

Pre-Calculus Honors

Summer Assignment

2022

Complete by the first day of class

The packet will be collected and you will have a test
on the material

Name: _____

- 1) What is the sum of $\frac{5}{3}x^2 - \frac{8}{5}x + \frac{7}{8}$ and $-\frac{3}{5}x^2 - \frac{1}{2}x + \frac{1}{4}$?
- A) $\frac{16}{15}x^2 - \frac{21}{10}x + \frac{9}{8}$ B) $\frac{2}{15}x^2 - \frac{9}{10}x + 1$ C) $\frac{8}{15}x^2 - \frac{9}{10}x + 2$ D) $x^2 - \frac{9}{7}x + \frac{2}{3}$
- 2) When $\frac{3}{8}x^3 - \frac{1}{4}x + 4$ is subtracted from $\frac{1}{8}x^3 - \frac{5}{8}x^2 + \frac{3}{8}x - 2$, the result is
- A) $\frac{1}{4}x^3 + \frac{5}{8}x^2 - \frac{1}{8}x + 6$ B) $-\frac{1}{4}x^3 + \frac{5}{8}x^2 - \frac{1}{8}x - 2$ C) $\frac{1}{2}x^3 - \frac{5}{8}x^2 + \frac{5}{8}x + 2$ D) $-\frac{1}{4}x^3 - \frac{5}{8}x^2 + \frac{5}{8}x - 6$
- 3) The revenue, $R(x)$, from selling x units of a product is represented by the equation $R(x) = 35x$, while the total cost, $C(x)$, of making x units of the product is represented by the equation $C(x) = 20x + 500$. The total profit, $P(x)$, is represented by the equation $P(x) = R(x) - C(x)$. For the given values of $R(x)$ and $C(x)$, what is $P(x)$?
- A) $10x + 100$ B) $15x$ C) $15x + 500$ D) $15x - 500$
- 4) Simplify: $7x^2y^3 - (-3x^2y^3)$
- 5) Simplify: $(5x^2 - 2x + 5) - (2x^2 - 4x - 3)$
- 6) What is the product of $(\frac{1}{2}x - \frac{1}{2})$ and $(\frac{1}{2}x + \frac{1}{2})$?
- A) $x^2 + 1$ B) $x^2 - 1$ C) $\frac{1}{4}x^2 + \frac{1}{4}$ D) $\frac{1}{4}x^2 - \frac{1}{4}$
- 7) Express $\log x$ in terms of $\log a$, $\log b$, and $\log c$: $x = \frac{(ab)^3}{c}$
- 8) If $\log(x - 3) + \log(x + 4) - \log x = \log 5$, then the solution set for x is
- A) $\{-6, 2\}$ B) $\{6\}$ C) $\{-2, 6\}$ D) $\{2, 6\}$
- 9) Which of the following is a value of x that is solution to the equation $16 = 4 \ln x$?
- A) e^4 and e^{-4} , only B) 4 , only C) e^4 , only D) 4 and -4
- 10) Solve for x to the nearest tenth: $4^x = 28$
- 11) Solve for x to the nearest tenth: $1.62^{2x} = 8$
- 12) Solve for x to the nearest tenth: $4^x = 32.8$
- 13) Solve for x : $\log_b 36 - \log_b 2 = \log_b x$
- 14) A radioactive material decays according to the formula $A = A_0 10^{-kt}$ where A is the final amount, A_0 is the initial amount, and t is time in years. Find k , if 500 grams of this material decays to 450 grams in 10 years. [Round the answer to 4 decimal places.]
- A) 0.0046 B) 1.1065 C) -16.9897 D) -0.9000

