$\qquad$ Class: $\qquad$

## Final Review

Indicate the answer choice that best completes the statement or answers the question.

1) What is the slope of a line that is perpendicular to the graph of $y=2 x+5$ ?
(a) $-\frac{1}{2}$
(b) $\frac{1}{2}$
(c) ${ }^{2}$
(C) -2
2) Use a scatter plot to draw a line of fit and then describe the correlation.

| $x$ | 0 | 1 | 2 | 5 | 8 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $y$ | 2 | 3 | 10 | 12 | 16 |

(a) positive
(b) negative
C) no correlation
(d) random correlation
3) By the Zero Product Property, if $(2 x-1)(x-5)=0$, then
(a) $x=1$ or $x=5$
(b) $x=-\frac{1}{2}$ or $x=-5$
C. $x=\frac{1}{2}$ or $x=5$
(d) $x=-1$ or $x=-5$
4) Which inequality is graphed below?


$$
\begin{array}{ll}
\text { (a) } y \geq|x|-3 & \text { (b) } y>|x|-3 \\
\text { (c) } y \leq|x|-3 & \text { (d) } y<|x|-3
\end{array}
$$

5) The system of equations $y=-3 x+5$ and $y=3 x-7$ has
(a) exactly one solution.
(b) no solution.
C) infinitely many
solutions.
(d) exactly two
solutions.
6) Find two arithmetic means between 6 and 30 .
(a) 12,24
(b) 14,22
(C) 12,18
(d) 18,18
7) Find $\sum_{n=1}^{7} 4(-3)^{n-1}$.
(a) -2188
(b) 2188
C. -728
(d) 2916
8) Find the multiplicative inverse of $-\frac{2}{3}$.
(a) $\frac{2}{3}$
(b) $-\frac{3}{2}$
C) $\frac{3}{2}$
(d) $\frac{3}{3}$
9) Find the slope of a line that passes through $(2,4)$ and $(-7,8)$.
(a) $-\frac{4}{9}$
(b) $-\frac{4}{5}$
C) $\frac{5}{4}$
(d) $-\frac{9}{4}$
10) Find the $x$-intercept of the graph of $4 x-2 y=8$.
(a) -4
(b) -2
(c) 0
(C) ${ }^{2}$
11) Which inequality describes the situation when Courtney wants to pay less than $\$ 15$ for a new hat?
(a) $h<15$
(b) $h \geq 15$
(C) $15<h$
(d) $h \leq 15$
12) The first equation of the system is multiplied by 3 . By what number would you multiply the second equation to eliminate the $x$ variable by adding?
$4 x-3 y=6$
$6 x+1 y=10$
(a) -2
(b) 2
(c) ${ }^{9}$
(C) -9
13) Find the sixth term of the geometric sequence for which $a_{1}=5$ and $r=3$.
(a) 1215
(b) 3645
(C) 9375
(d) 23
14) Two sides of a triangle are equal in length. The length of the third side is three meters less than the sum of the lengths of the other two sides. Find the length of the longest side of the triangle if its perimeter is 29 meters.
(a) 8 m
(b) 13 m
C) $\frac{55}{3} \mathrm{~m}$
15) Which function is a linear function?
(a) $f(x)=x^{3}+x$
(b) $h(t)=2 t+\frac{1}{t}$
C. $g(s)=1-4 s$
(d) $f(r)=\sqrt{r}$
$\qquad$ Class: $\qquad$

## Final Review

At a university, 1200 students are enrolled in engineering. There are twice as many in electrical engineering as in mechanical engineering, and three times as many in chemical engineering as there are in mechanical engineering.
16) Which system of equations represents the number of students in each program?
(a) $c+m+e=1200$,
(b) $c+m+e=1200$,
$2 m=e, 3 m=c$
$2 e=m, 3 c=m$
C. $c+m+e=1200$,
(d) $c+m+e=1200$,
$3 m=e, 2 m=c$
$2 m=e, 3 m=2 e$
17) What is the slope of a line that is parallel to the graph of $2 x+3 y=5$ ?
(a) $\frac{3}{2}$
(b) $-\frac{2}{3}$
(C) $\frac{2}{3}$
(C) $-\frac{3}{2}$
18) Find $a_{1}$ in a geometric series for which $S_{n}=210, r=-2$, and $n=6$.
(a) 10
(b) -10
(C) $\frac{1}{10}$
(d) $\frac{10}{3}$
19) Select the algebraic expression that represents the verbal expression five increased by seven times a number.
(a) $5 n+7$
(b) $n+12$
C. $7(n+5)$
(d) $7 n+5$
20) Write an equation for the $n$th term of the geometric sequence $-10,5,-\frac{5}{2}, \ldots$.
(a) $a_{n}=-10\left(\frac{1}{2}\right)^{n-1}$
(b) $a_{n}=10\left(-\frac{1}{2}\right)^{n-1}$
C. $a_{n}=-10\left(-\frac{1}{2}\right)^{n-1}$
(d) $a_{n}=-10\left(-\frac{1}{2}\right)^{-n-1}$
21) Simplify $(4-12 \boldsymbol{i})-(-8+4 \boldsymbol{i})$.
(a) $12-8$
(b) 28
C. $12-16 i$
(d) $12+16 i$
22) Yoshi is 12 years older than his sister. Six years from now, the sum of their ages will be 32 . Find Yoshi's present age.

