Name Date

§3-5 PROBLEM SET

Solve each radical equation.

1. $\sqrt{2x+1}=3$
2. $\sqrt{2-y}+1=5$
3. $5-\sqrt{2k}=3$
4. $9-\sqrt{t+2}=5$
5. $3-\sqrt{x+1}=0$
6. $\sqrt[3]{r}=2$
7. $\sqrt{x}-3=5$
8. $3-\sqrt{y+3}=0$
9. $4-\sqrt{x+1}=5$
10. $5-\sqrt{x+3}=3$
11. $t=\sqrt{6t-9}$
12. $t=2\sqrt{t-1}$
13. $x+2\sqrt{x+1}=7$
14. $x=\sqrt{6x+18}-3$
15. $x+2=\sqrt{2x+3}$
16. $3\sqrt{x-2}+2=x$
17. $x+3\sqrt{x-2}=12$
18. $a-4=2\sqrt{a-5}$
19. $\sqrt{x^2+3x-2}-x=1$
20. $x-1+\sqrt{x^2+3}=0$
21. $\sqrt{x^2-3x-1}=3$
22. $\sqrt{x}+\sqrt{x-7}=7$
23. $2=\sqrt{x-5}-\sqrt{x+16}$
24. $\sqrt{x}+\sqrt{x+11}=11$
25. $\sqrt{x+3}+\sqrt{x}=5$
26. $\sqrt{x+1}=2-\sqrt{x}$
27. $3\sqrt{c}-1=\sqrt{c}+1$
28. $\sqrt{m+10}-\sqrt{m-6}=2$
29. $\sqrt{2x+4}=3-\sqrt{2x}$
30. $2\sqrt{3w-5}-3\sqrt{w+1}=0$
31. $\sqrt{4s+3}=2\sqrt{s-1}+1$
32. $\sqrt{x}-\sqrt{x+8}=8$
33. $\sqrt{3+x}+\sqrt{x}=\dfrac{6}{\sqrt{3+x}}$
34. $\dfrac{5}{\sqrt{x-1}}+\dfrac{\sqrt{x+4}}{2}=2\sqrt{x-1}$
35. $\sqrt{x+7}=2-\sqrt{x-5}$
36. $2\sqrt{x+1}-\sqrt{2x}=\sqrt{x-4}$
37. $2\sqrt{x}-\sqrt{4x-22}=\sqrt{2}$
38. $\sqrt{x+9}-\sqrt{x+2}=\sqrt{4x-27}$

PROBLEM SOLUTIONS

1.	4	**2.**	-14	**3.**	2	**4.**	14
5.	8	**6.**	8	**7.**	64	**8.**	6
9.	no solution	**10.**	1	**11.**	3	**12.**	2
13.	3	**14.**	± 3	**15.**	-1	**16.**	$\{ 2, 11 \}$
17.	6	**18.**	6	**19.**	3	**20.**	-1
21.	$\{ -2, 5 \}$	**22**	16	**23.**	no solution	**24.**	25
25.	$\frac{121}{25}$	**26.**	$\frac{9}{16}$	**27.**	1	**28.**	15
29.	no solution	**30.**	$\frac{29}{3}$	**31.**	$\frac{13}{4}$	**32.**	no solution
33.	1	**34.**	5	**35.**	no solution	**36.**	$\frac{21 \pm 2\sqrt{154}}{7}$
37.	18	**38.**	no real solutions				

Name: Key

Mr. Varughese

Date: _____

Algebra 2 – Inverse/Function Operations Summary

For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question.

1.

What is the solution set for x in the equation below?

$$\sqrt{x+1} - 1 = x$$

(1) {1}
(2) {0}
(3) {−1,0}
(4) {0,1}

$(\sqrt{x+1})^2 = (x+1)^2$

$x+1 = x^2+2x+1$

$0 = x^2+x$

$0 = x(x+1)$ $x = 0, -1$

2.

For the system shown below, what is the value of z?

$$y = -2x + 14$$
$$3x - 4z = 2$$
$$3x - y = 16$$

(1) 5
(2) 2
(3) 6
(4) 4

$2x+1y+0z=14$
$3x+0y-4z=2$
$3x-1y+0z=16.$

Use Calc
6, 2, 4
x, y, z

3.

The expression $(x + a)(x + b)$ can *not* be written as

(1) $a(x + b) + x(x + b)$
(2) $x^2 + abx + ab$
(3) $x^2 + (a + b)x + ab$
(4) $x(x + a) + b(x + a)$

Careful.

$x^2+xb+ax+ab$ ← this is good

4.

