Practice Final

Student: _____
Date: _____

Course: College Algebra-Math 1314

1. Solve the polynomial inequality and graph the solution set on a real number line. Express the solution set in interval notation.

$(x - 1)(x + 4) < 0$

Use the inequality in the form $f(x) < 0$, to write the intervals determined by the boundary points as they appear from left to right on a number line.

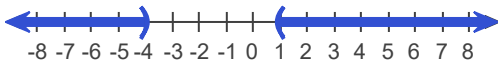
Interval	Sign
_____	(1) _____
_____	(2) _____
_____	(3) _____

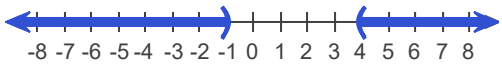
(Simplify your answers. Type your answers in interval notation. Type exact answers, using radicals as needed. Use integers or fractions for any numbers in the expressions.)

Solve the inequality. What is the solution set? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is _____.
  (Simplify your answer. Type your answer in interval notation. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)
- **B.** The solution set is the empty set.

Which number line below shows the graph of the solution set?

A.


B.


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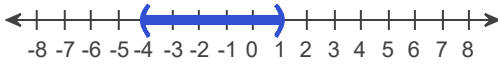
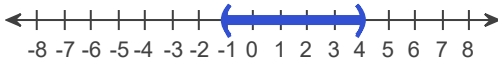
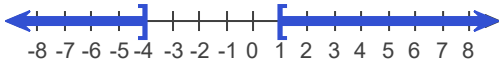
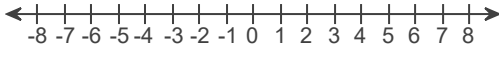


D.


E.


F.


G.


H.


(1) positive negative (2) negative positive (3) positive negative

2. Solve the following inequality. Graph the solution set on a number line.

$(x-2)(x-4)(x-5) \geq 0$

Use the inequality in the form $f(x) \geq 0$, to write the intervals determined by the boundary points as they appear from left to right on a number line.

Interval	Sign
_____	(1) _____
_____	(2) _____
_____	(3) _____
_____	(4) _____

(Simplify your answers. Type your answers in interval notation. Use integers or fractions for any numbers in the expressions.)

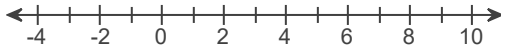
Solve the inequality. What is the solution set? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The solution set is _____.
(Simplify your answer. Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

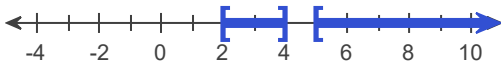
○ **B.** The solution set is the empty set.

Choose the correct graph below.

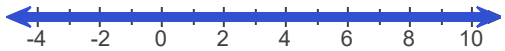
○ **A.**



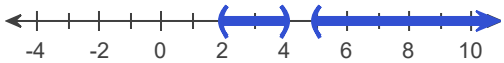
○ **B.**



○ **C.**

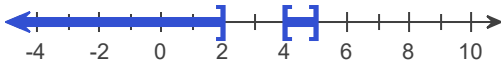


○ **D.**



○ **E.**

○ **F.**



(1) ○ negative ○ positive (2) ○ negative ○ positive (3) ○ negative ○ positive (4) ○ negative ○ positive

3. Solve the rational inequality and graph the solution set on a real number line. Express the solution set in interval notation.

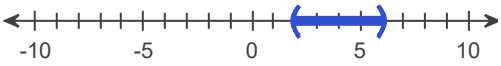
$$\frac{x-2}{x-6} > 0$$

Solve the inequality. What is the solution set? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The solution set is _____.
  (Simplify your answer. Type your answer in interval notation. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)
- **B.** The solution set is the empty set.

Choose the correct graph below.

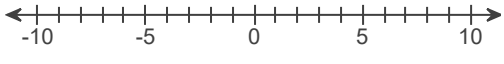
- **A.**



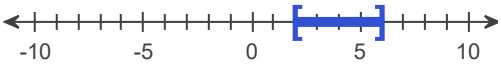
- **B.**

- **C.**

- **D.**



- **E.**



- **F.**

4. Graph the given function by making a table of coordinates.

$$f(x) = 4^x$$

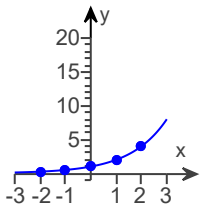
Complete the table of coordinates.

x	− 2	− 1	0	1	2
y					

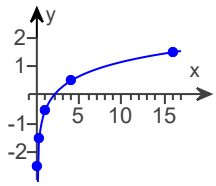
(Type integers or fractions. Simplify your answers.)

Choose the correct graph below.