24) Identify the graph of the solution set of $8.5>6.1+0.6 y$.

25) Write an equation for the $n$th term of the arithmetic sequence $-3,3,9,15, \ldots$.
(a) $a_{n}=n+6$
(b) $a_{n}=6 n+9$
(C) $a_{n}=6 n-9$
(d) $a_{n}=n-3$
26) Find the range of the relation $\{(-2,3),(-1,3),(-1,5)\}$. Then determine whether the relation is a function.
(a) $\{-2,-1\}$;
function
(b) $\{-2,-1\}$; not a
function
(c) $\{3,5\}$; function
(d) $\{3,5\}$; not a function
27) Find $f(-1)$ if $f(x)=\frac{x^{2}-4}{x+2}$.
(a) -5
(b) -3
C 1
(d) 3
28) Which quadratic inequality is graphed below?


$$
\begin{array}{ll}
\text { (a) } y \geq_{(x+1)^{2}+4} & \text { (b) } y \leq-(x+1)^{2}+4 \\
\text { (c) } y \leq(x-1)^{2}+4 & \text { (d) } y \leq(x-1)^{2}-4
\end{array}
$$

29) Find $S_{n}$ for the arithmetic series in which
$a_{1}=3, d=\frac{1}{2}$ and $a_{n}=15$.
(a) 225
(b) 9
C. 45
(d) 210
30) Name the sets of numbers to which -7 belongs.
(a) integers, rationals
(b) integers, rationals, reals
C whole numbers,
(d) integers, reals integers, reals
31) Evaluate $|a-8 b|_{\text {if }} a=-3$ and $b=\frac{1}{4}$.

$\qquad$ Class: $\qquad$

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32) John is getting his ATM card activated. He must select a password containing 4 nonzero digits to be able to use the card. How many passwords are allowed if no digit may be used more than once?
(a) 3,024
(b) 5,040
C 15,120
(d) 30,240
33) A letter is selected at random from the word MATHEMATICS. Find $P(\mathrm{I})$.
(a) $\frac{1}{10}$
(b) $\frac{2}{11}$
〇 $\frac{1}{5}$
© $\frac{1}{11}$

Simplify the given expression.
34) $5+\frac{14 a}{13 b}$
(a) $\frac{65+14 a}{13 b}$
(b) $\frac{5+14 a}{13 b}$
C) $\frac{5 b+14 a}{13 b}$
(d) $\frac{65 b+14 a}{13 b}$

## Simplify.

$$
\begin{aligned}
& \text { 35) }\left(-6 w^{3} z^{4}-3 w^{2} z^{5}+4 w+5 z\right) \div\left(2 w^{2} z\right) \\
& \begin{array}{ll}
\text { (a) }-3 w z^{3}-\frac{3 z^{4}}{2}+\frac{2}{w z}+\frac{5}{2 w^{2}} & \text { (b) } \frac{1}{-3 w z^{3}}-\frac{3 z^{4}}{2}+\frac{2}{w z}+\frac{5}{2 w^{2}} \\
\text { (c) }-3 w^{5} z^{6}-\frac{3 w^{4} z^{6}}{2}+\frac{2}{w^{4} z}+\frac{5}{2 w^{2} z^{2}} & \text { (d) } 3 w z^{3}+\frac{3 z^{4}}{2}+\frac{2}{w z}+\frac{5}{2 w^{2}}
\end{array}
\end{aligned}
$$

Simplify the given expression.
36) $\frac{\frac{h}{29 g^{4}}}{\frac{h^{5}}{2 g^{6}}}$
(a) $\frac{2 h^{4}}{29 g^{2}}$
(b) $\frac{g^{4}}{58 h^{2}}$
(C) $\frac{29 g^{4}}{2 h^{2}}$
(d) $\frac{2 g^{2}}{29 h^{4}}$

Simplify each expression.
37) $\frac{1}{5 n}-\frac{3}{4}+\frac{7}{10 n}$
(a) $\frac{3(6-5 n)}{20 n}$
(b) $\frac{3}{20}$
(c) $\frac{30(60-50 n)}{40 n}$
(C) $\frac{5}{11 n}$

Solve each equation or inequality. Check your solutions.
38) $\frac{4}{w-2}=\frac{-1}{w+3}$
(a) 2
(b) -2
$\begin{array}{ll}\text { (c) }-2,2 & \text { (d) } \varnothing\end{array}$

Simplify. Assume that no variable equals 0.
39) $\left(3 n^{2}+1\right)+\left(8 n^{2}-8\right)$
(a) $4 n^{2}$
(b) $11 n-7$
(C) $11 n^{2}-7$
(d) $11 n^{2}+7$
40) Find $(f+g)(x)$ for the following functions.
$f(x)=2 x^{2}+3 x+2$
$g(x)=8 x+2$

$$
\begin{array}{ll}
\text { (a) } 10 x^{2}+5 x+2 & \text { (b) } 2 x^{2}+11 x+2 \\
\text { (c) } 10 x^{3}+5 x+2 & \text { (d) } 2 x^{2}+11 x+4
\end{array}
$$

41) GEOMETRY The length of a rectangle is 2 feet more than its width. Find the dimensions of the rectangle if its area is 63 square feet.
(a) 3 ft by 21 ft
(b) 7 ft by 9 ft
C. 6 ft by 8 ft
(C) 6 ft by 9 ft

