

# Algebra 2 2019 Semester 1 Final Exam Study Guide

## Topic 1

<p>Use the function below to find the <math>f(6)</math> term</p> $f(n)=3n+2 \quad f(6) = 3(6) + 2 = 20$ $f(n)=2n-8 \quad f(6) = 2(6) - 8 = 4$ $f(n)=-6n+5 \quad f(6) = -6(6) + 5 = -31$ $f(n)=3^n \quad f(6) = 3^6 = 729$	<p>Use the recursive formulas below to write the sequences and find the 6<sup>th</sup> term</p> $a_1=5, a_n=a_{n-1}+8$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>5</td><td>13</td><td>21</td><td>29</td><td>37</td><td>45</td></tr> </table> $a_1=55, a_n=a_{n-1}-9$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>55</td><td>46</td><td>37</td><td>28</td><td>19</td><td>10</td></tr> </table> $a_1=2, a_n=3a_{n-1}$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>2</td><td>6</td><td>18</td><td>54</td><td>162</td><td>486</td></tr> </table> <p>a<sub>1</sub>=5, a<sub>n</sub>=a<sub>n-1</sub>+8 same as above</p>	1	2	3	4	5	6	5	13	21	29	37	45	1	2	3	4	5	6	55	46	37	28	19	10	1	2	3	4	5	6	2	6	18	54	162	486
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2	6	18	54	162	486																																
<p>Jamal is planning the seating for the new auditorium. He drew 15 seats for the first row, and is planning on each following row to have 3 more seats. Write a function that can be used to solve for the number of seats Jamal will have in the <math>n^{\text{th}}</math> row.</p> <p>Write a recursive rule that would show how many seats would be in the <math>n^{\text{th}}</math> row.</p> $a_1=15 \quad a_n=a_{n-1}+3$ <p>How many seats are in row 10?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr> <tr><td>15</td><td>18</td><td>21</td><td>24</td><td>27</td><td>30</td><td>33</td><td>36</td><td>39</td><td>42</td></tr> </table> <p>How many seats are there in the first 10 rows?</p> <p>285</p>	1	2	3	4	5	6	7	8	9	10	15	18	21	24	27	30	33	36	39	42	<p>Jenny is collecting leaves for her science project. She collects 2 leaves on the first day, and plans on tripling that number on day two. If she continues that pattern, how many leaves will she collect on day 8?</p> <p>How many leaves would she have collected total on day 8?</p> <p>4, 12, 36, 108, 324, 972, 2916, 8748, 26244, 78732, 236196, 708588, 2125764, 6377292, 19131876, 57395628, 172186884, 516560652, 1549681956, 4649045868, 13947137604, 41841412812, 125524238436, 376572715218, 1129718145654, 3409154436962, 10227463310886, 30682389932658, 92047169797974, 276141509393922, 828424528181766, 2485273584545298, 7455820753635894, 22367462260917682, 67102386782753046, 201307159348259138, 603921478044777414, 1811764434134332242, 5435293282382996726, 16305880847148990178, 48917642541446970534, 146752927624340911602, 439258782872822734806, 1317776348618468204418, 3953329045855394613254, 11859987136566183839732, 35579961409698551519206, 106739884229095654557618, 320219652687286963672854, 960658958061856941218562, 2902076874185570823655666, 8706230622556712461966998, 26118691867670137385905944, 78356075592910312157717832, 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## Topic 2: Inverses

- 1) a) What kind of function is the inverse of an exponential function?

logarithmic

- b) Write the domain and range of both an exponential function and its inverse.

Exponential

d: all real numbers

c: all real #'s  $> 0$

logarithmic

d: all real #'s  $> 0$

r: all real numbers

- 2)