- 15) A house bought 10 years ago for \$125,000 was just sold for \$200,000. Find, to the nearest tenth of a percent, the annual growth rate. [Show all work.]
- 16) The amount of money A after t years that principal P will become if it is invested at rate r compounded n times a year is given by the relationship $A(t) = P(1 + \frac{r}{n})^{nt}$ where r is expressed as a decimal. To the nearest tenth, how long will it take \$2,700 to become \$4,200 if it is invested at 7% and is compounded semi-annually? [Show all work.]
- 17) An archaeologist can determine the approximate age of certain ancient specimens by measuring the amount of carbon-14, a radioactive substance, contained in the specimen. The formula used to determine the age of a specimen is $A = A_0 (2)^{\frac{-t}{5,760}}$, where A is the amount of carbon-14 that a specimen contains, A_0 is the original amount of carbon-14, t is time, in years, and 5,760 is the half-life of carbon-14. A specimen that originally contained 120 milligrams of carbon-14 now contains 100 milligrams of this substance. What is the age of the specimen, to the nearest hundred years? [Show all work.]
- 18) The expression $(2a + 3b)^2$ is equivalent to
 A) $4a^2 + 6ab + 9b^2$ B) $4a^2 + 9b^2$ C) $4a^2 + 12a^2b^2 + 9b^2$ D) $4a^2 + 12ab + 9b^2$
- 19) If $(x - 24)(2x + 1) = 2x^2 - Bx + 10$, then $A \cdot B =$
 A) -26 B) 26 C) -105 D) 105
- 20) Dave and Sue have a patio whose width is three times its length. They decide to enlarge the patio by increasing each dimension by 3 feet. The difference between the area of the old patio and the area of the new patio may be expressed as
 A) $3x^2 + 6x + 9$ B) $12x$ C) $12x + 9$ D) $3x^2$
- 21) Simplify: $x^2(x^3 - 2x^2 + 4)$
- 22) The length and width of a rectangle are represented by $(4x + 1)$ and $(2x - 3)$. Express the area of the rectangle as a trinomial. [Show all work.]
- 23) The rate at which a person travels from point A to point B is represented by $(6 - 2x)$, and the time it takes to travel between the two points is represented by $(x^2 + 5x + 1)$. What is the distance between the two points expressed as a polynomial in simplest form? [Show all work.]
- 24) When $27y^3 + 125$ is factored completely, one of the factors will be
 A) $3y + 5$ B) $y + 5$ C) $9y^2 + 15y + 25$ D) $9y^2 - 30y + 25$
- 25) What will be one of the factors when $4x^4 - 16$ is factored completely?
 A) $x^4 - 4$ B) $x^2 - 2$ C) $x + 1$ D) $x - 1$
- 26) Factor completely: $x^4 - 81y^4$
 A) $(x + 3y)(x - 3y)(x + 3y)^2$ C) $(x^2 - 9y^2)(x^2 + 9y^2)$
 B) $(x + 3y)(x - 3y)(x^2 + 9y^2)$ D) $(x + 3y)(x - 3y)^2(x + 9y)^2$
- 27) Which of the following correctly shows the factoring of $x^3 + 27$?
 A) $(x + 3)(x^2 + 3x - 9)$ B) $(x + 3)(x + 3)(x + 3)$ C) $(x + 3)(x^2 - 3x + 9)$ D) $(x + 3)(x - 3)(x - 3)$

