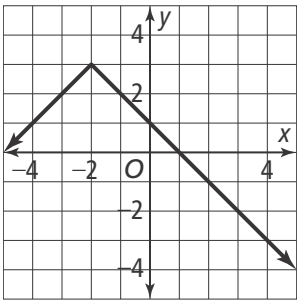
Name _____

Progress Monitoring Assessment Form C

1. The graph below is translated 3 units right, and 5 units down. What is the equation of the new graph?



Ⓐ $y = -|x + 1| - 2$

Ⓑ $y = -|x + 1| + 2$

Ⓒ $y = -|x - 1| - 2$

Ⓓ $y = -|x - 1| + 2$

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2. Select all functions whose graph has a vertical asymptote at $x = 4$.

☐ **A.** $f(x) = \log_4 x - 4$

☐ **B.** $f(x) = \ln (x - 4)$

☐ **C.** $f(x) = \log (x - 4) + 4$

☐ **D.** $f(x) = 4 \ln x - 4$

☐ **E.** $f(x) = \log (x - 4)$

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3. It takes Faucet A 8 hours to fill a tank, and it takes Faucet B 4 hours. If the tank is empty, how long will it take the two faucets to fill the tank together?

☐ hours and ☐ minutes

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4. The graph of a quadratic function $f(x)$ has a vertex at $(2, -4)$. What is the vertex of $g(x)$ if $g(x) = f(x - 3) - 2$?

(☐, ☐)

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5. The height above sea level of a pelican diving for fish is modeled by $f(x) = x^4 - 2x^3 - 29x^2 + 30x$. Select all the x-values where the pelican enters or exits the water.

☐ **A.** −6

☐ **B.** −5

☐ **C.** 0

☐ **D.** 1

☐ **E.** 4

☐ **F.** 6

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6. Solve $-x^2 + 5x = 7$ over the set of complex numbers.

Ⓐ $\frac{5 + i\sqrt{3}}{2}, \frac{5 - i\sqrt{3}}{2}$

Ⓑ $\frac{5 + i\sqrt{53}}{2}, \frac{5 - i\sqrt{53}}{2}$

Ⓒ $\frac{-5 + i\sqrt{53}}{2}, \frac{-5 - i\sqrt{53}}{2}$

Ⓓ $\frac{-5 + i\sqrt{3}}{2}, \frac{-5 - i\sqrt{3}}{2}$

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7. Find the exact solution to $5e^{\frac{x}{2}} = 10$.

$x = \ln($☐$)$

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8. Which of the following is equivalent to the expression $(i - 5)(3 + 2i)$?

Ⓐ $-7i - 13$

Ⓑ $13i - 17$

Ⓒ $-7i - 17$

Ⓓ $-13i - 17$

9. Divide $x^3 - 4x^2 + 6x - 2$ by $x - 1$. Complete the quotient using the choices provided.

$3x$	$-5x$	$-3x$	3
11	-3	$\frac{9}{x-1}$	$\frac{1}{x-1}$

$x^2 +$ ☐ $+$ ☐ $+$ ☐

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10. The formula $N = S(P - V) - F$ represents net income N, where P represents sales price, V is the variable cost per unit, S is the sales volume, and F are fixed costs. Complete the formula to find the variable cost per unit.

N	S	P	V	F

Formula for variable cost:

$$\square = \square - \frac{\square + \square}{\square}$$

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11. The function $f(x) = \sqrt{x - 10}$ represents the profits of a company after x years in business. Which function represents the number of years as a function of the profits?

Ⓐ $f^{-1}(x) = (x - 10)^2$, for $x \geq 0$

Ⓑ $f^{-1}(x) = (x - 10)^2$, for $x \geq -10$

Ⓒ $f^{-1}(x) = x^2 + 10$, for $x \geq 0$

Ⓓ $f^{-1}(x) = x^2 + 10$, for $x \geq -10$

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12. What is the average rate of change for the function $f(x) = -2x^2 + 5$ over the interval $-3.5 \leq x \leq 0$?

Ⓐ 19.5 Ⓒ -7

Ⓑ 7 Ⓓ -19.5

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13. A pizza restaurant is located in a town with a population density of 1200 people per square mile. What delivery radius will allow the pizza restaurant to deliver to approximately 30,000 people?

Ⓐ 2.8 miles

Ⓑ 5.0 miles

Ⓒ 1.6 miles

Ⓓ 8.0 miles

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14. Simplify.

