

You must show work (separate paper) and circle your final answer.

UNIT 1

- 1.) Simplify: $(5-2i)(3+7i)$ $29+29i$
- 2.) Simplify: $\frac{4+7i}{1-2i}$ $-2+3i$
- 3.) What are the solutions to the equation $x^2+8x+25=0$? $x=-4\pm 3i$
- 4.) Factor $3x^2+10x-8$. $(3x-2)(x+4)$
- 5.) Find the missing values so that x^2+bx+c is a perfect square trinomial.
a) $x^2+10x+c$; $c=25$ b) $x^2-16x+c$; $c=64$

UNIT 2

- 6.) Use binomial theorem to expand the binomial $(2x+5)^3$. $8x^3+60x^2+150x+125$
- 7.) Divide: $(x^4-6x^3-40x+33)\div(x-7)$. $x^3+x^2+7x+9+\frac{96}{x-7}$
- 8.) Find the difference. $(2x^3-x^2+5x)-(-7x^4+4x^3-6x^2-2x+9)$ $7x^4-2x^3+5x^2+7x-9$
- 9.) If $f(x)=2x-7$ and $p(x)=x-4$, find $p(f(x))$. $2x-11$
- 10.) Given $f(x)=5x^3-3x^2+2x-7$ and $g(x)=x^3+4x-27$. What is $f(x)-g(x)$?
 $4x^3-3x^2-2x+20$

UNIT 3

- 11.) Find the zeros of the function: $f(x)=x^3-8x^2-23x+30$. $x=1$ $x=10$ $x=-3$
- 12.) Solve for x : $x^4=8x^3-12x^2$. $x=0$ mult. 2 $x=2$ $x=6$
- 13.) Find all the solutions of $x^4-11x^2+24=0$ $x=\pm 2\sqrt{2}$ $x=\pm\sqrt{3}$
- 14.) How many zeros does the function have? Explain how you know. $f(x)=x^5+3x^3-6x^2-40$
 5 ; highest exponent
- 15.) If one of the solutions of a polynomial equation is $-5-4i$, what is another solution?
 $-5+4i$

UNIT 4

19.) Graph the function $f(x) = \sqrt{x+1} - 3$; state the domain and range.

D: $[-1, \infty)$
R: $[-3, \infty)$

20-22: Simplify each expression using properties of rational exponents.

20.) $3x^3 \cdot 6x^3 \cdot 2x^5$
 $36x^7$

21.) $\frac{x^{\frac{7}{4}}}{x^5} \cdot x^{\frac{3}{5}} = 5\sqrt{x} - 3$

22.) $(16x^{-4}y^{20})^{\frac{1}{4}}$
 $\frac{2y^5}{x}$

23-25: Simplify each expression using properties of rational exponents.

23.) $\sqrt[4]{81x^{18}y^8}$
 $3x^4y^2\sqrt[4]{x^2}$

24.) $5\sqrt{28} + 2\sqrt{63}$
 $16\sqrt{7}$

25.) $\frac{10}{\sqrt{2}}$
 $5\sqrt{2}$

26-28: Solve each equation and check for extraneous solutions.

26.) $4x^{\frac{1}{3}} = 32$
 $x = 512$

27.) $17 = 4\sqrt{x+6} + 5$
 $x = 3$

28.) $(x-9)^6 = 238$
 $x = 9 \pm \sqrt[6]{238}$

UNIT 5

29.) A new car purchased for \$23,500 depreciates at a rate of 12.5% per year. What is the value of the car after 4 years?

$\$13,775.27$

30.) You deposit \$6000.00 in an account that pays 3.8% annual interest compounded monthly. How much money do you have in the account after 8 years?

$\$8,127.71$

31-32: Refer to the graph at right.

31.) State the domain and range of the exponential function graphed.

D: $(-\infty, \infty)$
R: $(-2, \infty)$

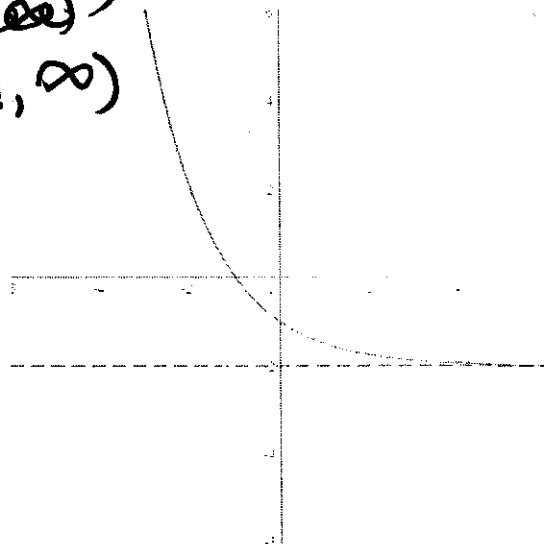
32.) What is the best equation of the function based on the graph?

A. $f(x) = -2^x - 3$

B. $f(x) = -2^{x+1} - 2$

C. $f(x) = -\left(\frac{1}{2}\right)^{x+1} - 2$

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



33.) Solve for x: $9^{2x+1} = 27^{x-5}$.

$x = -17$

34.) The parent function $f(x) = \left(\frac{1}{2}\right)^x$ has been vertically stretched by a factor of 5, shifted left 4 units and up 12 units. What is the equation of the new function?

$f(x) = 5\left(\frac{1}{2}\right)^{x+4} + 12$

UNIT 6

35.) Solve for x: $5^{x+2} = 22$.

$x = -.079$

36.) Solve for x: $7e^{x-5} = 28$.