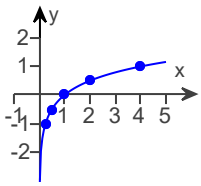
- **A.**



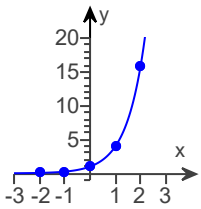
- **B.**



- **C.**



- **D.**



5. Graph the given function by making a table of coordinates.

$$f(x) = \left(\frac{1}{3}\right)^x$$

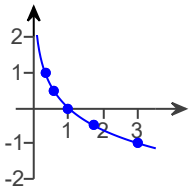
Complete the table of coordinates.

x	− 2	− 1	0	1	2
y					

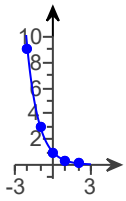
(Type integers or fractions. Simplify your answers.)

Choose the correct graph below.

A.



B.



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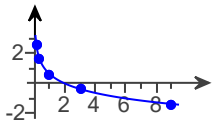
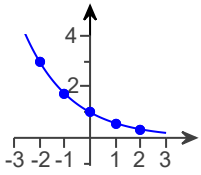


D.



6. Write the following equation in its equivalent exponential form.

$3 = \log_b 27$

The exponential form is _____ = _____.
(Type the expression containing b or y on the left side of the equation.)

7. Write the following equation in its equivalent logarithmic form.

$2^3 = x$

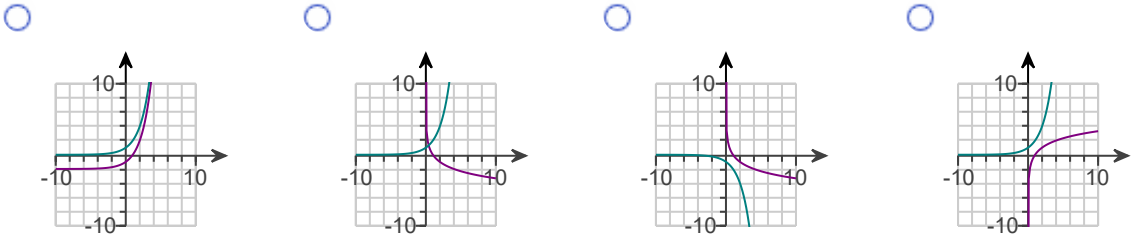
The equation in logarithmic form is _____.
(Type an equation.)

8. Select the answer that best completes the given statement.

The equation $y = \log_b x$ is equivalent to the exponential form (1) _____ $x > 0, b > 0, b \neq 1$.

(1)
- $x^b = y$,
- $x^y = b$,
- $b^y = x$,
- $y^x = b$,
- $y^b = x$,
- $b^x = y$,

9. Graph $f(x) = 2^x$ and $g(x) = \log_2 x$ in the same rectangular coordinate system.



10. Use properties of logarithms to expand each logarithmic expression as much as possible. Evaluate logarithmic expressions without using a calculator if possible.

$\log_b (x^4 y)$

$\log_b (x^4 y) =$ _____

11. Use properties of logarithms to condense the logarithmic expression. Write the expression as a single logarithm whose coefficient is 1. Evaluate logarithmic expressions if possible.

$3 \log_b x + 7 \log_b z$

$3 \log_b x + 7 \log_b z =$ _____

12. Use properties of logarithms to condense the logarithmic expression below. Write the expression as a single logarithm whose coefficient is 1. Where possible, evaluate logarithmic expressions.

$2 \ln x - 6 \ln y$

$2 \ln x - 6 \ln y =$ _____ (Simplify your answer.)

13. Find the domain of the following rational function.

$$H(x) = \frac{-8x^2}{(x-7)(x+4)}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain of H(x) is $\{x | x \neq$ _____$\}$. (Type an integer or a fraction. Use a comma to separate answers as needed.)
- **B.** The domain of H(x) has no restrictions.

14. Find the horizontal asymptote, if any, of the graph of the rational function.

$$f(x) = \frac{-3x + 7}{5x + 2}$$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The horizontal asymptote is _____.
  (Type an equation. Simplify your answer. Use integers or fractions for any numbers in the equation.)
- **B.** There is no horizontal asymptote.

15. Divide using synthetic division.

$$\frac{\left(5x^5 - 5x^3 + 3x^2 - 2x + 7\right)}{x - 2}$$

$$\frac{\left(5x^5 - 5x^3 + 3x^2 - 2x + 7\right)}{x - 2} = \_\_\_\_\_$$

(Simplify your answer.)

16. In the following exercise, find the coordinates of the vertex for the parabola defined by the given quadratic function.

$f(x) = 4x^2 + 16x + 5$

The vertex is _____. (Type an ordered pair.)

17. For $f(x) = 5x - 4$ and $g(x) = x^2 - 1$, find the following functions.

a. $(f \circ g)(x)$; **b.** $(g \circ f)(x)$; **c.** $(f \circ g)(1)$; **d.** $(g \circ f)(1)$

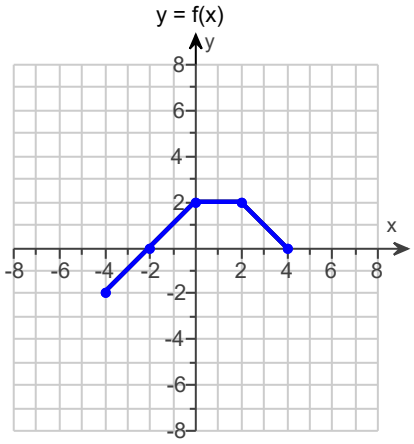
a. $(f \circ g)(x) =$ _____ (Simplify your answer.)

b. $(g \circ f)(x) =$ _____ (Simplify your answer.)

c. $(f \circ g)(1) =$ _____ (Simplify your answer.)