Simplify the expression using synthetic division.
42) $\left(7 x^{3}-91 x^{2}+224 x-140\right) \div(x-10)$
(a) quotient $\left(77 x^{2}+\right.$
$679 x-7,014)$ and remainder 70,000
(b) quotient $\left(7 x^{2}-21 x\right.$ $+14)$ and remainder 0
C. quotient $\left(70 x^{2}+\right.$ $609 x+6,314)$ and remainder 63,000
(d) quotient $\left(7 x^{2}-\right.$ $161 x-1386)$ and remainder 13,720
43) Carl drove from his house to work at an average speed of 35 miles per hour. The drive took him 25 minutes. If the drive home took him 30 minutes and he used the same route in reverse, what was his average speed going home?
(a) 27.50 miles per
(b) 29.17 miles per
C 42.00 miles per hour
(d) 291.70 miles per
hour

Find $\boldsymbol{a}_{\boldsymbol{n}}$ for each geometric sequence.
44) $a_{1}=-4, r=-2, n=10$
(a) 2048
(b) 72
C) -2048
(d) 80

Solve each equation or inequality. Check your solutions.
45) $\frac{x}{x-1}-1=\frac{x}{2}$
(a) $-1,2$
(b) 2
(c) -1 (d) $\varnothing$
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Simplify the given expression.
46) $\frac{19}{x y^{2}}-\frac{7 y^{2}}{8 x^{2}}$
(a) $\frac{19-7 y^{2}}{8 x^{2} y^{2}}$

C. $\frac{152 x-7 y^{4}}{8 x^{2} y^{2}}$
(d) $\frac{152 x-7 x y^{4}}{8 x^{3} y^{2}}$

Solve.
47) $x^{2}-21=4 x$
(a) $2 \pm i \sqrt{17}$
(b) $-6,14$
C. $3,-7$
(C) $-3,7$
48) Paula chooses a number from 1 to 10 and flips a coin. What is the probability of choosing an even number and the coin landing on heads?

$$
\begin{array}{ll}
\text { (a) } \frac{1}{2} & \text { (b) } \frac{1}{5} \\
\text { C) } \frac{9}{20} & \text { (d) } \frac{1}{4}
\end{array}
$$

Graph each function.
49) $f(x)=\frac{1}{x-2}-5$
(a)



d

50) Mrs. Johnson has 8 blue pens, 7 black pens, and 2 red pens in a desk drawer. If she selects two pens at random without replacing them, what is the probability that she selects a blue pen and then a red pen?
(a) $\frac{16}{289}$
(b) $\frac{1}{17}$

$$
\begin{array}{ll}
\text { (C) } \frac{8}{153} & \text { (d) } \frac{15}{289}
\end{array}
$$

Find the sum of each geometric series.
51) $\sum_{k=1}^{8}(-3)(3)^{k-1}$
(a) 9840
(b) -9000
C. -24
(d) -9840

State the degree and leading coefficient of each polynomial in one variable. If it is not a polynomial in one variable, explain why.
52) $\frac{2}{m^{2}}+3 m-12$
(a) $2 ; 2$
(b) $\begin{gathered}2 ; \\ \frac{1}{2}\end{gathered}$
C) Not a polynomial; $\frac{2}{m^{2}}$ cannot be written in the form $m^{n}$ for a (d) $\frac{1}{2}$; nonnegative integer $n$.
Find the explicit formula and the indicated term of the arithmetic sequence.
53) Find $a_{23}$ in the sequence, $-18,-34,-50,-66, \ldots$
(a) 334
(b) -434
(C) -370
(d) -386

Find the sum of each arithmetic series.


Determine whether each sequence is arithmetic, geometric, or neither. Explain your reasoning.
55) $4,9,16,25,36, \ldots$
a Arithmetic; the terms are increasing each time by an odd value.
emetric; the terms are increasing by 5 , then 7 , then 9 , then 11.
Neither; neither the difference nor the ratio between consecutive terms is consistent.
$\qquad$ Class: $\qquad$

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Find the first five terms of the given sequence.
56) $a_{1}=2, a_{n+1}=a_{n}-7$
(a) $2,-5,-12,-19,-26$
(b) $2,-26,-19,-12,-5$
(C) $2,-9,-16,-23,-30$
(d) $2,-5,-4,-3,-2$
57) A coin jar contains 4 pennies, 7 nickels, 5 dimes, and 3 quarters. If a coin is chosen at random, what is the probability of choosing a penny?
(a) $\frac{15}{19}$
(b) $\frac{4}{19}$
C) $\frac{5}{19}$
(d) $\frac{4}{15}$

Solve the given equation. Check your solution.
58) $\frac{6}{x+4}+\frac{1}{8}=\frac{7}{8}$
(a) 2 (b) $\frac{1}{4}$
(c) 4 (d) $\frac{1}{2}$

## Graph each function. State the domain and range.

59) $y=\sqrt{x+7}-4$
(a) $: x \leq 7$
(b): $x \geq-3$
$\mathrm{R}: y \geq-4$

R: $y \geq 0$

C): $x \geq 7$
R: $y \geq-4$
(C): $\begin{aligned} & x \geq-7 \\ & \mathrm{R}: y \geq-4\end{aligned}$



Simplify. Assume that no variable equals 0. 60) $\left(-2 b^{-2} c^{3}\right)^{3}$
(a) $\frac{-8 c^{9}}{b^{6}}$
(b) $\frac{8 c^{9}}{b^{6}}$
(C) $-8 c^{9} b^{6}$
(d) $\frac{c^{9}}{-8 b^{6}}$