- 28) The trinomial $4x^2 - 12x + 9$ represents the area of a square. Express the measure of a side in terms of x .
 A) $2x + 3$ B) $2x - 3$ C) $2(x + 3)$ D) $4x + 3$
- 29) Write an expression to represent $\cos^2 x - \cos x - 2$ when factored completely.
- 30) Factor: $ac + 2ad + 2bc + 4bd$
- 31) Factor: $a^2b^2 - 49$
- 32) Factor: $5 + 3xy - 2x^2y^2$
- 33) Factor: $3 \sin^2 x - 6 \sin x$
- 34) Factor completely: $x^3 + 5x^2 + 6x$
- 35) The solution set of the equation $x^2 + 5x = 0$ is
 A) $\{-5\}$ B) $\{5\}$ C) $\{0\}$ D) $\{0, -5\}$
- 36) Which quadratic equation has -2 and 3 as its roots?
 A) $x^2 - x - 6 = 0$ B) $x^2 + x - 6 = 0$ C) $x^2 - 5x + 6 = 0$ D) $x^2 + 5x + 6 = 0$
- 37) If the equation $x^2 = 3x + c$ has $x = -2$ as one of its roots, then what is the other root of the equation?
 A) -2 B) 1 C) 10 D) 5
- 38) Find the roots of the equation $2x^2 = 13x - 15$.
- 39) A rectangular lawn is 40 m wide and 60 m long. Stuart mows all the way along the perimeter of the lawn, leaving only $1,500$ square meters to be mowed in the center of the lawn. How wide is the strip of lawn that Stuart has already mowed? *[Show all work.]*
- 40) A model rocket is launched. The height, in feet, of the rocket $h(t)$ at t ($t \geq 0$) seconds after launch is determined by the equation $h(t) = -\frac{1}{2}t^2 + 15t$. The maximum height of the rocket is 112.5 feet.
 (a) Find the number of seconds after launch it takes for the rocket to reach its maximum height. *[Show all work.]*
 (b) For how many seconds will the rocket be at a height of more than 100 ft? *[Show all work.]*
- 41) Using the binomial theorem, expand the expression $(2a + b)^4$.

- 42) Use the binomial theorem to write the expansion of the given expression. [Express your results in simplest form.]

$$(2 \sin x - \cos x)^5$$

- 43) What is the third term in the expansion of $(a - 3b)^4$?

A) $6a^2b^2$ B) $54a^2b^2$ C) $-54a^2b^2$ D) $-6a^2b^2$

- 44) What is the middle term in the expansion of $(2 \sin \theta + \cos \phi)^4$?

A) $8 \sin \theta \cos^3 \phi$ B) $24 \sin^2 \theta \cos^2 \phi$ C) $12 \sin^2 \theta \cos^2 \phi$ D) $8 \sin^3 \theta \cos \phi$

- 45) Which of the following fractions is defined for *all* real numbers?

A) $\frac{x^2 - 1}{x + 1}$ B) $\frac{x^2 - 1}{(x - 1)^2}$ C) $\frac{x^2 - 1}{x^2 + 1}$ D) $\frac{x^2 - 1}{x^2}$

- 46) In the expression $\frac{4x^2 - 3x + 2}{x(x + 4)(x - 5)}$, x is undefined for all of the following *except*

A) -4 B) 5 C) 0 D) -2

- 47) Simplify: $(x^2 + 5x - 14) + (x - 2)$

48) Simplify: $\frac{x^{3a} - x^{2a}}{x^a}$

49) Simplify: $\left(\frac{x^2 - 1}{6x}\right)\left(\frac{3x^2}{x^2 + x}\right)$

A) $\frac{x - 1}{2}$ B) $-\frac{1}{2x}$ C) $\frac{x - 1}{4}$ D) $\frac{x - 1}{2x}$

50) Simplify: $\frac{x^2 - 9}{x^2 - x - 20} \cdot \frac{4x^2 - 20x}{4x^2 - 12x}$

- 51) The area of a rectangular deck is $\frac{x^2 - 3x}{2x^2 + x - 6}$ and its length is $\frac{x^2 - 5x + 6}{x^2 - 4}$. What is an expression that represents the width of the deck?

A) $\frac{x}{2x - 3}$ B) $\frac{x(x - 3)^2}{(2x - 3)(x + 2)^2}$ C) $\frac{2x - 3}{x}$ D) $\frac{x - 3}{x + 2}$

- 52) The expression $\frac{x - 2}{3} + \frac{x - 3}{2}$ is equivalent to

A) $\frac{3x - 5}{3}$ B) $\frac{5x - 13}{6}$ C) $\frac{3x - 5}{2}$ D) $\frac{2x - 5}{2}$

- 53) Combine and simplify: $\frac{2}{z - 3} + \frac{4}{3 - z}$

- 54) Expressed as a single fraction, $\frac{5}{x - 3} - \frac{1}{x}$ is equivalent to

