RISING GRADE 11 SUMMER PACKET

DUE ON THE FIRST DAY OF SCHOOL

The problems in this packet are designed to help you review topics from previous mathematics courses that are essential to your success in your next math class. **You are expected to bring this completed packet to class on the first day of school.** In addition, this packet will count as part of your first quarter grade. **Upon returning, you will be ASSESSED on the content of this packet**. All contents outlined in the packet are Integrated Algebra II objectives. Neatly **SHOW YOUR WORK** on a separate sheet of paper.

---

2 Determine whether or not each pair of polynomials has been added or subtracted correctly.

Polynomials	Correct	Incorrect
$(5x-5+5x^2)-(3x^2+2x)=2x^2+6x-6$	○	○
$(4x^2+6x)+(2x^2-8x)=6x^2-2x$	○	○
$(2x^2-14x+3)+(6x-9)=2x^2+8x-6$	○	○
$(3x^2-7)-(10x^2-1)=-7x^2-6$	○	○

---

3 What is the product of the polynomials $4-a$ and $a^2+7a-18$?

(A) $a^3-3a^2+10a-72$

(B) $a^3+3a^2-46a+72$

(C) $-a^3-3a^2+46a-14$

(D) $-a^3-3a^2+46a-72$

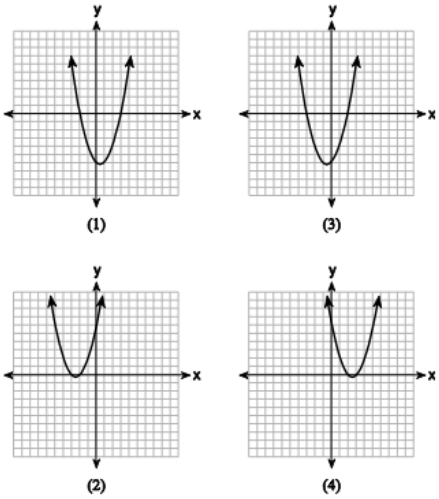
---

4 For the polynomials in the first column, determine the degree of each polynomial and tick the correct option.

Polynomial	6	4	3
$8s^4-6s^6+s^3$	○	○	○
$12s^4+24s^2+s$	○	○	○
$s+2s^3+5s^4$	○	○	○
$s+7s^4+5s^6$	○	○	○
$s+2s^3$	○	○	○

---

6 The graphs below represent functions defined by polynomials. For which function are the zeros of the polynomials 2 and –3?



---

7 Indicate ALL of the following polynomials that are NOT in standard form.

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

B $6 - 2x^2$

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

D 10

---

8 Factor the following polynomial expression completely: $x^3 - 2x^2 + 9x - 18$

A (x-3)(x+3)(x-2)

B (x-2)(x+2)(x+3)

C (x+3)(x+3)(x-2)

D $(x^2+9)(x-2)$

---

10 Factor the polynomial expression completely: $8x^3 - 27$

A (4x - 3)(4x + 3)

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

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

D $(2x - 3)(4x^2 - 6x - 9)$

---

11 Factoring the following polynomial expression completely: $2x^3 + x^2 - 8x - 4$

---

12 Subtract the two polynomials:
$(3x^5 - 2x^4 - 5) - (2x^4 + x^2 - 10)$

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

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

(C) $3x^5 - 4x^4 + x^2 - 15$

(D) $3x^4 + x^2 + 15$

---

13 Add the polynomials $(9x^3 + 5x^2 + 11x) + (-2x^3 - 8x^2 + 9x)$

---

14 Add the polynomials $(-4x^4 + 3x^2 + 14) + (-3x^4 - 14x^2 - 8)$

---

15 Multiply the polynomials: $(x^2 - 7x - 6)(7x^2 - 3x - 7)$

---

16 Subtract the two polynomials. Write your answer in standard form.

$5x(3x^5 - 2x^4 - 5) - 3(2x^4 + x^2 - 10)$

---

17 Write the polynomial in standard form.

(a) $8x - 6x^2 - 3x^3$

(b) Identify the leading coefficient of the polynomial.