$\sqrt{8} + \sqrt{32} - 2^{\frac{3}{2}}$

Ⓐ $-2\sqrt{2} - \sqrt[3]{2}$ Ⓒ $4\sqrt{2}$

Ⓑ $8\sqrt{2}$ Ⓓ 0

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15. M varies inversely with x. If $M = 2$ when $x = 10$, find the value of M when $x = 5$.

$M =$ ☐

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16. Solve the equation $-2 \ln(3x) = 5$.

Ⓐ 0.082

Ⓑ 0.027

Ⓒ 4.061

Ⓓ 36.547

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17. Factor the expression $x^2 - 33x + 32$ to reveal the zeros of the function defined by $f(x) = x^2 - 33x + 32$.

The factored expression is

$(x +$ ☐ $)(x +$ ☐ $)$

The zeros of the function are ☐ and ☐.

18. The number of people attending a music festival has been increasing over the last several days. On Monday, 240 people attended. On Tuesday, 290 people attended. And on Friday, 440 people attended.

Part A Is the sequence that represents the festival attendance arithmetic? If it is, choose the recursive formula for the sequence.

Ⓐ No; the music festival attendance cannot be represented by an arithmetic sequence.

Ⓑ Yes; $a(n) = 290 + n$

Ⓒ Yes; $a_1 = 240$, $a_n = a_{n-1} + 50$

Ⓓ Yes; $a_1 = 240$, $a_n = a_{n+1} + 50$

Part B If the trend continues, how many people will attend on Saturday?

( ) people

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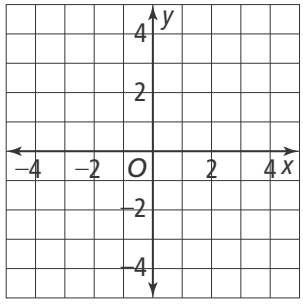
19. Use a graph to solve

$(x - 2)^2 - 1 = (x - 2)^3 + 1$.



$x =$ ( )

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20. What constant do you add to each side of the equation to solve by completing the square?

$3x^2 + 4x = 5$

Ⓐ $\frac{9}{16}$

Ⓑ $\frac{4}{3}$

Ⓒ $\frac{3}{2}$

Ⓓ 6

21. Select the solutions of the equation $x^2 = -64$.

☐ **A.** 8

☐ **B.** $-8i$

☐ **C.** -8

☐ **D.** $32i$

☐ **E.** $8i$

☐ **F.** $-32i$

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22. Simplify $(x^2 + 4x)(x^2 + x + 2)$.

Ⓐ $8x^2 + 5x^3 + 8x$

Ⓑ $x^4 + 5x^3 + 6x^2 + 8x + 2$

Ⓒ $x^4 + 5x^3 + 6x^2 + 8x$

Ⓓ $4x^5 + 4x^4 + 8x^3$

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23. Use a graph of the polynomial function $f(x) = x^3 + 3x^2$ to complete the following:

The zeros of f are ( ) and ( ).

As x decreases, $f(x)$ ☐ increases. ☐ decreases.

As x increases, $f(x)$ ☐ increases. ☐ decreases.

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24. Explain each step used to solve the equation using the properties of logarithms.

Product | Quotient | Power

$\log x + \log x^4 = 10$

$\log x^5 = 10$ ( )

$5 \log x = 10$ ( )

$x = 100$

25. Solve $x^2 + 10x + 6 = 0$. Use the choices provided to complete the solution.

10	−10	5	−5
$\sqrt{19}$	$\sqrt{6}$	$\sqrt{10}$	

$x =$ ☐ $\pm$ ☐

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26. Function f is a cosine function with period 3π, amplitude 4, and a local maximum at $f(0) = 6$. Find the equation of the midline of the graph of f.

The equation of the midline of the graph of f is $y =$ ☐.

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27. A Ferris wheel has a diameter of about 175 feet. To the nearest foot, how far does a rider travel as the wheel rotates through $\frac{\pi}{3}$ radians?

☐ feet

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28. A high school basketball team had a season average of 42 points per game. For the first 3 games of the season, they averaged 45 points per game. Which word best describes the number 45?

Ⓐ variable Ⓒ parameter

Ⓑ sample Ⓓ statistic

29. Select all the statements about the graph of $y = 2\sin(x)$ that are true.

☐ **A.** The domain of the function is $(-\infty < x < \infty)$.

☐ **B.** The function has vertical asymptotes when $x = 1$.

☐ **C.** Two of the function's zeros are when $x = 0$ and $x = 2\pi$.

