3/2, 7}
d. {-7/2, -3}

* $x \neq 0, -7$

LCD: $x(x+7)$

$\frac{x(3x+25)}{x(x+7)} = \frac{3(x+7)}{x(x+7)} + \frac{5x(x+7)}{x(x+7)}$

$3x^2 + 25x = 3x + 21 + 5x^2 + 35x$

$0 = 2x^2 + 13x + 21$

$(2x+7)(x+3) = 0$

$x = -\frac{7}{2} \quad | \quad x = -3$

12. Solve the system of equations shown below algebraically:

$(x-3)^2 + (y+2)^2 = 16$

$2x + 2y = 10$

$2y = 10 - 2x$

$y = 5 - x$

$(x-3)^2 + (5 - x + 2)^2 = 16$

$x^2 - 6x + 9 + (7-x)^2 = 16$

$x^2 - 6x + 9 + 49 - 14x + x^2 = 16$

$\frac{2x^2}{2} - \frac{20x}{2} + \frac{42}{2} = \frac{0}{2}$

$x^2 - 10x + 21 = 0$

$(x-3)(x-7) = 0$

$x = 3 \quad | \quad x = 7$

$y = 5 - 3 = 2 \quad y = 5 - 7 = -2$

$(3, 2), (7, -2)$

13. To solve $\frac{8}{x^2-2x} = \frac{2x}{x-2} - \frac{11}{x}$, Jack multiplied both sides by the least common denominator. Which statement is true?

a. 2 is an extraneous root

b. 3.5 is an extraneous root

c. 0 and 2 are extraneous solutions

d. This equation has no extraneous solutions

$x(x-2)=0$

$x=0 \quad x=2$

14. Diandra puts $5000 into an account with interest compounded continuously. Find the approximate annual growth rate, to the nearest hundredth (if necessary), for the account to grow to $9110 after 30 years?

$A = Pe^{rt}$

$9110 = 5000e^{r(30)}$

$\ln(1.822) = \ln(e^{30r})$

$\frac{\ln(1.822)}{30} = \frac{30r}{30}$

$.0199... = r$

$r = .02$

15. Find the solutions to $x + 3 - \frac{4}{x-1} = 5$, in simplest radical form.

$-3 \quad -3$

$x - \frac{4}{x-1} = 2$

$-x \quad -x$

$\frac{-4}{x-1} = \frac{2-x}{1}$

$(x-1)(2-x) = -4$

$2x - x^2 - 2 + x = -4$

$0 = x^2 - 3x - 2$

$x = \frac{3 \pm \sqrt{(-3)^2 - 4(1)(-2)}}{2(1)}$

$x = \frac{3 \pm \sqrt{17}}{2}$

16. If a, b, and c are positive constants, then solve $ae^{bt} = c$ for t.

$\frac{ae^{bt}}{a} = \frac{c}{a}$

$\ln(e^{bt}) = \ln\left(\frac{c}{a}\right)$

$bt = \ln\left(\frac{c}{a}\right)$

$t = \frac{\ln\left(\frac{c}{a}\right)}{b}$

17. A substance has a mass of 140 grams at 3 pm and 100 grams at 8 pm. The equation $100 = 140(\frac{1}{2})^{\frac{5}{h}}$ models this situation. Solve for h, to the nearest ten-thousandth.

$$\frac{100}{140} = \frac{140\left(\frac{1}{2}\right)^{\frac{5}{h}}}{140}$$

$$\frac{5}{7} = \left(\frac{1}{2}\right)^{\frac{5}{h}}$$

$$\log_{\frac{1}{2}}\left(\frac{5}{7}\right) = \frac{5}{h}$$

$$.4854\ldots = \frac{5}{h}$$

$$.4854\ldots h = 5$$

$$h = 10.30021\ldots$$

$$\boxed{h = 10.3002}$$

18. Solve for x: $\frac{1}{x} - \frac{1}{4} = -\frac{1}{4x}$

* $x \neq 0$
LCD: $4x$

$$\frac{1(4)}{4x} - \frac{1(x)}{4x} = \frac{-1}{4x}$$

$$4 - x = -1$$

$$-x = -5$$

$$\boxed{x = 5}$$