(c) Identify the degree of the polynomial.

18 Write the polynomial in standard form.

(a) $8x - 6x^2 - 3x^3$

(b) Identify the leading coefficient of the polynomial.

---

19 After simplifying, what is the leading coefficient of the polynomial?

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

---

20 Put the following polynomial into standard form:

$11 + 7x - 14x^2 + x^5$

---

21 **Input the correct values into the quadratic formula below:**

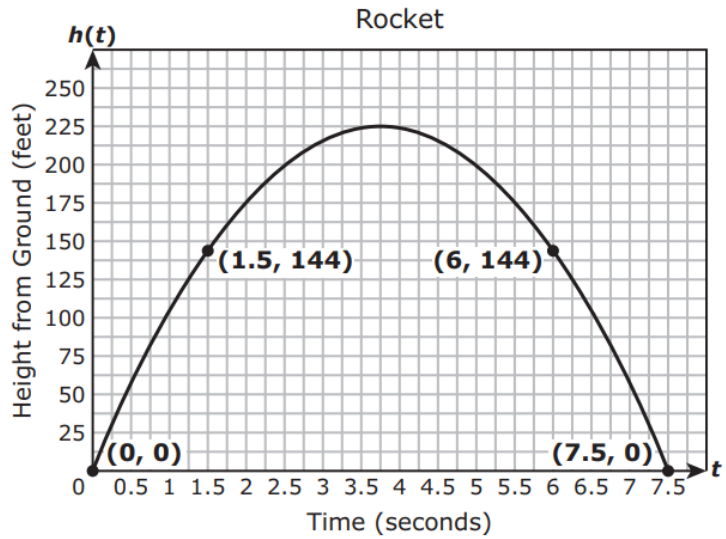
$x^2 - 4x - 8 = 0$

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

$$\frac{-\square \pm \sqrt{\square^2 - 4\square\square}}{2\square}$$

---

22 Quadratic function h can be used to model the height in feet of a rocket from the ground t seconds after it was launched. The graph of the function is shown.



What is the maximum value of the graph of the function?

23 Solve the quadratic equation below for the exact values of x.

$$4x^2 - 5 = 75$$

24 Solve using the quadratic formula $2x^2 + 3x - 20 = 0$

25 Factor completely:

$3x^2 + 20x + 25$

26 A ball is thrown into the air with an initial velocity of 15 meters per second. The quadratic function $h(t) = -3.2t^2 + 10x + 2$ represents the height of the ball above the ground, in meters with respect to time, *t*, in seconds.

(a) Determine $h(2)$?

(b) Based on the situation, which values below would a reasonable input for the function.

Select all that apply.