A) $\frac{4}{x^2 - 3x}$ B) $\frac{4x + 3}{x^2 - 3x}$ C) $\frac{4x + 3}{2x - 3}$ D) $\frac{6x - 3}{x^2 - 3x}$

- 55) Sarah can throw a softball at a speed of $\frac{3}{x+2}$ feet per second and Jennifer can throw the ball at a speed of $\frac{2}{x-2}$ feet per second. In terms of x , how much faster is Sarah's softball than Jennifer's?
- A) $\frac{x-10}{x^2-4}$ B) $\frac{x}{x-4}$ C) $\frac{1}{x}$ D) $\frac{x-4}{x^2-4}$
- 56) Combine and simplify: $\frac{3}{x^2-49} - \frac{1}{7-x}$
- 57) What is the result when the terms in the expression $\frac{b+2}{b^2-9} \cdot \frac{4b+12}{3b+6} + \frac{8}{2b-6}$ are combined and simplified?
- A) $\frac{16}{3(b-3)^2}$ B) $\frac{b+3}{b-3}$ C) 3 D) $\frac{1}{3}$
- 58) Simplify: $(a^{-1} + b^{-1})^{-1}$
- A) $\frac{ab}{a+b}$ B) $\frac{a+b}{ab}$ C) $\frac{1}{a} + \frac{1}{b}$ D) $\frac{1}{a^2} + \frac{1}{b^2}$
- 59) Expressed in simplest form, $\frac{\frac{a-1}{a}}{\frac{a^2-1}{a^2}}$ is equivalent to
- A) $\frac{a}{a+1}$ B) $\frac{a}{a-1}$ C) $\frac{a+1}{a}$ D) $\frac{a-1}{a}$
- 60) Express in simplest form: $\frac{\frac{x^2-5x+6}{x^2-4}}{\frac{6+x-x^2}{x^2+4x+4}}$
- A) -1 B) 1 C) $\frac{(x-2)^2}{(x-3)^2}$ D) $\frac{(x-3)^2}{(x-2)^2}$
- 61) What is the solution set of $\frac{x+2}{x} = \frac{(x+1)}{(x-3)}$?
- A) {6} B) {-3}, only C) {3}, only D) {-3, 3}
- 62) Find the positive root of $\frac{1}{x-1} = \frac{x+2}{4}$, $x \neq 1$.
- 63) Find the solution set of $\frac{4x+3}{x} = \frac{10x+15}{3x}$.
- 64) Find the solution set of $\frac{4}{x-1} = \frac{5}{x^2-x}$.
- 65) Solve by factoring: $\frac{4}{x-1} = \frac{5}{2x-2} + \frac{3x}{4}$

- 66) The members of the science club agreed to contribute equally to provide a fund of \$480. If there had been 3 more members in the club, each member would have had to pay \$8 less than in the original agreement. How many members were actually in the science club? [Show all work.]

67) Simplify: $\frac{\sqrt{48}}{\sqrt{3}}$

A) 16

B) 8

C) $\frac{4\sqrt{3}}{3}$

D) 4

68) Simplify: $-\sqrt[3]{27}$

69) Simplify: $\sqrt[3]{a^2b^3}$

70) Simplify: $\sqrt[3]{a^{12}}$

- 71) Simplify the given expression. [Assume all variables represent positive real numbers.]

$$\sqrt[3]{54x^7y^9}$$

72) Simplify: $3\sqrt{\frac{7}{3}}$

73) Simplify: $\sqrt{8x^3} + \sqrt{50x^5} - \sqrt{18x^3} - \sqrt{32x^5}$

A) $-x\sqrt{2} + x\sqrt{2x}$

B) $x^2\sqrt{2x} - x\sqrt{2x}$

C) $x\sqrt{2x} + x^2\sqrt{2x}$

D) $5x\sqrt{2x} - 9x^2\sqrt{x^3}$

74) Expand and simplify: $(4\sqrt{2} + 3\sqrt{5})(4\sqrt{2} - 3\sqrt{5})$

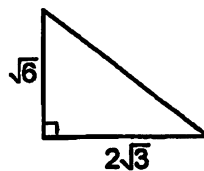
A) -7

B) -13

C) -161

D) 13

- 75) What is the length of the hypotenuse of the triangle below?