Write the equation of the inverse of the following functions:

a)  $y = 4^x$

$$y = \log_4 x$$

b)  $y = 10^x$

$$y = \log_{10} x$$

c)  $y = 25^x$

$$y = \log_{25} x$$

d)  $y = b^x$

$$y = \log_b x$$

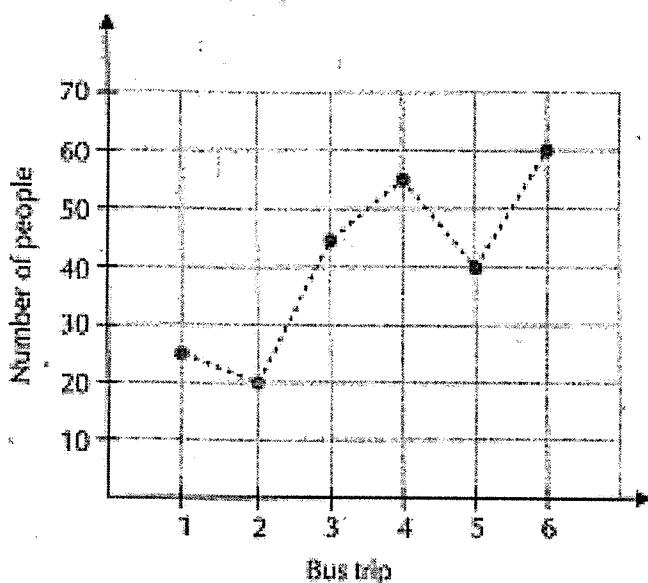
- 3)

Write the inverse for the given table.

Number of Students	2	3	4	6	8
Number of Cookies	12	8	6	4	3
	12	8	6	4	3
	2	3	4	6	8

- 5)

Graph the inverse.



- 4)

Find the error.

Alyssa says that the inverse of  $b = 5t - 2$  is  $5b + 2 = t$  because you switch the variables and do the opposite math.

$$t = 5b - 2$$

$$+2 \quad +2$$

$$\frac{t+2}{5} = b$$

Original

1, 25

2, 20

3, 45

4, 55

5, 40

6, 60

Inverse

25, 1

70, 2

95, 3

55, 4

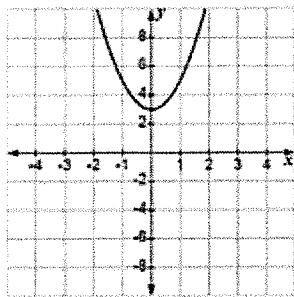
40, 5

60, 6

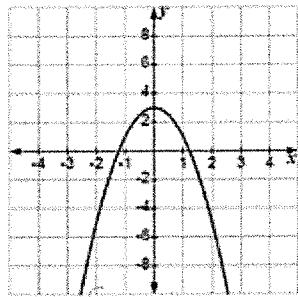
### Topic 3

$$y = a(x-h)^2 + k$$

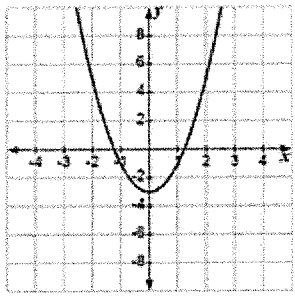
1) Identify whether the  $a$  and  $k$  values are positive or negative for the following graphs.