A -2

B 0

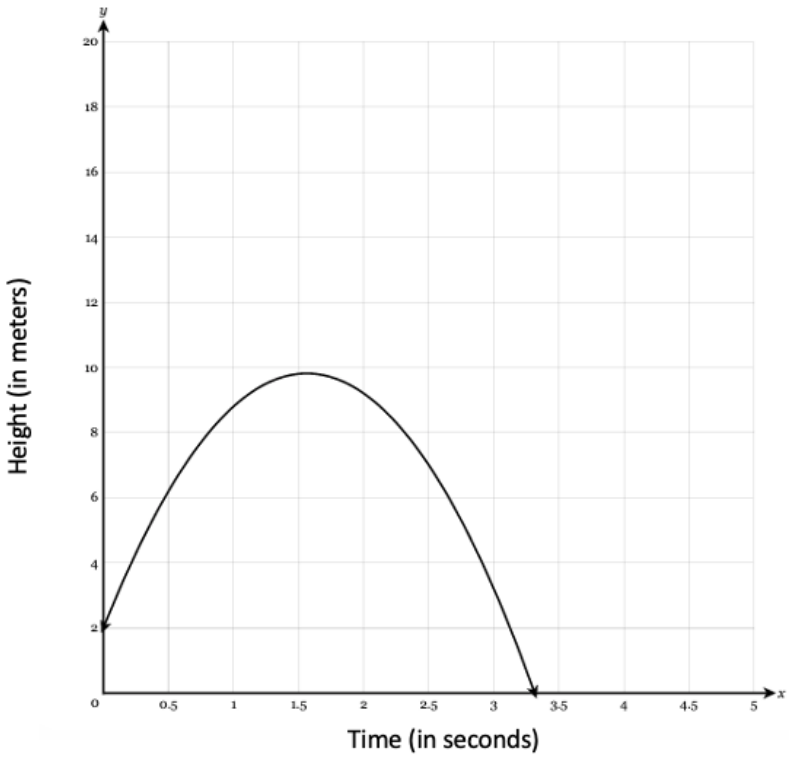
C 3.75

D 7

E 2

F -3

(c) The graph below represents the height of the ball with respect to time.



What is a reasonable domain for the function?

(A) $2 < x < 10$

(B) $0 \leq x \leq 3.45$

(C) $2 \leq x \leq 4$

(D) $0 < x \leq 3.45$

---

27 Solve the inequality algebraically.
Report the solution in interval notation.

$x^2 - 7x > -12$

---

28 Solve the quadratic equation below for the exact values of x.

$$4x^2 - 5 = 75$$

---

29 Use the method of completing the square to determine the exact values of x for the equation $x^2 - 8x + 6 = 0$.

---

30 Solve the following equation by completing the square:

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

---

31 Madison bought b pounds of bananas and p pounds of pears and spent a total of $\$10.38$. The price of bananas is $\$0.60$ per pound. The price of pears is $\$1.74$ per pound.

Create an equation that models the total amount of money that Madison spends on fruit.

---

32 Solve $5x^2 = 180$ algebraically.

---

33 What is the positive solution to $2x^2 - 8x - 42 = 0$?

---

34 What is the greater solution to the equation:

$x^2 + 4x - 12 = 0$

---

35 Rowan is training to run in a race. He runs 15 miles in the first week, and each week following, he runs 3% more than the week before. Using a geometric series formula, find the total number of miles Rowan runs over the first ten weeks of training, rounded to the *nearest thousandth*.

---

36 Solve the inequality below:

$1.8 - 0.4y \geq 2.2 - 2y$

---

37 Use the imaginary number i to rewrite the given expression as a complex number. Simplify the answer and write it the form $a + ib$.
$-7 + \sqrt{-28}$

---

38 Write $-\frac{1}{2}i^3\left(\sqrt{-9} - 4\right) - 3i^2$ in simplest $a + bi$ form.

---

39 Simplify $xi(i - 7i)^2$, where i is the imaginary unit.

---

40 Algebraically determine the roots, in simplest $a + bi$ form, to the equation below.

$$x^2 - 2x + 7 = 4x - 10$$

(a)

(b) Consider the system of equations below.

$$y = x^2 - 2x + 7$$
$$y = 4x - 10$$

The graph of this system confirms the solution from part a is imaginary. Explain why.

41 What is the x-intercept of the line 6x − 3y = 24?

42 How do you simplify $\sqrt{-24}$ using the imaginary unit *i* ?

(A) 2i $\sqrt{6}$

(B) 2 $\sqrt{6i}$

(C) 4i $\sqrt{6}$

(D) None of the above

43 Use the imaginary number i to match the expressions given in the first column as a complex number. Simpify all radicals.

$\sqrt{-16}$	
$-\sqrt{-4}$	
$\sqrt{-4}$	
$-\sqrt{-9}$	

DRAG & DROP THE ANSWER

$-3i$

$2i$

$-2i$

$4i$

44 To find the conjugate of a complex number, change both the real and the imaginary number.

(A) True

(B) False

47 Consider the following quadratic equations given in the first column. Identify whether the roots of the given quadratic equations are imaginary or real.