A) 9

B) $6\sqrt{2}$

C) $2\sqrt{3}$

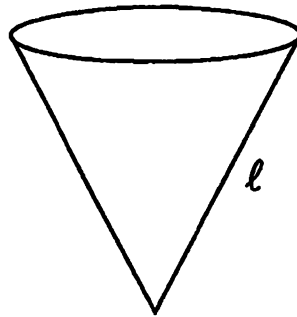
D) $3\sqrt{2}$

76) Simplify: $3(\sqrt{2x-1})^2$

77) Simplify: $\frac{4}{6\sqrt{2}}$

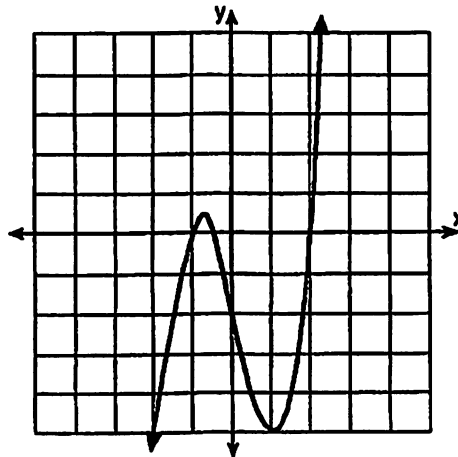
- 78) Simplify: $\frac{12\sqrt[3]{7}}{4\sqrt[3]{7}}$
- 79) Simplify: $\frac{\sqrt{5}-4}{2+\sqrt{3}}$
- A) $\frac{-3\sqrt{5}}{7}$ B) $\frac{5-4\sqrt{5}}{7}$ C) $13-6\sqrt{5}$ D) $\frac{-2\sqrt{5}-3}{9}$
- 80) The expression $\frac{6}{3-\sqrt{3}}$ is equivalent to
- A) $18-6\sqrt{3}$ B) $3+\sqrt{3}$ C) $2(3+\sqrt{3})$ D) $3-\sqrt{3}$
- 81) What is the solution set for $\sqrt{x+11}+1=x$?
- A) $\{-2\}$ B) $\{5\}$ C) $\{\}$ D) $\{5,-2\}$
- 82) Solve for x : $\sqrt[3]{2x-3}=4$
- A) 9.5 B) 6.5 C) 30.5 D) 33.5
- 83) Find the solution to the equation $\sqrt{3a-4}-3=-2$.

- 84) The slant height, ℓ , of the conical water tank shown in the accompanying diagram is $\ell = \sqrt[3]{\frac{8v}{\pi}}$. Solve for v , in terms of ℓ and π ?
[Show all work.]



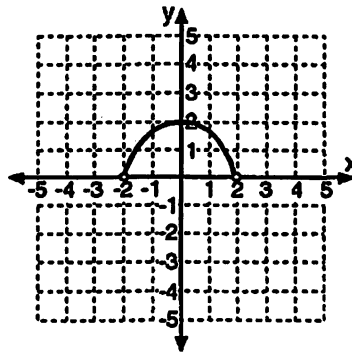
- 85) Which of the following equations is the solution to $x^2+12x+5=0$ after completing the square?
- A) $(x+6)^2=31$ B) $(x-6)^2=31$ C) $(x-6)^2=41$ D) $(x+6)^2=41$
- 86) Which one of the following expressions would be a step in solving $x^2-10x-4=0$ by the process of completing the square?
- A) $x-5=\pm\sqrt{21}$ B) $x-5=\pm\sqrt{29}$ C) $x-5=\pm\sqrt{40}$ D) $x-10=\pm\sqrt{58}$
- 87) What are the roots of the equation $x^2-9x+5=0$?
- A) $\frac{9\pm\sqrt{61}}{2}$ B) $\frac{9\pm\sqrt{101}}{2}$ C) $\frac{-9\pm\sqrt{101}}{2}$ D) $\frac{-9\pm\sqrt{61}}{2}$
- 88) What are the roots of the equation $5x^2-7x+1=0$?
- A) $\frac{7\pm\sqrt{69}}{10}$ B) $\frac{-7\pm\sqrt{69}}{10}$ C) $\frac{-7\pm\sqrt{29}}{10}$ D) $\frac{7\pm\sqrt{29}}{10}$
- 89) Find the roots of $x-4+\frac{2}{x}=0$ to the nearest tenth.