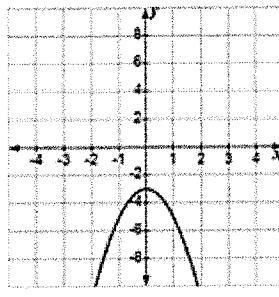
$a = \text{pos}$   
 $k = \text{pos}$



$a = \text{neg}$   
 $k = \text{pos}$

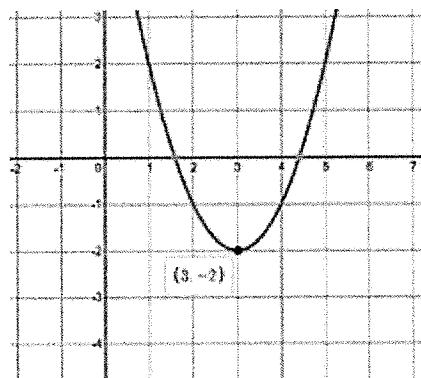


$a = \text{pos}$   
 $k = \text{neg}$

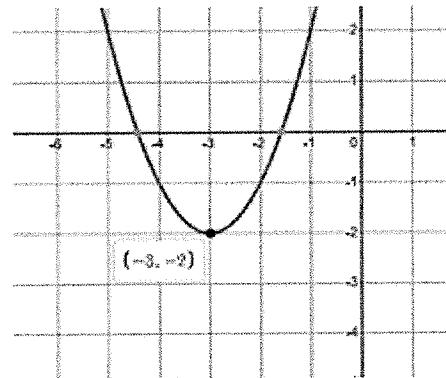


$a = \text{neg}$   
 $k = \text{neg}$

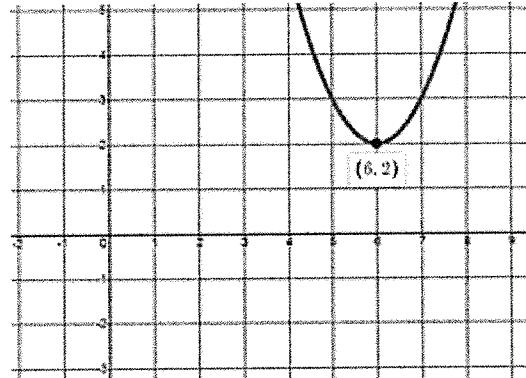
2) Create a function that best fits each graph shown.



$a = \text{pos}$   
 $k = \text{neg}$



$a = \text{pos}$   
 $k = \text{neg}$



$a = \text{pos}$   
 $k = \text{pos}$

3) Describe the transformations to the function  $f(x)$  to get  $g(x) = \frac{1}{2}f(x-2) + 3$

- vertical shrink by factor of  $\frac{1}{2}$
- horizontal shift to the right 2
- vertical shift up 3

4) Describe the transformations to the function  $f(x)$  to get  $g(x) = 2f(x+5) - 7$

- vertical stretch by factor of 2
- horizontal shift to the left 5
- vertical shift down 7

5) Describe the transformations to the function  $f(x)$  to get  $g(x) = -3f(x-6) - 4$

- vertical stretch by factor of 3 + flip over x-axis
- horizontal shift to the right 6
- vertical shift down 4

6) What happens to the function  $f(x) = a(x-h)^2 + k$ , if the value of  $a$  is changed from 2 to  $-\frac{1}{4}$ ?

vertical shrink by factor of  $\frac{1}{4}$  + flips over x-axis

7) What do the  $a$ ,  $h$ , and  $k$  values do to the function  $f(x) = a(x-h)^2 + k$ ?

$a$ : vertical stretch/shrink,  $+ = \text{up}$ ,  $- = \text{down}$

$h$ : horizontal shift, left or right

$k$ : vertical shift, up or down

## Topic 4: Introduction to Polynomial Functions

Directions: Simplify the following by performing the indicated math operation.

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

$$2x^2 + 10x - 3x - 15 =$$

$$2x^2 + 7x - 15$$

$$4) 5x^2(x^2 + 6x - 2)$$

$$5x^4 + 30x^3 - 10x^2$$

$$7) (x - 3)(2x^2 + 4x - 5)$$

$$2x^3 + 4x^2 - 2x - 15 =$$

$$2x^3 - 2x^2 - 12x + 15 =$$

$$10) (2x + 1)(x^2 - 3x + 2)$$

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

$$2x^3 - 5x^2 + x + 2 =$$

$$13) 3x(2x + 4)(x - 5)$$

$$3x(2x^2 - 10x^2 + 20) =$$

$$6x^3 - 18x^2 + 60x$$

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

$$5x^2 + 3x + 2$$

$$5) (6x^3 - 4x^2 + 5x) + (2x^3 + 3x^2 - 7x)$$

$$8x^3 - x^2 - 2x$$

$$8) (4x^4 - 3x^2 + 5) + (2x^3 - 6x^2)$$

$$4x^4 + 2x^3 - 9x^2 + 5$$

$$11) (8x^2 + 3) + (5x^3 - 6x^2 + 2)$$

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

$$14) (6x^3 - 2x + 6) + (3x^2 - 6x + 4)$$

$$9x^3 + 3x^2 - 3x + 10$$

$$3) (5x^3 + 3x^2 - 3x) - (4x^2 - 6x)$$

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

$$6) (3x^3 - 2x^2 + 6) - (5x^3 + 5x^2 + 7x)$$

$$-2x^3 - 7x^2 - 7x + 6$$

$$9) (4x^2 + 2x) - (-5x^2 + 6x - 3)$$

$$9x^2 - 4x + 3$$

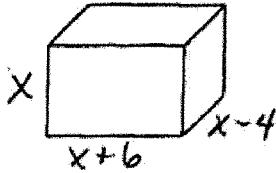
$$12) (2x^3 - 5x + 2) - (x^3 + 6x + 4)$$