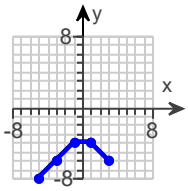
d. $(g \circ f)(1) =$ _____ (Simplify your answer.)

18. Use the graph of y = f(x) to graph the function g(x) = f(x − 1) − 6.

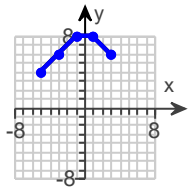


Choose the correct graph of g below.

A.



B.



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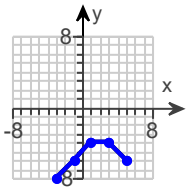
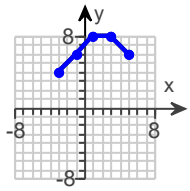


D.



19. Evaluate the piecewise function at the given values of the independent variable.

$$g(x) = \begin{cases} x + 4 & \text{if } x \geq -4 \\ -(x + 4) & \text{if } x < -4 \end{cases}$$

(a) g(0) (b) g(−7) (c) g(2)

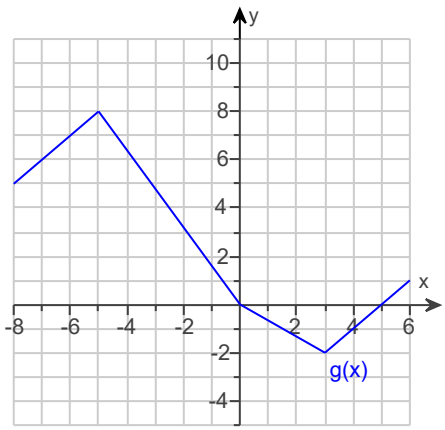
(a) g(0) = _____

(b) g(−7) = _____

(c) g(2) = _____

20. For what value of x is g(x) = 8?

x = _____



1. $(-\infty,-4)$

   (1) positive

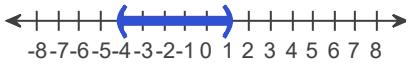
   $(-4,1)$

   (2) negative

   $(1,\infty)$

   (3) positive

   A. The solution set is **$(-4,1)$** .
   (Simplify your answer. Type your answer in interval notation. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

   C. 

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2. $(-\infty,2)$

   (1) negative

   $(2,4)$

   (2) positive

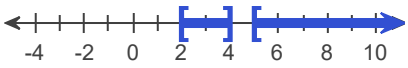
   $(4,5)$

   (3) negative

   $(5,\infty)$

   (4) positive

   A. The solution set is **$[2,4]\cup[5,\infty)$** .
   (Simplify your answer. Type your answer in interval notation. Use integers or fractions for any numbers in the expression.)

   B. 

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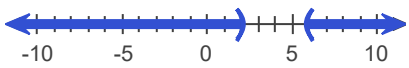
3. A. The solution set is **$(-\infty,2)\cup(6,\infty)$** .
   (Simplify your answer. Type your answer in interval notation. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression.)

   C. 

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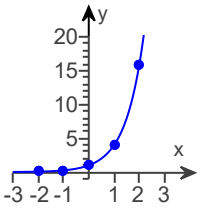
4. $\frac{1}{16}$

$\frac{1}{4}$

1

4

16

D. 

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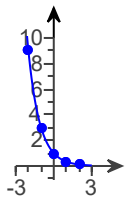
5. 9

3

1

$\frac{1}{3}$

$\frac{1}{9}$

B. 

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6. b^3

27

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7. $3 = \log_2 x$

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8. (1) $b^y = x$,

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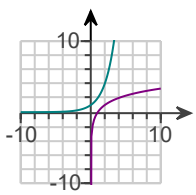
9. 

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10. $4 \log_b x + \log_b y$

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11. $\log_b \left(x^3 z^7\right)$

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12. $\ln \left(\frac{x^2}{y^6}\right)$

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13. A.
The domain of H(x) is {x|x ≠ **7, − 4**}. (Type an integer or a fraction. Use a comma to separate answers as needed.)

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14. A. The horizontal asymptote is $y = -\frac{3}{5}$.
(Type an equation. Simplify your answer. Use integers or fractions for any numbers in the equation.)

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15. $5x^4 + 10x^3 + 15x^2 + 33x + 64 + \frac{135}{x - 2}$

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16. $(-2, -11)$

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17. $5x^2 - 9$

$25x^2 - 40x + 15$

-4

0

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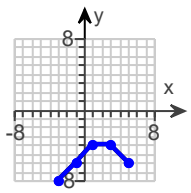
18. 

C.

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19. 4

3

6

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20. -5