Quadratic Equations	Imaginary roots	Real roots
$x^2 + 2x + 5 = 0$	☐	☐
$x^2 + 6x - 7 = 0$	☐	☐
$x^2 + 5x + 6 = 0$	☐	☐

48 Apply what you know about multiplying binomials and the imaginary number i to find each product. Write these products as a complex number in the form $a + bi$.

$(5 - 3i)(6 + 4i)$

51 Simplify $\sqrt{72}$

(A) $36\sqrt{2}$

(B) $6\sqrt{2}$

(C) $2\sqrt{36}$

(D) Doesn't simplify.

53 Convert to radical form:

$y^{2/5}$

54 **Directions - Solve the radical equation.**

$$\sqrt{3x + 12} = \sqrt{x + 8}$$

x =

57 Simplify $2\sqrt{5}\left(4\sqrt{2}+7\sqrt{3}\right)$

(A) $6\sqrt{7}+9\sqrt{8}$

(B) $8\sqrt{10}+14\sqrt{15}$

(C) $4\sqrt{20}-6\sqrt{35}$

(D) $10\sqrt{8}-10\sqrt{21}$

---

59 Simplify
$-\sqrt{2}+6\sqrt{5}-3\sqrt{5}$

(A) $3\sqrt{5}-\sqrt{2}$

(B) $2\sqrt{5}$

(C) $-\sqrt{2}+3$

(D) $\sqrt{2}-3\sqrt{5}$

---

60 **Directions - Solve each radical equation. <u>On your paper, show all work.</u>**

$-6+\sqrt{x+10}=2$

x = ____

---

61 Match each radical expression with the congruent exponential expression. Show each problem on paper to turn in.

Congruent Expressions	$2^{\frac{3}{4}}$	$2^{\frac{4}{3}}$	$3^{\frac{1}{2}}$	3^{2}	$4^{\frac{2}{3}}$	$4^{\frac{3}{2}}$
$A.\ \sqrt{4^3}$	○	○	○	○	○	○
$B.\ \sqrt{3^4}$	○	○	○	○	○	○
$C.\ \sqrt[3]{4^2}$	○	○	○	○	○	○
$D.\ \sqrt[3]{2^4}$	○	○	○	○	○	○
$E.\ \sqrt[4]{3^2}$	○	○	○	○	○	○
$F.\ \sqrt[4]{2^3}$	○	○	○	○	○	○

---

62 Convert to rational exponents:

$\sqrt[3]{x^4}$ = ____

---

63 Write $\sqrt[3]{8x^2}$ With rational exponents.

(A) $8x^{\frac{3}{2}}$

(B) $8^{\frac{2}{3}}x^{\frac{2}{3}}$

(C) $\frac{8}{3}x^{\frac{3}{2}}$

(D) $2x^{\frac{2}{3}}$

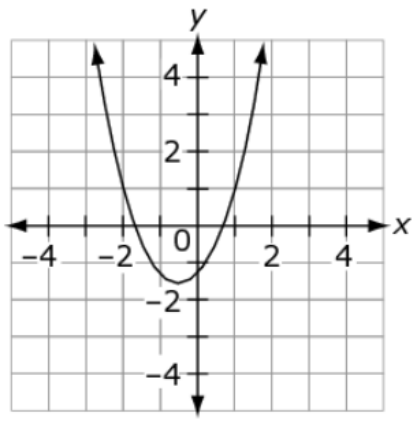
(E) None of the answer choices are correct.