$$x^3 - 11x - 2$$

$$15) (4x^4 - 2x - 6) - (3x^3 - 4x^2 - 3x + 2)$$

$$4x^4 + 3x^3 + 4x^2 + x - 8$$

Directions: Find the volume of the following..  $V = l \cdot w \cdot h$

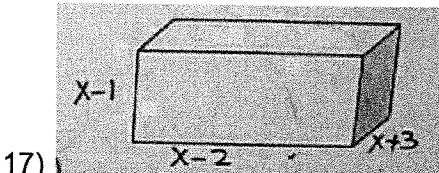


16)

$$V = x(x+6)(x-4)$$

$$V = x(x^2 + 2x - 24)$$

$$\boxed{V = x^3 + 2x^2 - 24x}$$



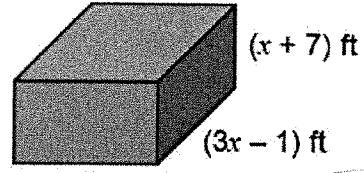
17)

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

$$V = (x-1)(x^2 + x - 6)$$

$$V = x^3 + x^2 - 6x - x^2 - x + 6$$

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



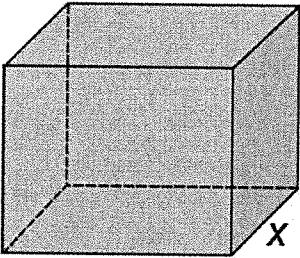
18)

$$(2x+3) \text{ ft}$$

$$V = (2x+3)(3x-1)(x+3) = (2x+3)(3x^2 + 20x - 3)$$

$$V = 10x^3 + 14x^2 - 14x + 9x^2 + 21x - 21$$

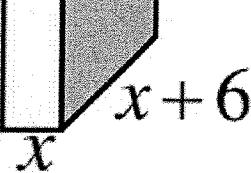
$$\boxed{V = 6x^3 + 49x^2 + 410x - 21}$$



$$2x + 1$$

21)

$$x+3$$

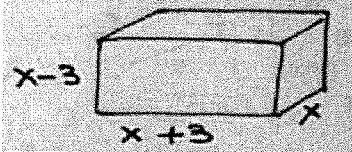


$$V = x(x+3)(x+6)$$

$$V = x(x^2 + 9x + 18)$$

$$\boxed{V = x^3 + 9x^2 + 18x}$$

19)



20)