☐ **D.** The function is decreasing when $\frac{\pi}{2} < x < \frac{3\pi}{2}$.

☐ **E.** The period of the function is 2π.

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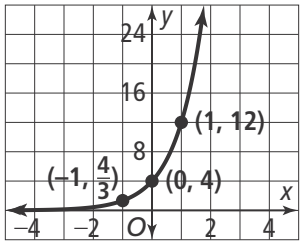
30. Function f is graphed below.



Select all the functions with a greater growth factor than f.

☐ **A.** $a(x) = 3 \cdot 4^x$

☐ **B.** $b(x) = 1.25^x$

☐ **C.** $c(x) = \left(\frac{1}{12}\right) \cdot 12^x$

☐ **D.** $d(x) = 12 \cdot \left(\frac{4}{3}\right)^x$

☐ **E.** $e(x) = \left(\frac{9}{16}\right)^x$

31. Complete the following sentence to make a true statement about the expression $81^{\frac{1}{3}}$.

$81^{\frac{1}{3}}$ is equivalent to

- ☐ $\sqrt[3]{81}$
- ☐ 3
- ☐ $\sqrt{81^3}$
- ☐ 2

because

- ☐ $9 = \sqrt{81}$
- ☐ $(\sqrt[3]{81})^3 = 81$
- ☐ $9^2 = 81$
- ☐ $\sqrt{81^3} = 1$

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32. In the expression $2x^2 + 3 + \frac{7}{y}$, x and y are positive numbers. Select all the statements which result in the value of the expression increasing.

- ☐ **A.** x decreasing and y increasing
- ☐ **B.** x increasing and y decreasing
- ☐ **C.** y increasing and x remaining constant
- ☐ **D.** y decreasing and x remaining constant
- ☐ **E.** x decreasing and y remaining constant
- ☐ **F.** x increasing and y remaining constant

33. Two community activists plan to contact local residents to urge them to vote for their preferred candidate for county sheriff.

Part A Lucía plans to contact 12 residents per day. Write a function that models the number of residents she contacts after x days.

$f(x) =$ ☐x

Caleb uses a different strategy. He contacts 4 people on the first day. Those people will then contact 4 people the next day. This pattern continues each day. Write a function that models the number of people contacted by both Lucía and Caleb after x days.

$g(x) =$ ☐$x +$ ☐^{x}

Part B Past experience shows that only 35% of people contacted will actually vote for their preferred candidate. Write a function that models the number of votes Lucía and Caleb can expect to gain for their candidate after x days.

$h(x) =$ ☐(☐$x +$ ☐^{x})

If Lucía and Caleb start contacting people 7 days before the election, how many additional votes does the model predict they will gain for their candidate? Round to the nearest whole number.

☐

34. Use the equation $\frac{x^2+4}{x-1} = \frac{5}{x-1}$ to answer the questions.

Part A

Solve the equation for x.

$x =$ ( )

Part B

Are there any extraneous solutions? Explain why or why not.

Ⓐ There are no extraneous solutions because all solutions are real numbers.

Ⓑ $x = 1$ is an extraneous solution because it makes a denominator equal to 0.

Ⓒ $x = -1$ is an extraneous solution because it makes a denominator equal to 0.

Ⓓ $x = 0$ is an extraneous solution because zero can not be a solution.

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35. Where will the discontinuities occur in the graph of the rational function?

$f(x) = \frac{x^2+5x}{x^2-2x-35}$

Ⓐ at $x = -5$ Ⓑ at $x = 7$

Ⓒ at $x = 0$, $x = -5$ and $x = 7$

Ⓓ at $x = -5$ and $x = 7$

36. Milianna rolls a number cube and will win a game with an outcome of an odd number or 6. Complete the statement.

The winning outcomes are the

☐ union
☐ intersection
☐ complement
☐ event

of {1, 2, 3, 5, 6} and {1, 3, 4, 5, 6}.

Use the data in Items 37 and 38.

The data show the favorite music of a random sample of students.

	Rock	Hip-Hop	Heavy Metal
10th Grade	16	12	4
11th Grade	18	10	12
12th Grade	16	8	6

37. What is the probability that a randomly selected 12th grade student at the school favors heavy metal?

( ) %

38. Complete the following to make a true statement.

The probability of randomly selecting a 10th grade student given the student chose rock is

☐ greater than
☐ less than
☐ equal to

selecting a student who chose rock given the student is in 10th grade.