65 A function is shown.

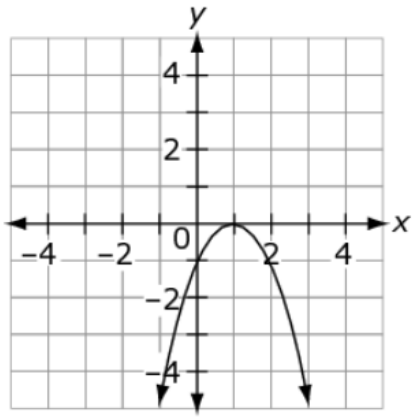
$f(x) = x^2 + 2x - 1$

Which graph represents the function?

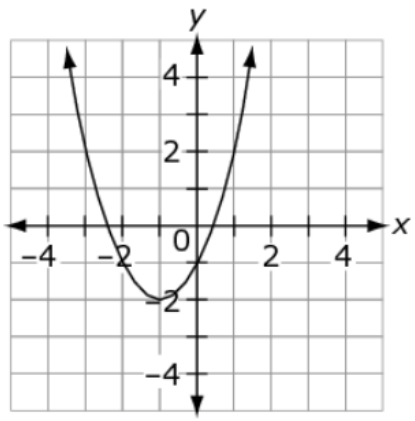
A



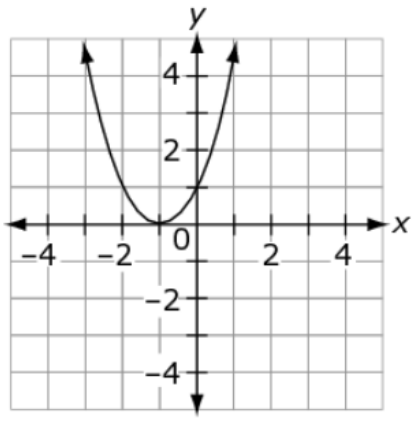
B



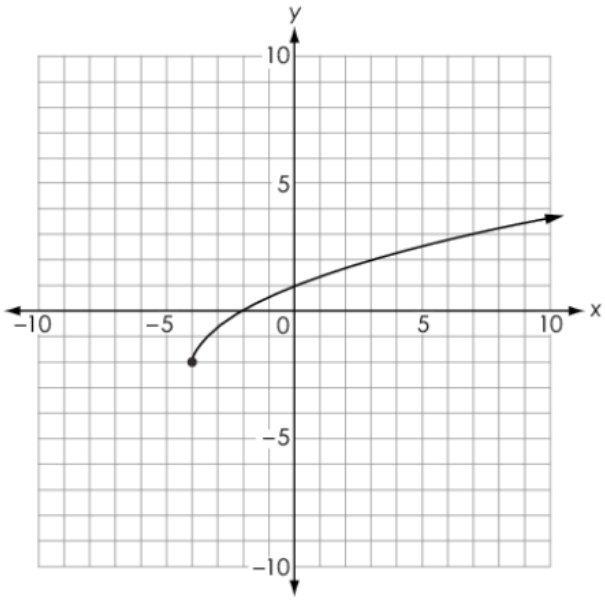
C



D



66 The graph of a function is shown.



What is the domain of the function?