In order to sustain itself in its cold habitat, a Siberian tiger requires 25 pounds of meat per day.
61) Write an equation to represent the amount of meat needed $m$ to sustain $x$ Siberian tigers for $d$ days.
(a) $m=25 x$
(b) $m=x d$
(C) $m=25 \mathrm{xd}$
(d) $m=25 d$

Determine whether each function has a maximum or minimum value, and find that value. Then state the domain and range of the function.
62) $f(x)=x^{2}-6 x+14$
(a) maximum; 5; all real numbers; $\{f(x)$ $\mid f(x) \leq 5\}$
(C)minimum; 14 ; all real numbers; $\{f(x)$ $\mid f(x) \geq 14\}$
(b) minimum; 5; all real numbers; $\{f(x)$ $\mid f(x) \geq 5\}$
(d) minimum; -6 ; all real numbers; $\{f(x)$ $\mid f(x) \geq-6\}$

Simplify the given expression.
63) $5 a^{3}\left(3 a b^{3}-6 a^{2} b^{2}+7 a^{3} b\right)$

$$
\begin{array}{ll}
\text { (a) } 15 a^{4} b^{3}-30 a^{5} b^{2}+ & \text { (b) } 15 a^{2} b^{4}-30 a^{2} b^{2}+ \\
35 a^{6} b & \\
\text { (c) } 15 a^{3} b^{3} b^{3}-30 a^{5} b^{2}+ & \text { (d) } 15 a^{4} b^{3}-30 a^{2} b^{2}+ \\
35 a^{6} b^{3} &
\end{array}
$$

Solve each system of equations.
64) $4 m-2 p=0$
$-3 m+9 p=5$
(a) $\left(-\frac{1}{3}, \frac{2}{3}\right)$
(b) $\left(\frac{1}{3}, \frac{2}{3}\right)$
C. no solution
(C)infinitely many

## Solve each system of equations by graphing.

65) $y-x=3$

$$
y=1
$$

(a)

(b) $(2,1)$

$\qquad$
$\qquad$

## Final Review


(d) $(1,4)$


Solve each equation or inequality. Check your solutions.
66) $\frac{1}{3 x-2}+\frac{5}{x}=0$

$$
\begin{array}{ll}
\text { (a) }-\frac{5}{8} & \text { (b) } \frac{2}{3} \\
\text { (c) } \frac{5}{8} & \text { (d) } \varnothing
\end{array}
$$

Find the first three terms of each arithmetic series described.
67) $a_{1}=1, a_{n}=19, S_{n}=100$
(a) $1,-1,-3$
(b) $1,3,5$
(C) $2,4,6$
(d) $1,2,3$

## Solve each system of equations.

68) $d+3 g+h=0$
$-d+2 g+h=-1$
$4 d+g-h=1$

| (a) no solution | (b) $(0,2,1)$ |
| :--- | :--- |
| (c) infinitely many solutions | (d) $(1,-1,2)$ |

69) Randy has 65 rock songs, 20 country songs, and 105 hip hop songs on her mp3 player. If she plays a song at random, what is the probability that it is a country song or a hip hop song? Round your answer to the nearest tenth percent if necessary.
(a) $10.5 \%$
(b) $65.8 \%$
C) $55.3 \%$
(d) $71.1 \%$

## Factor each polynomial.

70) $c^{2}-49$
(a) $\left(c-7^{2}\right)$
(b) $(c-7)(c+7)$
(C) $(c+7)$
(C) $(c-7)(c-7)$

## Solve each system of equations by graphing.

71) $2 x-y=6$
$x+2 y=-2$
(a) $(2,-2)$

(b) $(-2,-2)$

(c) $(1,-2.5)$

(C) $(-2,2)$

72) CHEMISTRY A scientist tested how fast a chemical reaction occurred at different temperatures. The data made this graph. What type of function shows the relation of temperature and speed of the chemical reaction?


The average American drinks about eight servings of hydrated beverages everyday.
73) Each member of a household of four members drinks the same amount of hydrated beverages each day as the average American. How many servings of hydrated beverages ( $w$ ) would the members of the household consume in a week?
(a) 28
(b) 32
(C) 224
(d) 992
74) A box contains 8 videotapes and 5 DVDs. In how many ways can one videotape and one DVD be selected?
(a) 2
(b) 13
(C) 40
(C) 64
$\qquad$

## Final Review

Identify the asymptotes of each function.
75) $f(x)=\frac{2}{x+1}+5$

(a) $x=-1, f(x)=5$
(b) $x=1, f(x)=5$
(c) $x=-1, f(x)=0$
(d) $x=5, f(x)=-1$

Determine whether each sequence is arithmetic, geometric, or neither. Explain your reasoning.
76) 57 ; 456; 3648; 29,184; ...
(a)
Arithmetic; each term is being multiplied by 8 .
(b) Geometric; the ratio between consecutive terms is 8 .