$$V = x(x+3)(x-3)$$

$$V = x(x^2 - 9)$$

$$\boxed{V = x^3 - 9x}$$

$$V = x(2x+1)(x+2) = x(2x^2 + 5x + 3)$$

$$\boxed{V = 2x^3 + 5x^2 + 3x}$$

$$V = x(2x^2 + 5x + 3)$$

$$V = x(x^2 + 5x + 3)$$

$$\boxed{V = x^3 + 5x^2 + 3x}$$

$$22) 3x^4 + 2x^2 - 5$$

$$\text{LCOE: } 3$$

$$\text{Degree: } 4$$

$$\text{Constant: } -5$$

$$25) 6x - 3x^3 + 4x^5 - 2x^3$$

$$\text{LCOE: } 4$$

$$\text{Degree: } 5$$

$$\text{Constant: } 0$$

$$23) 2x - 4x^2 + 8 + 3x^3$$

$$\text{LCOE: } 3$$

$$\text{Degree: } 3$$

$$\text{Constant: } 8$$

$$26) 4x - 8 + 3x^3 - 2x$$

$$\text{LCOE: } 3$$

$$\text{Degree: } 3$$

$$\text{Constant: } -8$$

$$24) 3x + 5x^2 - 2 + 4x - 7x^2$$

$$\text{LCOE: } -2$$

$$\text{Degree: } 2$$

$$\text{Constant: } -2$$

$$27) 6x^3 + 4x^2 - 8x + 2$$

$$\text{LCOE: } 4$$

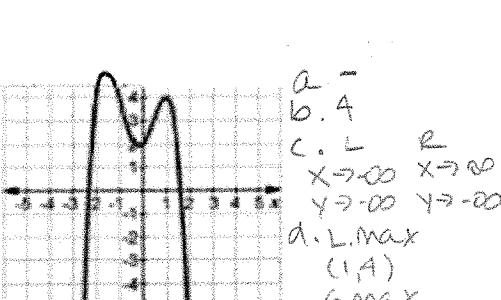
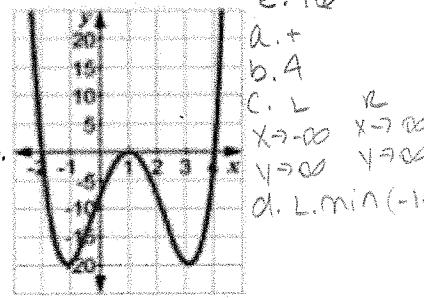
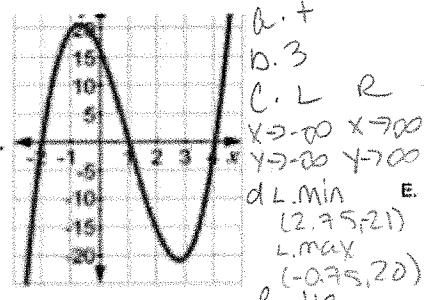
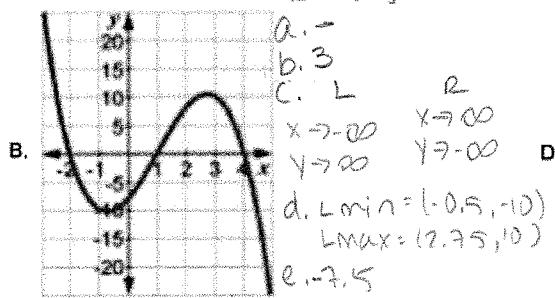
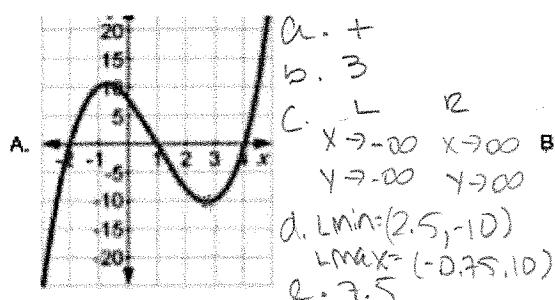
$$\text{Degree: } 3$$

$$\text{Constant: } 2$$

## Topic 5: Analyzing Polynomial Functions

Directions: For each of the following, answer the following

- Positive or Negative Leading Coefficient
- Degree
- End Behavior
- Local and/or Global Maximums or Minimums (on graphs only)
- Constant

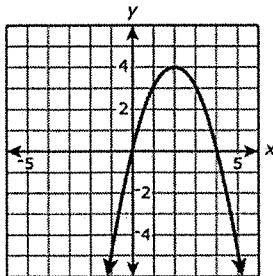


F)  $3x^4 - 4x^2 + 6$   
 a. + C. L R e. 6  
 b. 4 X>0 X>0  
 c. L R X>0 X>0  
 d. 2 Y>-20 Y>-20  
 e.  $5x^4 - 2x^2 + 7$   $-2x^2 + 5x + 7$   
 f. - C. L R e. 7  
 g. 2 X>0 X>0  
 h. 2 Y>-20 Y>-20

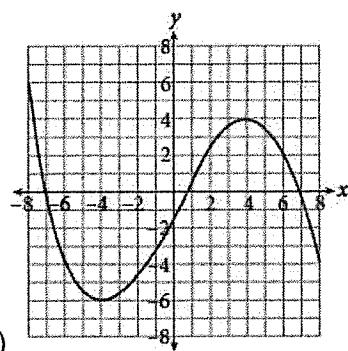
G)  $-6x^5 + 4x^3 + 4x^2$   
 a. - C. L R e. 0  
 b. 5 X>-20 X>0  
 c. L R X>0 X>0  
 d. 2 Y>-20 Y>-20  
 e.  $3x^2 + 2x^5 - 3x^3$   $2x^5 - 3x^3 + 3x^2$   
 f. + C. L R e. 0  
 g. 2 X>0 X>0  
 h. 2 Y>-20 Y>-20