(A) $x \geq -4$

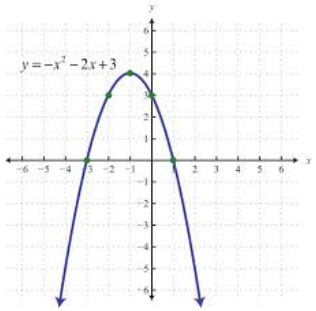
(B) $x \geq -2$

(C) $x \geq 0$

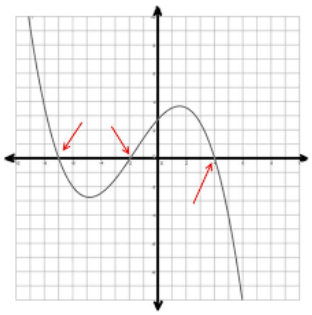
(D) $x \geq 1$

67 Which of these is a linear function?

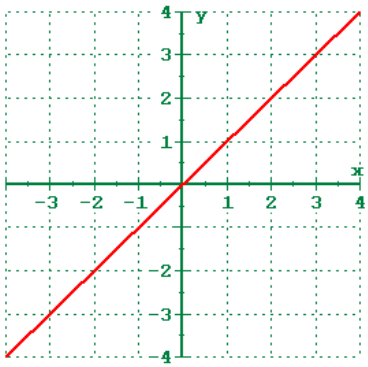
A



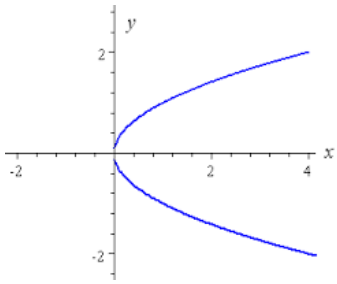
B



C



D



---

69 For the following quadratic functions, interpret the graphs of the functions and tick the correct option.

Quadratic function	Parabola will open upward direction	Parabola will open downward direction
$2x^2+16x+30$	○	○
$-x^2+10x-26$	○	○
$-4x^2+24x-16$	○	○
$7x^2$	○	○

70 Consider the following functions $f\left(x\right)$ given below in the first column. Match these functions with their corresponding inverse function $f^{-1}\left(x\right)$.

Functions	$f^{-1}\left(x\right)=\frac{x}{4}-3$	$f^{-1}\left(x\right)=\frac{x}{4}+3$	$f^{-1}\left(x\right)=-\frac{x}{4}-3$
$f\left(x\right)=-4x-12$	○	○	○
$f\left(x\right)=4x+12$	○	○	○
$f\left(x\right)=4x-12$	○	○	○

---

71 Given the following rational function, what is its horizontal asymptote?

$$f(x)=\frac{6}{2x+5}-8$$

(A) $x=8$

(B) $y=-8$

(C) $y=6$

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

---

72 Identify the vertical asymptote(s) for the equation.

$$y=\frac{x^2+7x+12}{x^2-4}$$

(A) $x=-4,\ -3$

(B) $x=2$

(C) $x=2,\ -2$

(D) $x=4,\ 3$

---

73 If f(x) and g(x) are inverse functions, then g(f(x)) = ?

(A) 0

(B) x

(C) x^2

(D) $\sqrt{x}$

---

74 Select *all* statements that correctly identify a pair of inverse functions.

A The function $k(x) = -\frac{\sqrt{x-6}}{3}$ is the inverse of the function $f(x) = 9x^2 + 6$ for all $x \geq 0$.

B The function $k(x) = \frac{\sqrt{x-9}}{4}$ is the inverse of the function $f(x) = 16x^2 + 9$ for all $x \geq 0$.

C The function $k(x) = \frac{1}{4}\sqrt{x}$ is the inverse of the function $f(x) = 16x^2$ for all $x \geq 0$.

D The function $k(x) = \sqrt{7x}$ is the inverse of the function $f(x) = 7x^2$ for all $x \geq 0$.