- 90) What is the *best* estimate of the real zeros of the function graphed below?



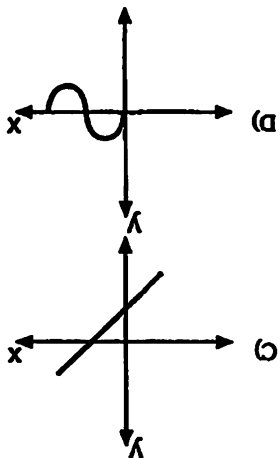
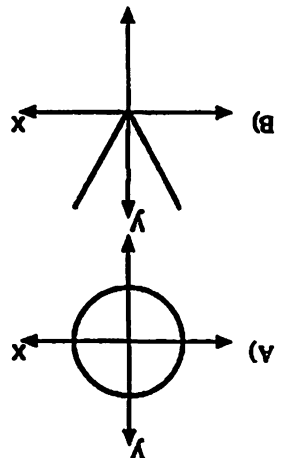
- A) $2, -\frac{1}{2}, -1$ B) $-2, -\frac{1}{2}, 1$ C) 2 D) $-\frac{1}{2}, 2$
- 91) What is the solution set for the equation $|4x - 3| = 17$?
- A) $\{-5, \frac{7}{2}\}$ B) $\{5, -\frac{7}{2}\}$ C) $\{-3\frac{1}{2}\}$ D) $\{5\}$
- 92) Solve for the variable: $|4n - 4| = 3n$
- 93) What is the solution set for $|2x - 1| < 9$?
- A) $\{x | x < 5\}$ B) $\{x | -4 < x < 5\}$ C) $\{x | x < -4\}$ D) $\{x | x < -4 \text{ or } x > 5\}$
- 94) Which of the following is the graph of an absolute value function?
- A) B) C) D)
- 95) Which relation is also a function?
- A) $y = 4x^2$ B) $x^2 - y^2 = 36$ C) $x^2 + y^2 = 36$ D) $9x^2 + 4y^2 = 36$
- 96) Which relation is *not* a function?
- A) $y = x^2$ B) $y = 3$ C) $x^2 + y^2 = 25$ D) $y = 2x + 3$
- 97) How many of the following relations are functions?
- $y = \pm 2x + 7$
 - $y = \sqrt{5 - x}$
 - $y = \frac{1}{x + 62} - 2$
 - $y = -3^x + 41$
- A) 1 B) 2 C) 3 D) 4
- 98) Which of the following equations represents a linear function?
- A) $y = 2x$ B) $y = 2^x$ C) $y = \log_2 x$ D) $y = x^2$
- 99) The domain of the equation $y = \frac{1}{(x - 1)^2}$ is *all* real numbers
- A) greater than 1 B) less than 1 C) except 1 and -1 D) except 1

- 100) What is the domain of $f(x) = \frac{3}{\sqrt{x-1}}$?
- A) $\{x | x \neq 1\}$ B) $\{x | x \geq 1\}$ C) $\{x | x < 1\}$ D) $\{x | x > 1\}$
- 101) For the graph of the relation below:
- (a) State the domain.
- (b) State the range.
- (c) State whether or not the relation is a function. [Justify your answer.]