## C Neither

Solve each system of inequalities by graphing.
77) $y \leq 2 x-3$
$y \leq-\frac{1}{2} x+2$


Simplify each expression.
78) $\frac{n^{5}}{n-6} \cdot \frac{n^{2}-6 n}{n^{8}}$
(a) $n^{2}$
(b) $\frac{1}{n^{2}}$
(C) $\frac{n^{7}-6 n^{6}}{n^{9}-6 n^{8}}$
(C) $\frac{n^{3}}{6}$

Write an equation for the $n$th term of each geometric sequence.
79) $1,4,16, \ldots$

$$
\begin{array}{ll}
\text { (a) } a_{n}=(4) n^{-1} & \text { (b) } a_{n}=(4)^{4-1} \\
\text { (c) } a_{n}=\left(\frac{1}{4}\right) n^{-1} & \text { (d) } a_{n}=4(4) n^{-1}
\end{array}
$$

Write a quadratic equation in standard form with the given root(s).
80) $-5,8$

$$
\begin{array}{ll}
\text { (a) } x^{2}-5 x+8=0 & \text { (b) } x^{2}-3 x-40=0 \\
\text { (c) } x^{2}-13 x-40=0 & \text { (d) } x^{2}-3 x+40=0
\end{array}
$$

81) Tina has to create a password for the security of a software program file. She wants to use a password with 3 letters. How many passwords are allowed if no letters are repeated and the password is not case sensitive?
(a) 13,800
(b) 15,600
(C) 17,576
(d) 46,800
82) SPORTS Alexandria High School scored 37 points in a football game. Six points are awarded for each touchdown. After each touchdown, the team can earn one point for the extra kick or two points for a 2-point conversion. The team scored one fewer 2-point conversions than extra kicks. The team scored 10 times during the game. How many touchdowns were made during the game?


Solve each system of equations.
83) $5 g+4 k=10$

$$
\begin{array}{ll}
-3 g-5 k=7 & \\
\text { (a) }(6,-5) & \text { (b) }(-5,6) \\
\text { (c) }(-6,-5) & \text { (d) no solution }
\end{array}
$$

In order to sustain itself in its cold habitat, a Siberian tiger requires 25 pounds of meat per day.
84) How much meat would seven Siberian tigers need for the month of April?
(a) 750 pounds
(b) 175 pounds
C. 5,425 pounds
(d) 5,250 pounds
$\qquad$ Class: $\qquad$

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Use synthetic substitution to find $\boldsymbol{f}(-3)$ and $\boldsymbol{f}(4)$.
85) $f(x)=2 x^{4}-3 x^{3}+4 x^{2}-2 x+1$
(a) 38,377
(b) 286,377
(C) 286,249
(d) no solutions
86) David's science quiz has 10 multiple-choice questions. For each question, there are 4 possible answer choices. How many different choices for answering the 10 questions are possible?
(a) 14
(b) 80
(C) 40 (C) $1,048,576$

Simplify the given expression.
87) $7+\frac{4 a}{7 b}$
(a) $\frac{7 b+4 a}{7 b}$
(b) $\frac{7+4 a}{7 b}$
C) $\frac{49 b+4 a}{7 b}$
(C) $\frac{49+4 a}{7 b}$
88) Write a recursive formula for finding the $n$th term of each geometric sequence. $-7,49,-343, \ldots$

$$
\begin{array}{ll}
\text { (a) } a_{1}=-7, a_{n}=-7 a n_{-1} & \text { (b) } a_{1}=49, a_{n}=-7 a n \\
-1 \\
\text { C. } a_{1}=-343, a_{n}=-7 a n & \text { (d) } a_{1}=-7, a_{n}=-7 a n
\end{array}
$$

Simplify each expression.
89) $\left(y^{-\frac{1}{3}}\right)^{-\frac{3}{5}}$

$$
\begin{array}{ll}
\text { (a) } y^{5} & \text { (b) } y^{\frac{3}{5}} \\
\text { (c) } y^{\frac{5}{3}} & \text { (d) } y^{\frac{1}{5}}
\end{array}
$$

Find the values of $\ell$ and $m$ that make each equation true. 90) $(6-\ell)+(3 m) \boldsymbol{i}=-12+27 \boldsymbol{i}$

$$
\begin{array}{ll}
\text { (a) } \ell=9, m=18 & \text { (b) } \ell=18, m=9 \\
\text { (c) } \ell=6, m=9 & \text { (d) } \ell=1, m=3
\end{array}
$$

91) GEOMETRY The expressions $\frac{5 x}{2}, \frac{20}{x+4}$, and $\frac{10}{x-4}$ represent the lengths of the sides of a triangle. Write a simplified expression for the perimeter of the triangle.
(a) $\frac{5\left(x^{3}-4 x-16\right)}{2(x-4)(x+4)}$
(b) $\frac{4}{2(x-4)(x+4)}$
C $\frac{5\left(x^{3}-4 x-16\right)}{2(x-4)}$
(d) $\frac{\left(x^{3}-4 x-16\right)}{(x+4)}$

Find the inverse of the given relation.
92) $\{(10,-1),(7,-4),(12,-3),(10,-8)\}$
(a) $\{(-1,10),(4,-7)$,
(b) $\{(-1,10),(-4,7)$,
$(-3,12),(-8,10)\}$ $(-3,-12),(-8,10)\}$
C $\begin{gathered}\{(-1,10),(-4,7) \text {, } \\ (-3,12),(-8,10)\}\end{gathered}$
(C) $\{(-1,10),(-4,7)$, $(-3,12),(-8,-10)\}$