H)  $4x^3 - 5x^2 + 6x - 2$  e. -2  
 a. + C. L e. 0  
 b. 3 X>0 X>0  
 c. L R X>0 X>0  
 d. 2 Y>-20 Y>-20  
 e.  $3 - 5x^6 - 4x^2 + 5x - 5x^6 - 4x^2 + 5x$   
 f. - C. L R e. 0  
 g. 6 X>0 X>0  
 h. 6 Y>-20 Y>-20

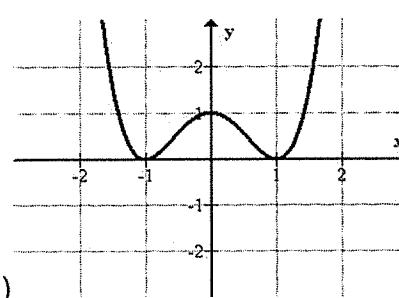
Directions: For the following graphs, identify the increasing/ decreasing intervals.



inc  $(-\infty, 0)$   
dec  $(0, \infty)$



inc  $(-4, 4)$   
dec  $(-\infty, -4) \cup (4, \infty)$



inc  $(-1, 0) \cup (1, \infty)$   
dec  $(-\infty, -1) \cup (0, 1)$

## Topic 6: Polynomial Equations

Directions: Solve the following equations.

$$1) (x+10)(x-7)=0$$

$$\begin{array}{l} x+10=0 \\ x=-10 \end{array}$$

$$\begin{array}{l} x-7=0 \\ x=7 \end{array}$$

$$2) x(x+9)(x+6)(x+1)=0$$

$$\begin{array}{l} x=0 \\ x=-9 \\ x=-6 \\ x=-1 \end{array}$$

$$3) x(7x+3)(5x-2)=0$$

$$\begin{array}{l} x=0 \\ 7x+3=0 \\ x=-\frac{3}{7} \end{array}$$

$$\begin{array}{l} 5x-2=0 \\ x=\frac{2}{5} \end{array}$$

$$4) (x+3)(x-2)=0$$

$$\begin{array}{l} x=-3 \\ x=2 \end{array}$$

$$5) x(x+4)(x-1)(x-2)(x+5)=0$$

$$\begin{array}{l} x=0 \\ x=-4 \\ x=1 \\ x=2 \\ x=-5 \end{array}$$

$$6) (5x-15)(2x+3)=0$$

$$\begin{array}{l} 5x-15=0 \\ 5x=15 \end{array}$$

$$\begin{array}{l} 2x+3=0 \\ x=-\frac{3}{2} \end{array}$$

Directions: Simplify each radical.

$$\sqrt{-1 \cdot 36 \cdot 2}$$

$$7) \sqrt{-4}$$

$$\sqrt{-1 \cdot 4} = \sqrt{1^2 \cdot 4} = 2i$$

$$8) \sqrt{-72}$$

$$6i\sqrt{2}$$

$$\sqrt{-1 \cdot 16 \cdot 3}$$

$$9) \sqrt{-48}$$

$$4i\sqrt{3}$$

$$\sqrt{-1 \cdot 25 \cdot 2}$$

$$10) \sqrt{-50}$$

$$5i\sqrt{2}$$

$$\sqrt{-1 \cdot 36}$$

$$11) \sqrt{-36}$$

$$6i$$

Directions: Use the quadratic formula to solve each of the following.