- 102) If $f(x) = \frac{x+3}{x-1}$, then $f(a+1)$ is equal to
- A) 5 B) 4 C) $\frac{a+4}{a}$ D) $\frac{a+3}{a-1}$
- 103) Consider the function f defined by $f(x) = (1-x)(5-2x)$. At what point does the curve $y = f(x)$ intersect the y -axis?
- A) (0,5) B) (1,0) C) (0,1) D) (5,0)
- 104) If $f(x) = 2x^2 - x$, what does $f(2) - f(-2)$ equal?
- A) -16 B) 0 C) -4 D) 6
- 105) If $f(x) = x^2 + 2x$ and $g(x) = \frac{5}{2}x + 5$, for what negative value of x does $f(x) = g(x)$?
- 106) If $f(x) = 3x + 5$ and $g(x) = x^2 + 1$, what is the value of $g(f(x))$?
- A) $9x^2 + 26$ B) $9x^2 + 30x + 26$ C) $3x^2 + 8$ D) $x^2 + 3x + 6$
- 107) Given $f(x) = x - 2$ and $g(x) = 5x + 3$, find the value of the following:
- $(g \circ f)(-4)$
- 108) By which transformation can the set representing the inverse of a function be found?
- A) reflection in the origin C) reflection in the line $y = x$
 B) reflection in the y -axis D) rotation of 90° about the origin

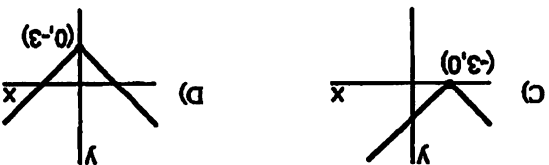
109) Which of the following graphs has an inverse that is a function?



110) What is the inverse of the function $x + 2y + 3 = 0$?

- A) $2y + x + 3 = 0$ B) $2x - y + 3 = 0$

111) Which of the following is the graph of $y = |x| - 3$?



- C) $y = -2x - 3$ D) $y = -\frac{2}{1}x - \frac{2}{3}$

112) For which value of x is $f(x) = \frac{3x - 1}{1}$ undefined?

- A) 1 B) -1

113) If $3x \cdot y = 3x + 1$, what is the value of y ?

- A) 1 B) -1

114) The product of $3x^5$ and $2x^7$ is

- A) $6x^{35}$ B) $6x^{12}$

115) Simplify: $\frac{2^{4x}}{2^{4x-1}}$

- A) -1 B) -2

116) Simplify: $\frac{5x^{2a}}{x^a}$

- C) $-\frac{1}{2}$

- D) 2

117) Find the value of $\left(\frac{27}{8}\right)^{\frac{3}{2}}$.

- A) $-\frac{3}{2}$ B) $-\frac{9}{4}$

- C) $\frac{9}{4}$

- D) $\frac{4}{9}$

118) Simplify: $(-27)^{\frac{1}{3}}$

119) Simplify: $4^0 \cdot 16^{-\frac{1}{2}}$

120) The graph of the equation $y = 10^x$ lies in which quadrants?

A) I and IV

B) I and II

C) II and III

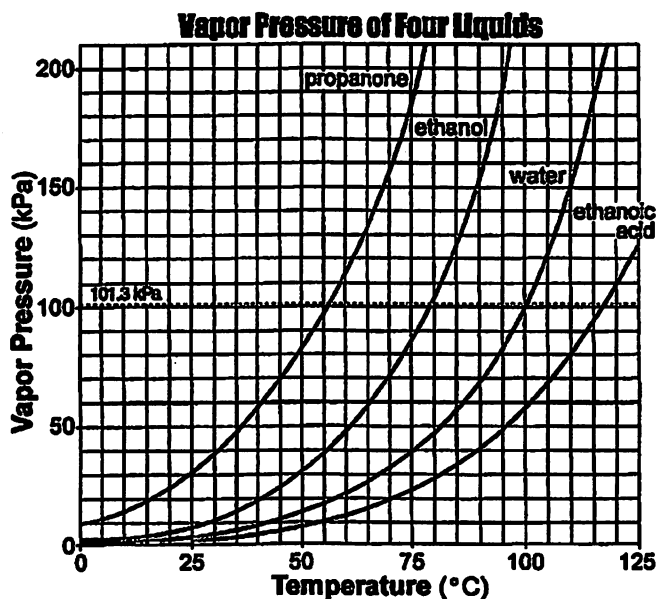
D) III and IV

121) What is the domain of the function $y = 3^{x-4}$?A) $\{x | x > 4\}$ B) $\{x | x > -4\}$

C) all real numbers

D) $\{x | -4 < x < 4\}$

122) The family of curves shown in the accompanying graph illustrates the transformations of a function.



