

WATKINS MILL HS
SUMMER REVIEW PACKET
AP STATISTICS
DUE 3rd DAY OF CLASS
IN AUGUST

Solve for the variable.

1. $4(x - 2) = 3^2 - x$ 2. $\frac{1}{3}n + 3 = n - 2$ 3. $9(2p + 1) - 3p > 4p - 6$

4. $\frac{2}{3}y = \frac{8}{27}$ 5. $(q - 12)3 \leq 5q + 2$ 6. $\frac{m}{12} + \frac{5}{6} = \frac{5}{24}$

7. Write equations of the horizontal and vertical lines that pass through the point $(-3, 4)$. Please label which equation is horizontal and which is vertical.

8. Find the slope and y-intercept of the line.

a. $y = \frac{2}{3}(2x - 4)$ b. $3x + 2y = 14$ c. $\frac{1}{3}y - 6x = 4$

9. Find the slope and write the equation of the line containing the points.

a. $(6, -2)$ and $(0, 5)$ b. $(8, -5)$ and $(3, 4)$

10. Sketch the graph of the following functions.

a. $y = |x - 3| + 4$ b. $y = |x + 2| - 6$ c. $y = 3|x - 2| + 1$

11. Solve and graph each inequality.

a. $|x - 2| < 4$ b. $|4x - 6| \leq 4$ c. $|x + \frac{3}{2}| \geq \frac{3}{2}$

d. $-2x + 3y \geq x + 9$ e. $\frac{1}{2}x + 2y > 4$ f. $-y \geq 3x - 1$

12. Solve each equation:

a. $\frac{1}{2}x^2 - 8 = 0$ b. $-3x^2 + 343 = 0$ c. $x^2 - 8x + 7 = 0$

13. Plot the data using a scatter plot, then decide if the data is linear, exponential, quadratic, or absolute value.

a. $(-3, 4)$ $(-2, 3\frac{1}{2})$ $(-1, 3)$ $(0, 2\frac{1}{2})$ $(1, 2)$ $(2, 1\frac{1}{2})$ $(3, 1)$
b. $(-3, 4)$ $(-2, 3)$ $(-1, 2)$ $(0, 1)$ $(1, 2)$ $(2, 3)$ $(3, 4)$
c. $(-3, 4)$ $(-2, 2)$ $(-1, 1)$ $(0, \frac{1}{2})$ $(1, \frac{1}{4})$ $(2, \frac{1}{8})$ $(3, \frac{1}{16})$
d. $(-3, 4)$ $(-2, \frac{7}{3})$ $(-1, \frac{4}{3})$ $(0, 1)$ $(1, \frac{4}{3})$ $(2, \frac{7}{3})$ $(3, 4)$

14. There are 25 students in your English class. To determine the speaking order for presenting oral reports, slips of paper numbered from 1 to 25 are placed in a box. Each student draws a number to determine his or her speaking order.

- What is the probability that the number you draw will be odd?
- What is the probability that the number you draw will be even?
- Five oral reports will be given on each day. What is the probability that you will have to give your report on the first day?
- What is the probability that you will be the very last person to give your report?

15. For each function, find $f(x)$ for $x = -3, 0,$ and 2

a. $f(x) = 4x - 2$

b. $f(x) = 3x^2$

$f(-3) =$

$f(-3) =$

$f(0) =$

$f(0) =$

$f(2) =$

$f(2) =$

16. Evaluate $g[f(-2)]$ and $f[g(3)]$ for each of the following functions.

a. $f(x) = 3x; g(x) = 2x + 3$

b. $f(x) = -x; g(x) = x^2 + 5$

$g[f(-2)] =$

$g[f(-2)] =$

$f[g(3)] =$

$f[g(3)] =$

17. Solve and check:

a. $2\sqrt{x} + 9 = 21$

b. $\sqrt{2x+10} = x+1$

18. Sketch each graph.

a. $y = \left(\frac{1}{2}\right)^x - 2$

b. $y = 4^{x-1}$

c. $y = \sqrt{x-9}$

d. $y = -x^2 + 2$

e. $y = |x| + 3$

Logarithmic review:

Definition of logarithm to base a:

Let a and x be positive numbers, $a \neq 1$. The logarithm of x with base a is denoted by $\log_a x = y$ and is defined as follows:

$$\log_a x = y \quad \text{if and only if} \quad a^y = x$$

Properties of Logarithms:

Let a , u , and v be positive numbers such that $a \neq 1$, and let n be any real number.

1. $\log_a(uv) = \log_a u + \log_a v$

2. $\log_a \left(\frac{u}{v} \right) = \log_a u - \log_a v$

3. $\log_a u^n = n \log_a u$

Inverse Properties of Exponents and Logarithms:

Let a be a positive real number, $a \neq 1$.

Base a
1. $\log_a a^x = x$

2. $a^{\log_a x} = x$

Base e
 $\ln e^x = x$

$e^{\ln x} = x$

Properties of Exponential and Logarithmic Equations:

Let a be a positive real number.

1. $a^x = a^y$
if and only if $x = y$.

2. $\log_a x = \log_a y$
if and only if $x = y$.

19. Evaluate each expression without using a calculator.

a. $\log_5 25$ b. $\log_9 81$ c. $\log_{\frac{1}{2}} \left(\frac{1}{2} \right)$ d. $\log_2 \left(\frac{1}{8} \right)$

e. $\log_9 \left(\frac{1}{3} \right)$

20. Solve the equation for x :

a. $\log_3 81 = x$ b. $\log_3 x = 5$ c. $\log_x 256 = 8$

d. $\log_2 (x + 1) = 1$ e. $\log_5 (x - 4) = 0$

21. Simplify the expression:

a. $\frac{4e^x}{e^{4x}}$

b. $(2e^{5x})^2$

c. $\sqrt[3]{64e^6x}$

22. Decide whether the function is an example of exponential growth or decay.

a. $f(x) = 3e^{2x}$

b. $f(x) = e^{-4x}$

23. Expand each expression:

a. $\log_2(3x)$

b. $\log_{10}(7x^3yz)$

c. $\log_2(x^{1/2}y^3)$

d. $\ln(3xy^2)$

e. $\ln \frac{2xy}{x^2}$

24. Condense each expression:

a. $\log_{10} 8 + \log_{10} x + 2 \log_{10} y$

b. $2 \log_{10} 9 + 5 \log_{10} x + \log_{10} \left(\frac{1}{3}\right)$

c. $\ln 20 + 2 \ln \frac{1}{2} + \ln x$

d. $2(\ln 2 - \ln x) + (\ln x - \ln 4)$

25. Use properties of logarithms to solve for x:

a. $\log_4 2 - \log_4 x = \log_4 \left(\frac{2}{3}\right)$

b. $\log_3 8 = x \log_3 2$

26. Solve the exponential equation:

a. $5(2)^{3x} - 4 = 13$

b. $10^{-12x} + 6 = 100$

27. Solve the logarithmic equation:

a. $\ln x = 4$

b. $4 \log_3 x = 28$

28. Sketch the graph of each function.

a. $y = \log_8 x$

b. $y = -1 + \log_3 x$

c. $y = \log_2(x - 1)$

d. $y = \ln x - 4$

e. $y = \ln(x + 2) - 1$