Name: _____

Question 1 refers to the following:

Multiply the given expression:

1) $4\sqrt{3} \bullet 3\sqrt{3}$

A) 72 B) 36 C) $12\sqrt{3}$ D) $7\sqrt{3}$

---

2) Multiply: $(-5y)^3(-2y^4)^2$

Show your work.

Answer: _____

Questions 3 and 4 refer to the following:

Factor the given polynomial completely:

3) $4n^3$ - 49n

Answer: _____

4) $m^4 + 7m^2$ - 44

Answer: _____

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5) If $2x^2$ - x + 6 is subtracted from $x^2 + 3x$ - 2, what is the result?

A) x^2 - 4x + 8 B) $-x^2 + 2x$ - 8 C) $x^2 + 2x$ - 8 D) $-x^2 + 4x$ - 8

Question 6 refers to the following:

Write the given expression as a polynomial in standard form:

6) $(x + 3)^2$ - (2x - 1)^2
Show your work.

Answer: _____

Question 7 refers to the following:

Solve the given quadratic equation by taking a square root and express irrational roots in radical form:

7) $4(x + 3)^2 = 64$
Show your work.

Answer: _____

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8) Which one of the following equations would be a step in solving x^2 - 10x - 4 = 0 by the process of completing the square?
A) x - 5 = $\pm\sqrt{40}$ B) x - 10 = $\pm\sqrt{58}$ C) x - 5 = $\pm\sqrt{29}$ D) x - 5 = $\pm\sqrt{21}$

9) Solve the equation below algebraically, and express the result in radical form:
$\frac{13}{x}$ = 10 - x
Show your work.

Answer: _____

10) Find three consecutive positive integers such that the square of the third is 51 more than the sum of the first and second.
Show your work.

Answer: _____

11) A homeowner wants to increase the size of a rectangular deck that now measures 15 feet by 20 feet, but building code laws state that a homeowner cannot have a deck larger than 900 square feet. If the length and the width are to be increased by the same amount, find, to the nearest tenth, the maximum number of feet that the length of the deck may be increased in size legally.
Show your work.

Answer: _____ ft

12) Solve the given formula for r: $V = \left(\frac{1}{3}\right)\ \pi r^2 h$
Show your work.

Answer: _____

Question 13 refers to the following:

Solve the given system of equations by using an algebraic method that eliminates one of the variables:

13) $2x + 3y = -4$
$5x + 2y = 1$
Show your work.

Answer: _____

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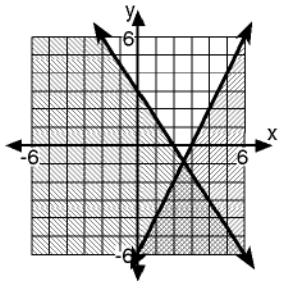
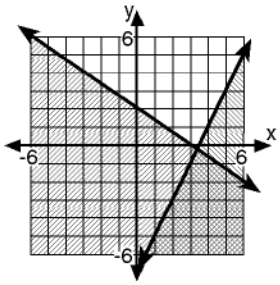
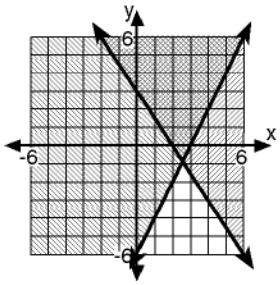
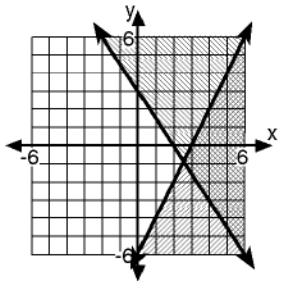
14) Which of the following graphs represents the solution to the system of inequalities below?
$2y + 3x \geq 6$
$2x - y \leq 6$

A) 

B) 

C) 

D) 

Question 15 refers to the following:

For the given arithmetic sequence, write an explicit formula for f(n). Assume the initial value of *n* to be 1.

15) 70, 63, 56, 49, ...
Show your work.
Answer: _____

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16) Given the following geometric sequence 2, 8, 32, 128, ...

Part A

Write an explicit rule for this sequence.

Show your work.

Answer: _____

Part B

Find the 7th term in this sequence.

Show your work.

Answer: _____

17) Find the third term in the recursive sequence f(k + 1) = 2f(*k*) - 1, where f(1) = 3.

Show your work.

Answer: _____

18) Raymond bought a vintage baseball card for $20. He estimates that the card will increase in value by 15% every year.

Part A

Write an explicit formula to represent the value of the card after n years, $n \geq 0$.

Answer: _____

Part B

How much might the card be worth after 4 years?

Show your work.

Answer: $_____

Part C

How much might the card be worth after 8 years?

Show your work.