Describe the transformation in each function.
93) $y=(x+8)^{2}$
\(\left.$$
\begin{array}{lc}\text { (a) translation of the } \\
\text { graph of } y=x^{2} \\
\text { right } 8 \text { units }\end{array}
$$ \quad \begin{array}{l}(b) translation of the <br>
graph of y=x^{2} <br>

down 8 units\end{array}\right\}\)| (c) translation of the |  |
| :--- | :--- |
| translation of the <br> graph of $y=x^{2}$ up 8 <br> units | graph of $y=x^{2}$ <br> left 8 units |

Solve each equation. State the number and type of roots.
94) $-9 x-15=0$
(a) $\frac{5}{3} ; 1$ real
(b) $-\frac{5}{3} ; 1$ imaginary
C) $-\frac{5}{3} ; 1$ real
(C) $-\frac{5}{3} ; 0$ real

## Simplify each expression.

95) $\frac{2 k^{2}-k-15}{k^{2}-9}$
(a) $\frac{1-k-5}{-1}$
(b) $\frac{2 k+5}{k+3}$
C) $\frac{2 k+5}{k-3}$
(d) $\frac{7}{4}$

Simplify the given expression.
96) $\frac{5 x^{2} y^{3}}{2 a^{5} b^{4}} \div \frac{41 x^{5} y}{32 a^{7} b^{3}}$

$$
\begin{array}{ll}
\text { (a) } \frac{80 y^{2} a}{41 x^{3} b} & \text { (b) } \frac{80 y^{2} a^{2}}{41 x^{3} b} \\
\text { (c) } \frac{80 y^{2} a^{2}}{41 x^{3}} & \text { (d) } \frac{80 y a^{2}}{41 x^{3} b}
\end{array}
$$

$\qquad$ Class: $\qquad$

## Final Review

Describe the translation in each function. Then graph the function. 97) $y=x^{2}-3$

C) translated 3 units up


(d) no change


## Simplify.

98) $(6-4 i)(6+4 i)$
(a) 52
(b) $12-8 i$
(C) $52 i$
(d) $36-16 i^{2}$

Simplify the given expression.
99) $\frac{12 x}{2 y} \cdot \frac{3 y^{2}}{24 x^{3}}$
(a) $\frac{3 y}{4 x}$
(b) $\frac{3 y^{2}}{4 x^{2}}$
CC $\frac{3 y}{4 x^{2}} \quad$ (d) $\frac{4 y}{3 x^{2}}$

List all of the possible rational zeros of each function.
100) $s(x)=x^{4}-8 x^{3}+7 x-14$
(a) $1,2,7,14$
(b) $-1,-2,-7,-14$
(C) $\pm 1, \pm 2, \pm 7, \pm 14$
(d) no rational zeros
101) Use a calculator to approximate the value of $\sqrt[4]{(327)^{2}}$ to three decimal places.
(a) 18.083
(b) 5.657
(C) 2.378
(d) 4.252

Use the elimination method to solve each system of equations. 102) $-4 x-2 y=-2$

$$
-6 x+2 y=-8
$$

(a) $(-1,1)$
(b) $(-1,6)$
(c) $(6,-1)$
(d) $(1,-1)$
103) BIOLOGY A culture initially contains 200 bacteria. If the number of bacteria doubles every 2 hours, how many bacteria will be in the culture at the end of 12 hours?
(a) 12,800
(b) 6000
(C) $154,321,000$
(C) $-12,800$

Determine the value(s) of $x$ for which the function is not defined.
104) $f(x)=\frac{3}{4 x-1}$
(a) 4 (b) -4
$\begin{array}{ll}\text { (C) } \frac{1}{4} & \text { (C) }-\frac{1}{4}\end{array}$

Solve each system of equations.

$$
\begin{aligned}
\text { 105) } h-z & =3 \\
-3 h+3 z & =6
\end{aligned}
$$

(a) $(3,3)$ (b) $(-3,3)$
(C) infinitely many (d) no solution
106) $8 q-15 r=-40$
$4 q+2 r=56$
(a) $(-10,8)$
(b) $(10,-8)$
(C) $(10,8)$
(d) $(8,10)$

Solve each equation or inequality. Check your solutions.
107) $\frac{12}{x}+\frac{3}{4}=\frac{3}{2}$
(a) 16
(b) 12
(c) ${ }^{3}$ (d) $\varnothing$

## Solve each equation.

108) $2 m^{2}+10=0$
(a) $i \sqrt{5}$
(b) $\pm 2 i \sqrt{10}$
(C) $\pm i \sqrt{5}$
(d) $\pm \sqrt{-5}$
109) EDUCATION Trevor Koba has opened an English Language School in Isehara, Japan. He began with 26 students. If he enrolls 3 new students each week, in how many weeks will he have 101 students?
(a) 75 weeks
(b) 25 weeks
(C) 26 weeks
(d) 34 weeks
$\qquad$ Class: $\qquad$

## Final Review

110) Find $[g \circ h](x)$ and $[h \circ g](x)$.
$g(x)=11 x$
$h(x)=-7 x-6$

$$
\begin{array}{ll}
\text { (a) }[g \circ h](x)=-77 x^{2} & \text { (b) }[g \circ h](x)=-77 x \\
-66 x & -66 \\
{[h \circ g](x)=-77 x^{2}-} & {[h \circ g](x)=-77 x} \\
6 x & -6 \\
\text { c) }[g \circ h](x)=-77 x & \text { (d) }[g \circ h](x)=-77 x \\
+66 & -66 \\
{[h \circ g](x)=-77 x+} & {[h \circ g](x)=-77 x} \\
6 & -66
\end{array}
$$