What is the quotient when $10x^3 - 3x^2 - 7x + 3$ is divided by $2x - 1$?

(1) $5x^2 + x + 3$
(2) $5x^2 - x + 3$
(3) $5x^2 - x - 3$
(4) $5x^2 + x - 3$

$5x^2+x-3$

$2x-1 \overline{)10x^3-3x^2-7x+3}$

$-(10x^3-5x^2)$

$2x^2-7x+3$

$-(2x^2-1x)$

$-6x+3$

$-6x+3$

0

5.

The solutions to $x + 3 - \frac{4}{x-1} = 5$ are

(1) $\frac{3}{2} \pm \frac{\sqrt{17}}{2}$
(2) $\frac{3}{2} \pm \frac{\sqrt{17}}{2}i$
(3) $\frac{3}{2} \pm \frac{\sqrt{33}}{2}$
(4) $\frac{3}{2} \pm \frac{\sqrt{33}}{2}i$

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

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

$x^2-3x+2-4=0$

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

$x = \frac{3 \pm \sqrt{9-4\cdot1\cdot-2}}{2} = \frac{3 \pm \sqrt{17}}{2}$

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Algebra 2 – Inverse/Function Operations Summary

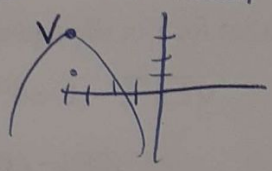
6.

What is the equation of the directrix for the parabola $-8(y-3)=(x+4)^2$?

(1) $y=5$ (3) $y=-2$

(2) $y=1$ (4) $y=-6$

$y=\frac{1}{4p}(x-h)^2+k$



$y=-\frac{1}{8}(x+4)^2+3$

$p=2$

$V=(-4,3)$

7.

The function below models the average price of gas in a small town since January 1st.

$G(t)=-0.0049t^4+0.0923t^3-0.56t^2+1.166t+3.23$, where $0\le t\le 10$.

If $G(t)$ is the average price of gas in dollars and t represents the number of months since January 1st, the absolute maximum $G(t)$ reaches over the given domain is about

(1) \$1.60 (3) \$4.01

(2) \$3.92 (4) \$7.73

Look at table to set window

2nd Calc Max.

8.

If $p(x)=2x^3-3x+5$, what is the remainder of $p(x)\div(x-5)$?

Remainder Theorem

(1) -230 (3) 40

(2) 0 (4) 240

$2(5)^3-3(5)+5$

$250-15+5$

9.

What is the inverse of $f(x)=-6(x-2)$?

(1) $f^{-1}(x)=-2-\frac{x}{6}$

(2) $f^{-1}(x)=2-\frac{x}{6}$

(3) $f^{-1}(x)=\frac{1}{-6(x-2)}$

(4) $f^{-1}(x)=6(x+2)$

$x=-6(y-2)$

$\frac{x}{-6}=y-2$

$+2 \quad +2$

$\frac{x}{-6}+2=y$

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10.

When factored completely, $m^5 + m^3 - 6m$ is equivalent to

(1) $(m + 3)(m - 2)$
(2) $(m^3 + 3m)(m^2 - 2)$
(3) $m(m^4 + m^2 - 6)$
(4) $m(m^2 + 3)(m^2 - 2)$

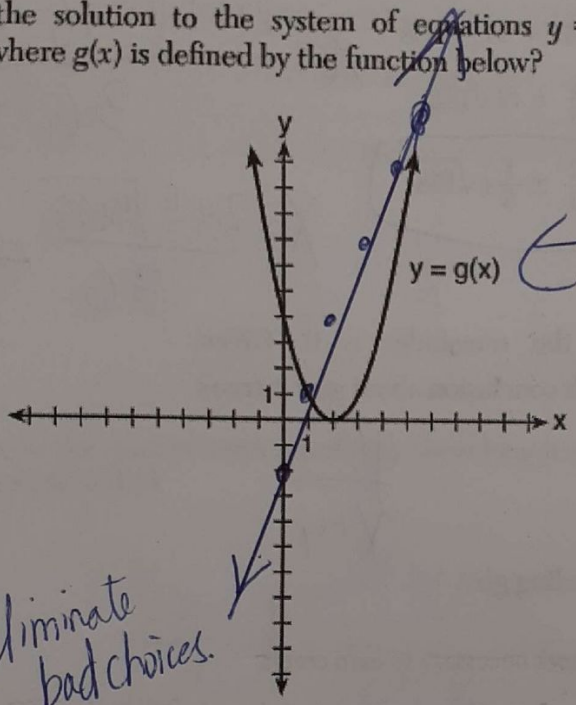
① GCF

$m(m^4+m^2-6)$

$m(m^2+3)(m^2-2)$

11.