$x = 6.386$

37.) Expand the expression $\ln \frac{y^2 z^4}{x^3}$.

$2 \ln y + 4 \ln z - 3 \ln x$

38.) Condense the expression $2 \log x + \log 5 - 3 \log y$.

$\log \frac{5x^2}{y^3}$

39.) Write a function that will give the following transformations from the parent graph $f(x) = \log x$. Reflection across the x-axis, a vertical compression by a factor of $2/3$, horizontal shift 4 units to the left, and vertical shift 1 unit down.

$f(x) = \frac{2}{3} \log(x+4) - 1$

40.) Solve for x: $\log_7 x = -2$.

$x = \frac{1}{49}$

41.) Solve the equation $\log_2(10x + 8) = 4$.

$x = .8$

UNIT 7

42.) Match the sample of students with the correct sampling method.

- | | |
|---|------------------|
| <u>D</u> Every 7 th student on a class list | A. self-selected |
| <u>A</u> Mail a response card | B. convenience |
| <u>B</u> The 1 st 40 students who enter the office | C. simple random |
| <u>C</u> Select students using number generator | D. systematic |

43.) According to the 11 PM news, the average price of regular unleaded gasoline in the Atlanta area is \$2.37 per gallon with a standard deviation of \$0.10.

a) About **what percent** of gas stations should be selling their regular unleaded gasoline between \$2.17 and \$2.57 per gallon?

95%

b) If 250 random gas stations in the Atlanta area were surveyed, **how many** gas stations should be selling their regular unleaded gasoline between \$2.17 and \$2.57 per gallon?

238

44.) Mrs. Allison's students conducted a poll of 500 students and found that 72% of those surveyed plan to attend the semifinal football playoffs at AHS.

a) What is the margin of error for the survey? $\pm 4.47\%$

b) Find the interval that is likely to contain the true population percent.

$67.53 - 76.47\%$

45.) The time taken to assemble a car in a certain plant is a random variable having a normal distribution with a mean of 20 hours and a standard deviation of 2 hours. What is the probability that a car can be assembled at this plant in a period of time less than 19.5 hours?

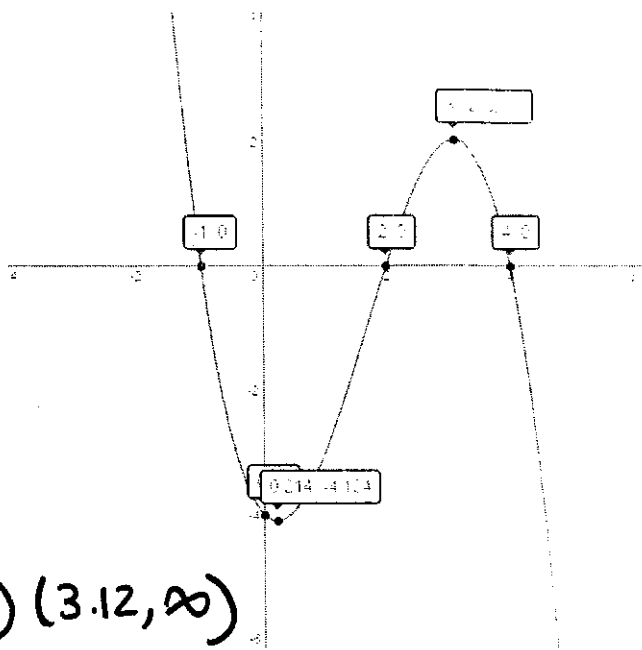
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46.) The class average on a math test was 78 and the standard deviation was 4.2. Find the z-score for a test score of 90.

2.86

16.) Use the graph to answer A-H below. Round answers to the nearest tenth.

- A. y-intercept: (0, -4)
 B. zero(s): $x = -1$ $x = 2$ $x = 4$
 C. Relative Minimum: (0.2, -4.1)
 Relative Maximum: (3.1, 2)
 Absolute Minimum: N/A
 Absolute Maximum: N/A
 D. Domain: \mathbb{R}
 E. Range: $(-\infty, \infty)$
 F. Intervals of increase or decrease:



I: (0.2, 3.12) D: $(-\infty, 0.2)$ $(3.12, \infty)$

G. End behavior as $x \rightarrow -\infty, f(x) \rightarrow \infty$
 as $x \rightarrow +\infty, f(x) \rightarrow -\infty$

Critical points on the graph (hard to read):
 (-1, 0), (2, 0), (4, 0), (0, -4), (0.2, -4.1), (3.1, 2.0)

H. Is the function odd, even or neither? Neither Explain.

not symmetric

17.) What type of symmetry does an even function have? y-axis

an odd function? origin

18.) Give the end behavior of (each) of the following functions.

A) $f(x) = x^6 - 7x^3 = 14x + 41$ as $x \rightarrow \infty, f(x) \rightarrow \infty$
 as $x \rightarrow -\infty, f(x) \rightarrow \infty$

B) $g(x) = -2x^4 + x^2 + 71$ as $x \rightarrow \infty, f(x) \rightarrow -\infty$
 as $x \rightarrow -\infty, f(x) \rightarrow -\infty$

C) $h(x) = x^3 + 5x^2 - 7x + 71$ as $x \rightarrow \infty, f(x) \rightarrow \infty$
 as $x \rightarrow -\infty, f(x) \rightarrow -\infty$

D) $j(x) = -12x^3 + x^2 + 7x - 71$ as $x \rightarrow \infty, f(x) \rightarrow -\infty$
 as $x \rightarrow -\infty, f(x) \rightarrow \infty$