Solve the given equation. Check your solution.
111) $\frac{2}{5}+\frac{1}{x-2}=\frac{21}{40}$
(a) 10
(b) $\frac{1}{10}$
(C) 4 (C) $\frac{1}{4}$

Simplify the given expression.
112) $\frac{12}{y+2}-\frac{11 y}{y^{2}-4}$

$$
\begin{array}{ll}
\text { (a) } \frac{12-11 y}{(y+2)\left(y^{2}-4\right)} & \text { (b) } \frac{y-24}{(y+2)(y-2)} \\
\text { C) } \frac{y+24}{(y+2)(y-2)} & \text { (d) } \frac{y-24}{(y+2)\left(y^{2}-4\right)}
\end{array}
$$

113) There are 16 girls and 20 boys in a class. A team of 2 students is to be selected for preparing a science project from this class. How many ways can a pair of a boy and a girl be selected from this class?

114) Suppose that of 70 students, 25 sing in the school choir, 40 play in the school band, and 18 both sing in the choir and play in the band. What is the probability that a student selected at random sings in the school choir or plays in the school band?

115) Find the value of $c$. Round to the nearest tenth.

(a) 45.6
(b) 39
$\begin{array}{ll}\text { (c) } 30 & \text { (d) } 33.5\end{array}$
116) Find the missing measure of the right triangle. Round to the nearest tenth.
$a=8, b=$ ?, $c=28$
(a) 36.8
(b) 21.9
(C) 26.8
(d) 31.1
117) Find the median of the data set. Round to the nearest tenth if necessary.
$35,10,6,26,6,13,7,24$
(a) 15.9
(b) 13
(C) 16.8
(d) 11.5
118) Find the mode of the data set below.
$38,34,33,20,36,30,35,20$

119) Find the standard deviation of the data set below. Round to the nearest tenth if necessary.

60, 75, 60, 100, 75

120) Find the minimum, lower quartile, median, upper quartile, and maximum of the data set below.

121) Find the minimum, lower quartile, median, upper quartile, and maximum of the data set below.
$77,71,61,72,69,63,88,85,72,82,86,56,57,34,76$

$$
\begin{array}{ll}
\text { (a) } 34,61,70,82,88 & \text { (b) } 56,61,72,82,88 \\
\text { (c) } 34,61,72,82,88 & \text { (d) } 56,61,72,82,86
\end{array}
$$

## Final Review

Find the probability.
122) Jasmine has 4 red bracelets, 5 green bracelets, and 2 yellow bracelets. If she selects a bracelet at random from her collection, what is the probability that it is red or yellow?
123) There were 150 customers at a car wash last Saturday. Of these, 112 customers had their cars washed, 48 had the interiors detailed, and 16 had both their cars washed and the interiors detailed. What is the probability that a randomly selected customer from last Saturday had their car washed or their interior detailed?
124) Christina rolls a number cube and flips a coin. Are these events independent or dependent? What is the probability that she rolls an even number and flips heads with the coin?

A research group wants to find the opinions' of city residents on the construction of a new downtown parking garage. 125) Which of the following represents an unbiased survey question?
(a) Do you agree that
the construction
of the parking

garage would be a $\quad$\begin{tabular}{l}
(b) Dou support the <br>
construction of a new <br>
parking garage <br>
waste of taxpayer <br>
dollars?

$\quad$

downtown?
\end{tabular}

126) A die is rolled 6 times. Find $P$ (exactly 4 occurrences of 6).


The points obtained by students of a class in a test are normally distributed with a mean of 60 points and a standard deviation of 5 points.
127) About what percent of students have scored between 55 and 65 points?

128) About what percent of students have scored less than 45 points?

129) About what percent of students have scored more than 65 points?

130) Find the values of the six trigonometric functions for angle $\theta$, when $A C=13$ and $B C=12$.


$$
\begin{array}{ll}
\text { (C) } \sin \theta=\frac{12}{13}, \cos \theta= & \text { (d) } \sin \theta=\frac{12}{13}, \cos \theta= \\
\frac{5}{13}, \csc \theta=\frac{13}{12}, \sec & \frac{5}{13}, \csc \theta=\frac{13}{5}, \sec \\
\theta=\frac{13}{5}, \tan \theta=\frac{12}{5}, & \theta=\frac{13}{12}, \tan \theta=\frac{12}{5}, \\
\text { and } \cot \theta=\frac{5}{12} . & \text { and } \cot \theta=\frac{12}{5} .
\end{array}
$$

131) Solve $\triangle A B C$ by using the measurements $\angle A B C=90^{\circ}$, $\angle B A C=15^{\circ}$, and $a=10$. Round measures of sides to the nearest tenth and measures of angles to the nearest degree.


$$
\begin{array}{lc}
\text { (a) } \angle C=75^{\circ}, c \approx 2.7, & \text { (b) } \angle C=75^{\circ}, c \approx 37.3, \\
b \approx 2.8 & \text { (d) } \angle C=75^{\circ}, c \approx 37.3, \\
b \approx 10.4
\end{array}
$$

$\qquad$
$\qquad$

## Final Review

132) A 15-m long ladder rests against a wall at an angle of $60^{\circ}$ with the ground. How far is the foot of the ladder from the wall?
(a) 7.5 m
(b) 12.9 m
C 17.3 m
(d) 30 m
133) Two boys are on opposite sides of a tower. They sight the top of the tower at $33^{\circ}$ and $24^{\circ}$ angles of elevation respectively. If the height of the tower is 100 m , find the distance between the two boys.