What is the solution to the system of equations $y = 3x - 2$ and $y = g(x)$ where $g(x)$ is defined by the function below?



Clearly there are 2 pts of intersection.

eliminate bad choices.

(1) $\{(0,-2)\}$
(2) $\{(0,-2),(1,6)\}$
(3) $\{(1,6)\}$
(4) $\{(1,1),(6,16)\}$

12.

The expression $\left(\frac{m^2}{m^{\frac{1}{3}}}\right)^{-\frac{1}{2}}$ is equivalent to

$m^a d^s p^m$

(1) $-\sqrt[6]{m^5}$
(2) $\frac{1}{\sqrt[6]{m^5}}$
(3) $-m\sqrt[5]{m}$
(4) $\frac{1}{m\sqrt[5]{m}}$

$\frac{m^{-1}}{m^{-\frac{1}{6}}} = m^{-1-\left(-\frac{1}{6}\right)} = m^{-\frac{6}{6}+\frac{1}{6}} = m^{-\frac{5}{6}}$ P/R

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13.

If $p(x) = ab^x$ and $r(x) = cd^x$, then $p(x) \bullet r(x)$ equals

(1) $ac(b + d)^x$

(2) $ac(b + d)^{2x}$

(3) $ac(bd)^x$

(4) $ac(bd)^{x^2}$

$ab^x \cdot cd^x$

14.

The solution to the equation $18x^2 - 24x + 87 = 0$ is

(1) $-\frac{2}{3} \pm 6i\sqrt{158}$

(2) $-\frac{2}{3} \pm \frac{1}{6}i\sqrt{158}$

(3) $\frac{2}{3} \pm 6i\sqrt{158}$

(4) $\frac{2}{3} \pm \frac{1}{6}i\sqrt{158}$

$x = \frac{24 \pm \sqrt{576 - 4 \cdot 18 \cdot 87}}{36}$

$x = \frac{24 \pm \sqrt{5688}}{36} = \frac{2}{3} \pm \frac{6i\sqrt{158}}{36}$

15.

When $g(x)$ is divided by $x + 4$, the remainder is 0. Given $g(x) = x^4 + 3x^3 - 6x^2 - 6x + 8$, which conclusion about $g(x)$ is true?

(1) $g(4) = 0$

(2) $g(-4) = 0$

(3) $x - 4$ is a factor of $g(x)$.

(4) No conclusion can be made regarding $g(x)$.

$\frac{g(x)}{x+4}$

For each statement or question, show all work necessary to earn credit.

1.

Elizabeth tried to find the product of $(2 + 4i)$ and $(3 - i)$, and her work is shown below.

$$\begin{aligned}
&(2 + 4i)(3 - i) \\
&= 6 - 2i + 12i - 4i^2 \\
&= 6 + 10i - 4i^2 \\
&= 6 + 10i - 4(1) \\
&= 6 + 10i - 4 \\
&= 2 + 10i
\end{aligned}$$

no $i^2 = -1$

Identify the error in the process shown and determine the correct product of $(2 + 4i)$ and $(3 - i)$.

$= 6 + 10i - 4(-1)$

$6 + 10i + 4 =$ $10 + 10i$

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2.

A formula for work problems involving two people is shown below.

$$\frac{1}{t_1}+\frac{1}{t_2}=\frac{1}{t_b}$$

t_1 = the time taken by the first person to complete the job
t_2 = the time taken by the second person to complete the job
t_b = the time it takes for them working together to complete the job

Fred and Barney are carpenters who build the same model desk. It takes Fred eight hours to build the desk while it only takes Barney six hours. Write an equation that can be used to find the time it would take both carpenters working together to build a desk.

$$\frac{1}{8}+\frac{1}{6}=\frac{1}{x}$$

Determine, to the *nearest tenth of an hour*, how long it would take Fred and Barney working together to build a desk.

$$\frac{3x}{24x}+\frac{4x}{24x}=\frac{24}{24x}$$

$$7x=24 \qquad \boxed{x=3.4}$$

3.

Explain why $81^{\frac{3}{4}}$ equals 27.