---

75 Match the function $f(x)$ in the first column with their respective inverse function $f^{-1}(x)$.

$f(x) = 5x + 10$	
$f(x) = 15x - 6$	
$f(x) = 15x + 10$	

DRAG & DROP THE ANSWER

$f^{-1}(x) = \frac{x}{15} + \frac{2}{5}$

$f^{-1}(x) = \frac{x}{15} - \frac{2}{3}$

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

---

76 Which of the following is the inverse function for $f(x) = \frac{x^2+1}{4}$, where $x \geq 0$?

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

B $f^{-1}(x) = \sqrt{4x} + 1$

C $f^{-1}(x) = \sqrt{4x-1}$

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

---

77 What is the inverse of the function $y = 4x + 5$?

A $x = \frac{1}{4}y - \frac{5}{4}$

B $y = \frac{1}{4}x - \frac{5}{4}$

C $y = 4x - 5$

D $y = \frac{1}{4x+5}$

---

78 Which type of function is the inverse of logarithms?

(A) Quadratic

(B) Square Root

(C) Exponential

(D) Logarithms

---

79 Match the ordered pairs of a one-to-one function $f(x)$ with the ordered pairs of the inverse of the function $f(x)$.

$(0, -1)$	
$(-4, 5)$	
$(1, 0)$	
$(-4, -5)$	
$(-1, 0)$	
$(-5, 4)$	

DRAG & DROP THE ANSWER

$(-5, -4)$

$(5, -4)$

$(0, 1)$

$(-1, 0)$

$(0, -1)$

$(4, -5)$

---

80 The table shown lists ordered pairs of a function, $y = f(x)$.

x	y
0	2
2	6
6	10
10	8
14	14

Which coordinate pair belongs to the inverse of the function shown in the table?

(A) $(-2, -6)$

(B) $(6, -10)$

(C) $(0, 2)$

(D) $(10, 6)$

---

81 Part A

If $f(x)$ is a one-to-one function with ordered pair $(-2, 5)$ then the ordered pair of the inverse of the function $f(x)$ is, ([ ] , [ ]).

Part B

If a function is one-to-one then the range of the function becomes the [a] of the inverse function.

a

- range
- domain

---

82 Consider the function $f(x) = 3x^2 + 4$ on the domain $[0, \infty]$.
What is the inverse of f(x)?

(A) $f^{-1}(x) = \sqrt{\frac{x-3}{4}}$

(B) $f^{-1}(x) = \sqrt{\frac{x-4}{3}}$

(C) $f^{-1}(x) = \sqrt{\frac{x}{3}} - 4$

(D) $f^{-1}(x) = \sqrt{\frac{x}{4}} - 3$

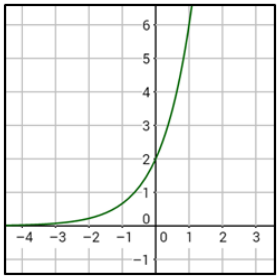
---

84 Enter the value of the exponential expression 5^0.

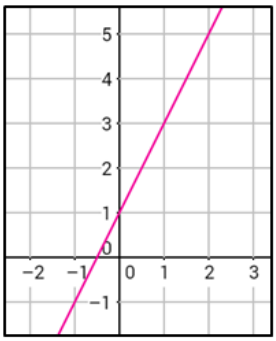
[ ]

85 **Directions - Select all the graphs that represent Exponential Growth or Exponential Decay.**

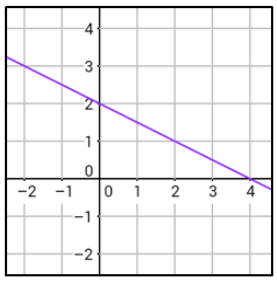
A



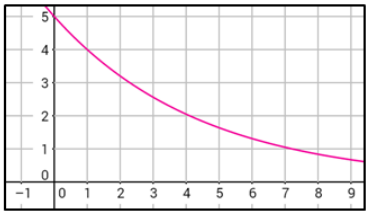
B



C



D



---

86 The exponential function $f(x) = \frac{1}{3}(2.45)^x$ represents exponential a while the exponential function $g(x) = 145(0.84)^x$ represents b .

a

- growth
- decay
- Enter Value

b

- growth
- decay
- Enter Value

---

87 Determine whether the function below is exponential growth or exponential decay, and find the percentage rate of change.

$P(t) = 3.5\,(0.91)^t$

(A) Exponential decay; 3.5%

(B) Exponential decay; 9%

(C) Exponential growth; 9%

(D) Exponential growth; 3.5%

---

88 (Lesson 32) Determine if each equation represents exponential growth or exponential decay.