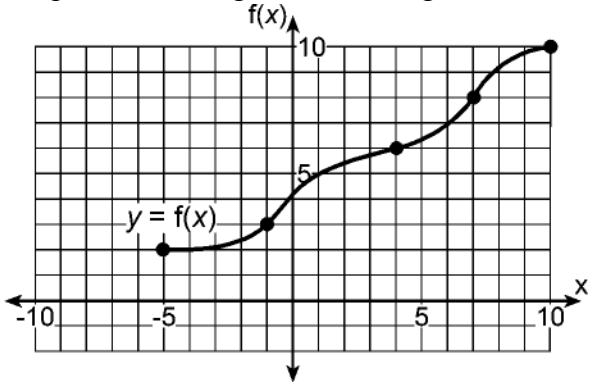
Answer: $_____

19) What is the average rate of change of y with respect to x from $x = 2$ to $x = 5$ when $y = x^2 - 3x$?

A) 4 B) 3 C) $\frac{1}{4}$ D) $\frac{8}{3}$ E) 1

Question 20 refers to the following:

Use the accompanying graph to compute the average rate of change of function f over the indicated interval:



20) [4,10]
Show your work.
Answer: _____

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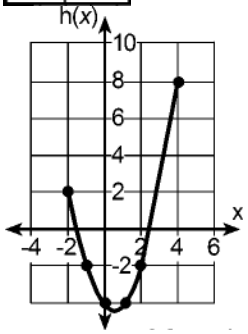
21) Given below are three functions f(x), g(*x*), and h(*x*).
(**A**) $f(x) = 2x^2 - 4x$

(**B**)

x	g(*x*)
-2	-6
0	8
2	10
4	14

(**C**)



Arrange these three functions in decreasing order from greatest to *least* in value for the average rate of change over the interval $-2 \le x \le 4$.
Show your work.
Answer: _____

22) What is the equation of the axis of symmetry of the parabola $y - 2 = \frac{1}{2}(x + 3)^2$?

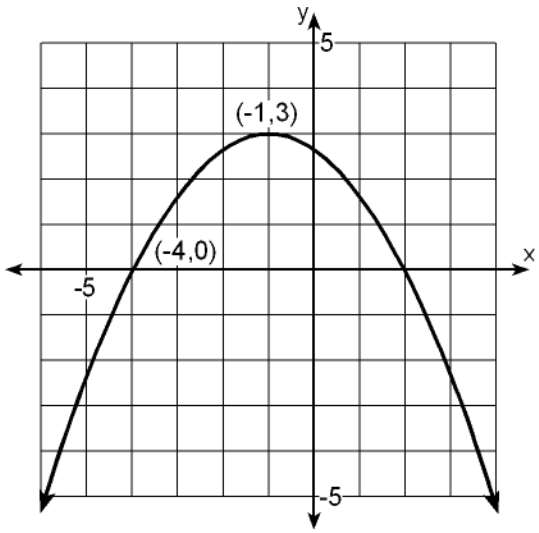
A) x = 3 B) x = -3 C) y = -2 D) y = 2

23) Determine the largest interval for which the graph of $f(x) = 5(x - 6)^2 - 10$ is *decreasing*.
Show your work.

24) What is the value of h when $4y = -x^2 - 2x + 3$ is placed in the form $y = a(x - h)^2 + k$?

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

25) What is the equation of the parabola below?



A) $y = -\frac{1}{9}(x + 1)^2 + 3$ B) $y = -\frac{1}{3}(x - 1)^2 - 3$ C) $y = -\frac{1}{9}(x - 1)^2 - 3$ D) $y = -\frac{1}{3}(x + 1)^2 + 3$

26) A ball is thrown straight up at an initial velocity of 54 feet per second. The height of the ball t seconds after it is thrown is given by the formula h(t) = 54t - $12t^2$. How many seconds after the ball is thrown will it return to the ground?
Show your work.
Answer: _____ sec

27) Consider the function f(x) = (x + 1)(x - 2)(x + 3). What is the sum of the zeros of this function?
A) 4 B) 2 C) -3 D) -2

28) What is the range of the function $f(x) = \sqrt{2x + 4}$?
A) {y|$y \geq 2$} B) {y|$y \leq 0$} C) {y|$y \geq -2$} D) {y|$y \geq 0$}

Question 29 refers to the following:

For the function $f(x) = \begin{cases} x^3 - 2 & \text{if } x \leq 0 \\ x^2 & \text{if } 0 < x \leq 1 \\ 2x - 1 & \text{if } x > 1 \end{cases}$, find the indicated functional value:

29) f(-1) = _____

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30) Phillipe invests $4,000 at 3% interest, compounded monthly.
Part A
Write an explicit formula to determine the value of this investment after t years when $t \geq 0$.
Answer: _____
Part B
What will be the value of his investment after 12 years? [Round your answer to the nearest dollar.]
Show your work.
Answer: $_____

31) What is the interquartile range for the data set {5, 4, 2, 5, 9, 3, 4, 5, 3, 1, 6, 7, 5, 8, 3, 7}?

A) 5 B) 4 C) 3 D) 8

32) Find, to the nearest tenth, the standard deviation for the following data.

Measure (x_i)	Frequency (f_i)
20	4
21	2
24	5
26	3
30	6

Show your work.

Answer: _____