$81^{\frac{3}{4}}$ ($\frac{3}{4}$ = Power / Root) $= \sqrt[4]{81}^{3} = 3^3 = 3\cdot3\cdot3 = \boxed{27}$

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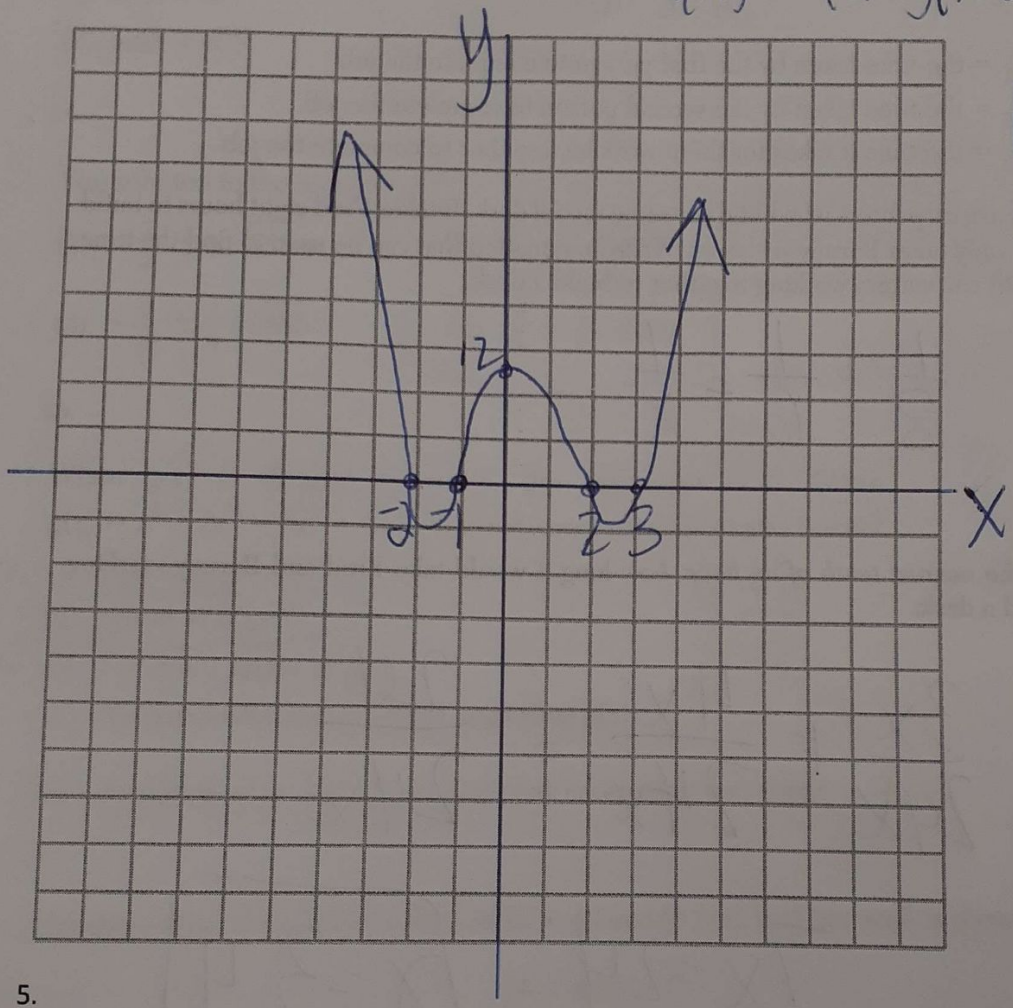
4.

The zeros of a quartic polynomial function h are -1, ± 2, and 3.

Sketch a graph of $y = h(x)$ on the grid below. $h(x) = (x+1)(x+2)(x-2)(x-3)$



y int (0, 12)

5.

Given: $f(x) = 2x^2 + x - 3$ and $g(x) = x - 1$

Express $f(x) \bullet g(x) - [f(x) + g(x)]$ as a polynomial in standard form.

$(2x^2+x-3)(x-1) - [2x^2+x-3+x-1]$

$2x^3-2x^2+x^2-1x-3x+3-2x^2-2x+4$

$\boxed{2x^3-3x^2-6x+7}$

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$i^2 = -1$

6.

Express $(1 - i)^3$ in $a + bi$ form.

$(1-i)(1-i)(1-i)$

$(1-2i+i^2)(1-i)$

$-2i(1-i) =$ $-2i+2i^2$

$-2i+2(-1)$

$-2-2i$

7.

Given the equal terms $\sqrt[3]{x^5}$ and $y^{\frac{5}{6}}$, determine and state y, in terms of x.

$(x^{5/3})^{6/5} = (y^{5/6})^{6/5}$

$x^{30/2} = x^2 = y$

8.

Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 10x^2 + 11x - 7 = (x - 4)(2x^2 + hx + 3) + k$$

$k = 5$ $h = -2$