What type of function could be the original function?

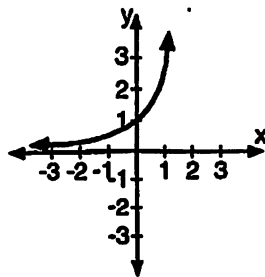
A) sinusoidal

B) linear

C) exponential

D) tangent

- 123) The accompanying diagram shows the graph of the equation $y = 3^x$.



What is the equation of the graph obtained by reflecting $y = 3^x$ in the x-axis?

- A) $y = (\frac{1}{3})^x$ B) $y = \log_3 x$ C) $x = 3^y$ D) $y = -3^x$
- 124) Solve: $(c-1)^{\frac{2}{3}} = 25$
- A) 126 B) 126 and -124 C) -126 and 124 D) -124
- 125) Solve: $a^{\frac{2}{3}} = 49$
- 126) Solve: $6 \cdot 3^{x-1} = 18$
- 127) If $\log_x 9 = \frac{1}{2}$ what is the value of x ?
- A) 81 B) $4\frac{1}{2}$ C) 3 D) 27
- 128) The expression $e^{-\ln 3}$ is equivalent to
- A) $-\frac{1}{3}$ B) -3 C) $\frac{1}{3}$ D) e^3
- 129) The equation $\log_b N = x$ expressed in exponential form is
- A) $N^b = x$ B) $b^x = N$ C) $x^b = N$ D) $b^N = x$
- 130) Write the equation in logarithmic form: $3^4 = 81$
- 131) Write the equation in exponential form: $\log_5 125 = 3$
- 132) Write the equation in exponential form: $\log_{\frac{1}{2}} \frac{1}{8} = 3$
- 133) Find the value of x : $\log_2 x = 3$

134) Solve for x : $\log_{\frac{2}{3}} x = -3$

135) If $\log_a 5 = \frac{1}{2}$, find the value of a .

136) For which value of x is $y = \log x$ undefined?

A) π

B) 0

C) 1.483

D) $\frac{1}{10}$

137) What is the domain of the function $y = \log_3(x - 2)$?

A) real numbers > 0

B) real numbers > 2

C) real numbers < 2

D) integers > 0

138) The expression $\log a + \frac{1}{2} \log b$ is equivalent to

A) $(\log a)^{\frac{1}{2}} \log b$

B) $\log a \cdot b$

C) $\log(a + b)$

D) $\log \sqrt{ab}$

139) The expression $\log \left(\frac{x^n}{\sqrt{z}}\right)$ is equivalent to

A) $\log(nx) - \log\left(\frac{1}{2}z\right)$

B) $\log(nx) - \log(2z)$

C) $n \log x - \frac{1}{2} \log z$

D) $n \log x - 2 \log z$

140) The equation used to determine the time it takes a swinging pendulum to return to its starting point is $T = 2\pi\sqrt{\frac{\ell}{g}}$, where

T represents time, in seconds, ℓ represents the length of the pendulum, in feet, and g equals $32 \frac{\text{ft}}{\text{sec}^2}$. How is this equation expressed in logarithmic form?

A) $\log T = \log 2 + \log \pi + \log \sqrt{\ell} - 32$

C) $\log T = \log 2 + \log \pi + \frac{1}{2} \log \ell - \log 16$

B) $\log T = \log 2 + \log \pi + \frac{1}{2} \log \ell - 16$

D) $\log T = \log 2 + \log \pi + \frac{1}{2} \log \ell - \frac{1}{2} \log 32$