$$12) x^2 - x - 2 = 0$$

$$\begin{array}{l} a=1 \\ b=-1 \\ c=-2 \end{array}$$

$$x = \frac{1 \pm \sqrt{1+8}}{2}$$

$$\begin{array}{l} x=2 \\ x=-1 \end{array}$$

$$13) x^2 - 4x - 4 = 0$$

$$\begin{array}{l} a=1 \\ b=-4 \\ c=-4 \end{array}$$

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

$$\begin{array}{l} x=4 \pm \sqrt{16+16} \\ x=4 \pm \sqrt{32} \end{array}$$

$$\begin{array}{l} x=4 \pm \sqrt{16+16} \\ x=4 \pm 4\sqrt{2} \end{array}$$

$$14) -2x^2 - 2x - 1 = 0$$

$$\begin{array}{l} a=-2 \\ b=-2 \\ c=-1 \end{array}$$

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

$$\begin{array}{l} x=2 \pm \sqrt{4+8} \\ x=2 \pm \sqrt{12} \end{array}$$

$$15) 4x^2 - 5x + 1 = 0$$

$$\begin{array}{l} a=4 \\ b=-5 \\ c=1 \end{array}$$

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4(4)(1)}}{8}$$

$$\begin{array}{l} x=5 \pm \sqrt{25-16} \\ x=5 \pm \sqrt{9} \end{array}$$

$$16) 6x^2 - 8x - 2 = 0$$

$$\begin{array}{l} a=6 \\ b=-8 \\ c=-2 \end{array}$$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(6)(-2)}}{12}$$

$$\begin{array}{l} x=8 \pm \sqrt{64+48} \\ x=8 \pm \sqrt{112} \end{array}$$

$$17) 9x^2 - 9x + 5 = 0$$

$$\begin{array}{l} a=9 \\ b=-9 \\ c=5 \end{array}$$

$$x = \frac{9 \pm \sqrt{(-9)^2 - 4(9)(5)}}{18}$$

$$\begin{array}{l} x=9 \pm \sqrt{81-180} \\ x=9 \pm \sqrt{-99} \end{array}$$

$$18) (-7+7i) + (-3+4i)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$19) (-8+6i) - (6+i)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$20) (7-5i)(-4+6i)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$21) (2+2i)(-4-3i)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$22) (-2-i) + (2-4i)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$23) (8-6i) - (1-2i)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$24) (-5-2i) - (-7-2i)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$25) (-8-i)(-8-2i)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$26) (-7+5i) + (6+3i)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$27)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

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$$73)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$74)$$

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$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$80)$$

$$\begin{array}{l} x=9 \pm \sqrt{-99} \\ x=9 \pm 3i\sqrt{11} \end{array}$$

$$81)$$

## Topic 9 Review

1. Factor  $n^2 - 16n - 80$

$$(n-20)(n+4)$$

2. Factor  $4n^2 + 16n - 9$

$$\frac{-1}{2} \frac{-2}{9} \cancel{\frac{18}{16}} = \frac{9}{2}$$

$$(2x-1)(2x+9)$$

3. Simplify and state the asymptotes of  $\frac{n^2-2n-8}{8n+24} \div \frac{2n-8}{n^2+7n+12} = \frac{n^2-2n-8}{2(8n+24)} \cdot \frac{n^2+7n+12}{2n-8}$

$$1. n^2-2n-8$$

$$2. 8n+24$$

$$3. n^2+7n+12$$

$$4. 2n-8$$

$$5. (n-4)(n+2)$$

$$6. 8(n+3)$$

$$7. (n+3)(n+4)$$

$$8. 2(n-4)$$

$$9. (n+3)(n+2)$$

$$10. (n+3)(n+4)$$

$$11. 8(n-3)$$

$$12. 2(n-9)$$

$$\frac{8(n-3)}{(n+2)(n+4)} \cdot \frac{2(n-9)}{16}$$

no v.A.

4. Simplify and state the asymptotes of  $\frac{(n+13)(2n+9)}{(13n-2)(n+2)} \cdot \frac{(n+2)(2n-6)}{(n+13)(2n-6)}$

$$\frac{2n+9}{13n-2}$$

$$\frac{13n-2=0}{V.A. @ n = \frac{2}{13}}$$

5. What are the asymptotes of  $\frac{2n^2-9n-5}{3n^2-2n-33}$ ?

$$1. 2n^2-9n-5$$

$$2. 3n^2-2n-33$$

$$\frac{(2x+1)(x-5)}{(x+3)(3x-11)}$$

$$V.A. @ x=3 + x=\frac{11}{3}$$

$$(2x+1)(x-5)$$

$$(x+3)(3x-11)$$

6. Simplify and state the asymptotes of  $\frac{4x^2+8x-5}{(2x-1)(x-5)(x-1)}$

$$\frac{4x^2+8x-5}{-1 \frac{-2}{2} \frac{10}{9} \frac{5}{2}}$$

$$\frac{(2x-1)(2x+5)}{(2x-1)(x-5)(x-1)} = \frac{(2x+5)}{(x-5)(x-1)}$$

$$V.A. @ x=5 + x=1$$

$$(2x-1)(2x+5)$$

7. Simplify and state the asymptotes of  $\frac{x}{x+2} - \frac{3x-5}{x^2+3x+2}$

$$\begin{aligned} & \frac{x}{x+2} - \frac{3x-5}{(x+1)(x+2)} = \frac{x^2+x}{(x+1)(x+2)} - \frac{3x-5}{(x+1)(x+2)} = \frac{x^2-2x+5}{(x+1)(x+2)} \\ & V.A. @ x=-1 + x=-2 \end{aligned}$$