Solve the given triangle. Round the measures of sides to the nearest tenth and measures of angles to the nearest degree.
134)

$Q=56^{\circ}, p=14, q=14.3$

$$
\begin{array}{ll}
\text { (a) } P=54^{\circ}, R=70^{\circ}, r & \text { (b) } P=54^{\circ}, R=70^{\circ}, r \\
=15 & =16.3 \\
\text { C } P=70^{\circ}, R=54^{\circ}, r & \text { (d) } P=70^{\circ}, R=54^{\circ}, r \\
=16.3 & =15
\end{array}
$$

Solve the given triangle. Round the measures of sides and angles to the nearest tenth after calculating.

$a=14, b=19, C=68^{\circ}$

$$
\begin{array}{ll}
\text { (a) } c \approx 19, A \approx 68.6^{\circ}, B & \text { (b) } c \approx 28, A \approx 28^{\circ}, B \approx \\
\approx \approx 43.4^{\circ} & 84^{\circ} \\
\text { (c) } c \approx 19, A \approx 43.4^{\circ}, B & \text { (d) } c \approx 28, A \approx 43.4^{\circ}, B \\
\approx 68.6^{\circ} & \approx 68.6^{\circ}
\end{array}
$$

## Evaluate the logarithmic expression.

136) $\log _{8} 64$

$$
\begin{array}{ll}
\text { (a) } 2 & \text { (b) } 2^{8} \\
\text { (c) } 64 & \text { (d) } 8^{64}
\end{array}
$$

Solve the given equation.
137) $10^{11 n+10}=10,000$

$$
\begin{array}{ll}
\text { (a) } n=-6 & \text { (b) } n=-\frac{7}{11} \\
\text { (C) } n=\frac{14}{11} & \text { (d) } n=-\frac{6}{11}
\end{array}
$$

Write the given equation in logarithmic form.
138) $11^{5}=161,051$
(a) $\log _{5} 161,051=11$
(b) $\log _{11} 161,051=5$
(C) $\log _{6} 161,051=5$
(C) $\log _{6} 161,051=11$

Write the given equation in exponential form.
139) $\log _{9} \frac{1}{81}=-2$

$$
\begin{array}{ll}
\text { (a) } 9^{-2}=\frac{1}{81} & \text { (b) } 2^{9}=81 \\
\text { (c) } 9^{2}=81 & \text { (d) }(-2)^{9}=\frac{1}{81}
\end{array}
$$

$\qquad$ Class: $\qquad$

## Final Review

## Answer Key

1) a 25) C
2) $a$
3) C
4) d
5) $a$
6) $b$
7) $b$
8) $b$
9) $a$
10) d
11) $a$
12) $a$
13) $a$
14) $b$
15) C
16) a
17) $b$
18) $b$
19) $d$
20) C
21) C
22) $d$
23) d
24) d
$\qquad$ Class: $\qquad$

## Final Review

| 49) a |  |
| :---: | :---: |
|  | 74) C |
| 50) b |  |
|  | 75) a |
| 51) d |  |
|  | 76) b |
| 52) C |  |
|  | 77) a |
| 53) C |  |
|  | 78) b |
| 54) a |  |
|  | 79) a |
| 55) c |  |
|  | 80) b |
| 56) a |  |
|  | 81) b |
| 57) b |  |
|  | 82) C |
| 58) c |  |
|  | 83) a |
| 59) d |  |
|  | 84) d |
| 60) a |  |
|  | 85) b |
| 61) C |  |
|  | 86) d |
| 62) b |  |
|  | 87) C |
| 63) a |  |
|  | 88) a |
| 64) b |  |
|  | 89) d |
| 65) c |  |
|  | 90) b |
| 66) c |  |
|  | 91) a |
| 67) b |  |
|  | 92) C |
| 68) d |  |
|  | 93) d |
| 69) b |  |
|  | 94) C |
| 70) b |  |
|  | 95) b |
| 71) a |  |
|  | 96) b |
| 72) b |  |
|  | 97) a |
| 73) C |  |

$\qquad$ Class: $\qquad$

## Final Review

98) a
99) c
100) C
101) a
102) d
103) a
104) C
105) d
106) c
107) a
108) C
109) $b$
110) b
111) a
112) $b$
113) d
114) a
115) d
116) C
117) d
118) d
119) a
120) b
cannot be both red and yellow.
$P($ red or yellow $)=\frac{4}{11}+\frac{2}{11}=\frac{6}{11}$
121) These events are not mutually exclusive because customers can have their car washed and the interior detailed.
$P($ car washed or interior detailed $)=$
$\frac{112}{150}+\frac{43}{150}-\frac{16}{150}=\frac{144}{150}=\frac{24}{25}$
122) The events are independent because the roll of the number cube and the result of flipping the coin do not affect each other.
$P($ even number and heads $)=\frac{3}{6} \times \frac{1}{2}=\frac{1}{4}$
123) $b$
124) c
125) d
126) a
127) $b$
128) C
129) b
130) a
131) a
132) $b$
133) c
134) a
135) d
136) $b$
137) a
138) C
139) These events are mutually exclusive because a bracelet