Equation	Growth or Decay?
$y = 400\,(.99)^x$	a
$y = 0.5\,(1.001)^x$	b
$y = 12\,(4)^x$	c
$y = 100\left(\frac{1}{2}\right)^x$	d

a
- Exponential Growth
- Exponential Decay

b
- Exponential Growth
- Exponential Decay

c
- Exponential Growth
- Exponential Decay

d
- Exponential Growth
- Exponential Decay

---

89 Select **all** exponential functions:

[A] $y = \frac{3}{2}x + 3$

[B] $y = 3 \cdot (2)^x$

[C] $f(x) = .5 \cdot (3)^x$

[D] $y = 3x$

[E] $f(x) = 2 \cdot (2)^x$

[F] $f(x) = 4.5$

---

91 Express the following in exponential notation.

$$\underbrace{bb\cdots b}_{10 \text{ times}}$$

(A) b

(B) b^{10}

(C) b^{13}

(D) b^{30}

---

92 Select all the functions that represent exponential growth.

[A] $f(x) = 9(1.03)^x$

[B] $f(x) = 4(0.97)^x$

[C] $f(x) = 5(3.5)^x$

[D] $f(x) = 7(0.5)^x$

---

94 Write the following exponential equation in log form. $4^{-3} = \frac{1}{64}$

(A) $\log_{64} 4 = -3$

(B) $\log_{-3} 4 = \frac{1}{64}$

(C) $\log_4 \frac{1}{64} = -3$

(D) $\log_4 -3 = \frac{1}{64}$

---

96 Write the logarithmic equation exponential form. $\log_2 16 = 4$

(A) $4^{16}=2$

(B) $2^{16}=4$

(C) $2^4=16$

(D) None of these

---

97 Given the following expression, select an equivalent expression in exponential notation.

$$\frac{1}{34^{-4}}$$

(A) $\frac{1}{34^4}$

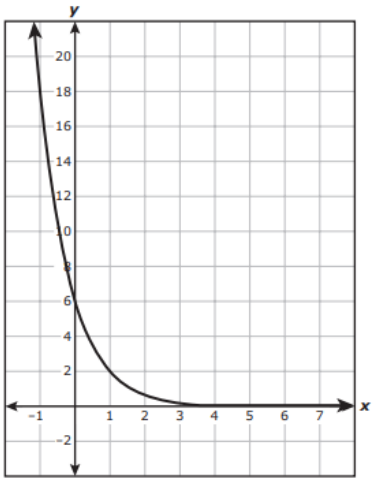
(B) $\frac{3}{4^4}$

(C) 34^4

(D) 34^{-4}

---

98 An exponential function is graphed on the grid.



Which function is best represented by the graph?

(A) $g(x) = 6(\frac{1}{3})^x$

(B) $g(x) = 6(3)^x$

(C) $g(x) = 6 - (\frac{1}{3})^x$

(D) $g(x) = 6 - (3)^x$

---

99 Rewrite in simplified exponential notation: $(79^{-4}) \times (79^8)$

---

100 Change the following exponent into a logarithm $64 = 4^3$

(A) $\log_3 4 = 64$

(B) $\log_4 64 = 3$

(C) $\log_{64} 3 = 4$

(D) $\log_4 3 = 64$

102 For the logarithm $\log(17)$, what is the base of the logarithm?

(A) 0

(B) 1

(C) 10

(D) e

(E) 17

---

106 Convert the following logarithm into an exponent $\log(x-2)=4$

(A) $x^4=2$

(B) $10^{x-2}=4$

(C) $10^4=x-2$

(D) $x=2^4$

---

108 When no base is written for the log, we consider it the common logarithm with a base of 10.

(A) True

(B) False

---

109 The natural logarithm $f(x)=\ln(x)$ is the same as which of the following?

(A) $\ln_{10}(x)$

(B) $\ln_e(x)$

(C) $\log_e(x)$

(D) $\log_{10}(x)$