$$\begin{aligned} a &= 1 & x &= 2 \pm \sqrt{2^2 - 4(1)(5)} \\ b &= -2 & x &= 2 \pm \frac{2(1)}{2} \\ c &= 5 & x &= \frac{2 \pm \sqrt{4-40}}{2} \end{aligned}$$

8. Write your own rational expression with an asymptote at  $x = -\frac{3}{7}$ .

- no real x-intercepts  
- not factorable

$$\frac{x+1}{7x+3}$$

YOU can put anything in the numerator!

OR

$$\frac{1}{7x+3}$$

OR

$$\frac{x}{7x+3}$$

OR

$$\frac{7x^6+21x^5+x^3}{7x+3}$$

OR

$$\frac{\star}{7x+3}$$

SINCE  $7x+3=0$   $\frac{-3}{7} = -\frac{3}{7}$   $x = -\frac{3}{7}$

\* Don't forget to check for extraneous solutions \*

### Topic 11

$$(\sqrt{2x+8})^2 = -12$$

$$2x+8 = 144$$

$$\frac{2x}{2} = \frac{136}{2}$$

$$\sqrt{144} = -12$$

$$X = 68$$

$$\sqrt{2(68)+8} = -12$$

$$\sqrt{144} = -12$$

$$12 \neq -12$$

NO SOLUTION

$$\sqrt{2x-1} + 2 = -1$$

$$\sqrt{2x-1} = -3$$

a square root cannot equal a negative number, no solution

$$\sqrt{3x+8} = 2$$

$$(\sqrt{3x+8})^2 = (-2)^2$$

$$3x+8 = 4$$

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

$$\sqrt{3x} = -\frac{4}{3}$$

$$\sqrt{2x-6+4} = x$$

$$(\sqrt{2x-4})^2 = (x-4)^2$$

$$2x-4 = x^2-8x+16$$

$$\frac{2\sqrt{2x-1}}{2} = \frac{-6}{2}$$

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

$$2x-1 = 9$$

$$\frac{2x}{2} = \frac{10}{2}$$

$$X = 5$$

$$\sqrt{2(12)+8} = 2$$

$$\sqrt{3(12)} = 2$$

$$3x = 3(4)$$

$$\frac{3x}{3} = \frac{12}{3}$$

$$\sqrt{36} = -4$$

$$6 \neq -4$$

NO SOLUTION

$$(\sqrt{3x+1})^2 = (x-1)^2$$

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

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

$$-x^2+5x = 0$$

$$x(-x+5) = 0$$

$$x = 0$$

$$-x+5 = 0$$

$$-x = -5$$

$$x = 5$$

$$\sqrt{3(5)+1} = 5$$

$$9 = 9 \checkmark$$

$$\sqrt{x-1} + 4 = x-3$$

$$(\sqrt{x-1})^2 = (x-7)^2$$

$$x-1 = x^2-14x+49$$

$$-x^2+15x-50 = 0$$

$$3\sqrt{5-4x} = 3x$$

$$(\sqrt{5-4x})^2 = (x)^2$$

$$5-4x = x^2$$

$$-x^2-4x+5 = 0$$

$$-x+5 = 0$$

$$-x = -5$$

$$x = 5$$

$$\sqrt{5-4(1)} = 3(1)$$

$$3\sqrt{1} = 3$$

$$3 = 3 \checkmark$$

$$\sqrt{5-4(-5)} = 3(-5)$$

$$3\sqrt{25} = -15$$

$$15 \neq -15$$

$$2\sqrt{2(5)-1} = -6$$

$$2\sqrt{10-1} = -6$$

$$2\sqrt{9} = -6$$

$$2(3) = -6$$

$$6 \neq -6$$

no solution

I know this is messy, you can double check in a graph.