

Date: _____

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Total Score:

/ 100

ARCHBISHOP WILLIAMS HIGH SCHOOL - AWHS SUMMER MATH ASSIGNMENTS: SECTION 1

Students Entering AP Calculus AB - Summer Assignment

QUESTION 1

 /1**Topic Resource: Simplifying Rational Expressions****Simplify the following**

$$\frac{3}{4x^2-25} + \frac{2}{2x+5}$$

QUESTION 2

 /3**Topic Resource: Function Decomposition****Let $f(x) = 2x + 1$ and $g(x) = 2x^2 - 1$. Find each.**

a) $f(h + 1)$

b) $f[g(-2)]$

c) $g[f(m + 2)]$

QUESTION 3

 /3

Topic Resource: Evaluating Trigonometric Functions

Let $f(x) = \sin(2x)$. Find each exact value.

a) $f\left(\frac{\pi}{4}\right)$

b) $f\left(\frac{2\pi}{3}\right)$

c) $f\left(-\frac{\pi}{6}\right)$

QUESTION 4

 /3**Topic Resource: Function Decomposition**

Let $f(x) = x^2$, $g(x) = 2x + 5$, and $h(x) = x^2 - 1$. Find each.

a) $h[f(-2)]$

b) $f[g(x - 1)]$

c) $g[h(x^3)]$

QUESTION 5

 /2

Topic Resource: Quadratic Equations**Find the x- and y-intercepts of the function:**

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

QUESTION 6

 /2**Topic Resource: Solving Systems of Equations****Find the point(s) of intersection of the graphs for the given equations:**

$$x^2 + y = 6$$

$$x + y = 4$$

QUESTION 7

 /4

Topic Resource: Domain and Range

Find the domain and range of the following functions. Write your answers in interval notation.

a) $f(x) = x^2 - 5$

b) $f(x) = -\sqrt{x+3}$

c) $f(x) = 3 \sin(x)$

d) $f(x) = \frac{2}{x-1}$

QUESTION 8

 /1**Topic Resource: Simplifying Rational Expressions**

Eliminate the complex fraction.

$$\frac{x - \frac{1}{2x}}{x^2 + \frac{1}{4x^2}}$$

QUESTION 9

 /4

Topic Resource: Inverse Functions

Find the inverse of each function.

a) $f(x) = 2x + 1$

b) $f(x) = \frac{x^2}{3}$

c) $g(x) = \frac{5}{x-2}$

d) $y = \sqrt{4-x} + 1$

QUESTION 10

 /1**Topic Resource: Inverse Functions**If the graph of $f(x)$ has the point (2, 7) then what is one point that will be on the graph $f^{-1}(x)$?

QUESTION 11

 /2

Topic Resource: Inverse Functions

Explain in words, how the graphs of $f(x)$ and $f^{-1}(x)$ compare.

QUESTION 12

 /1**Topic Resource: Writing Linear Equations**

Determine the equation of a line passing through the point (5, -3) with an undefined slope.

QUESTION 13

 /1**Topic Resource: Writing Linear Equations**

Determine the equation of a line passing through the point (4, -2) with a slope of 0.

QUESTION 14

 /1

Topic Resource: Writing Linear Equations

Use point-slope form to find the equation of the line passing through the point (0, 5) with a slope of $\frac{2}{3}$.

QUESTION 15

 /1**Topic Resource: Writing Linear Equations**

Use point-slope form to find a line passing through the point (2, 8) and parallel to the line $y = \frac{5}{6}x - 1$.

QUESTION 16

 /1**Topic Resource: Writing Linear Equations**

Use point-slope form to find a line perpendicular to $y = -2x + 9$ passing through the point (4, 7).

QUESTION 17

 /1

Topic Resource: Writing Linear Equations

Find the equation of a line passing through the points (-3, 6) and (1, 2).

QUESTION 18

 /1**Topic Resource: Writing Linear Equations**

Find the equation of a line with an x-intercept of (2, 0) and a y-intercept of (0, 3).

QUESTION 19

 /4**Topic Resource: Evaluating Trigonometric Functions**

Determine the exact value of the following. Do not use a calculator.

a) $\sin(\pi)$

b) $\cos\left(\frac{\pi}{4}\right)$

c) $\tan\left(\frac{7\pi}{4}\right)$

d) $\sin\left(\frac{4\pi}{3}\right)$

QUESTION 20

 /2

Topic Resource: Solving Trigonometric Equations

Solve the equation for $0 \leq x \leq 2\pi$.

$$4 \sin^2 x = 3$$

QUESTION 21

 /2

Topic Resource: Solving Trigonometric Equations

Solve the equation for $0 \leq x \leq 2\pi$.

$$\sin x - 2 \sin x \cos x = 0$$

QUESTION 22

 /2

Topic Resource: Transformations of Functions

Given $f(x) = x^2$ and $g(x) = (x - 3)^2 + 1$, how does the graph of $g(x)$ differ from $f(x)$ in terms of transformations of functions?

 /2

QUESTION 23

Topic Resource: Transformations of Functions

Write an equation for the function that has the shape of $f(x) = x^3$ but moved six units to the left and reflected over the x-axis.

QUESTION 24

 /2**Topic Resource: Vertical Asymptotes**

Find the vertical asymptotes for the following functions:

a) $f(x) = \frac{2+x}{x^2(1-x)}$

b) $f(x) = \frac{x-1}{x^2+x-2}$

QUESTION 25

 /2

Topic Resource: Horizontal Asymptotes

Find the horizontal asymptotes for the following functions:

a) $f(x) = \frac{x^2 - 2x + 1}{x^3 + x - 7}$

b) $f(x) = \frac{4x^2}{3x^2 - 7}$

QUESTION 26

 /2**Topic Resource: Solving Exponential Equations**

Solve the following equations to find the value of x.

a) $3^{3x-5} = 9^{2x+1}$

b) $\left(\frac{1}{9}\right)^x = 27^{2x+4}$

QUESTION 27

 /4

Topic Resource: Evaluating Logarithms

Evaluate the following logarithms. Use the exponential definition of a logarithm to help you.

a) $\log_3 27$

b) $\log_{25} 5$

c) $\ln \sqrt{e}$

d) $\ln \frac{1}{e}$

QUESTION 28

 /3**Topic Resource: Logarithmic Equations**

Solve each equation. Give exact answers.

a) $\log_{20}(8 - 2x) = \log_{20}(-3x + 10)$

b) $3 \log_4(4n - 5) + 4 = 7$

c) $4 - 2e^{x+1} = -12$

QUESTION 29

 /2

Topic Resource: Even and Odd Functions

State whether the following functions are even, odd, or neither. Explain how you know.

a) $y = 2x^4 - 5x^2$

b) $g(x) = x^5 - 3x^3 + x$

QUESTION 30

 /1**Topic Resource: Simplifying Rational Expressions**

Simplify the expression.

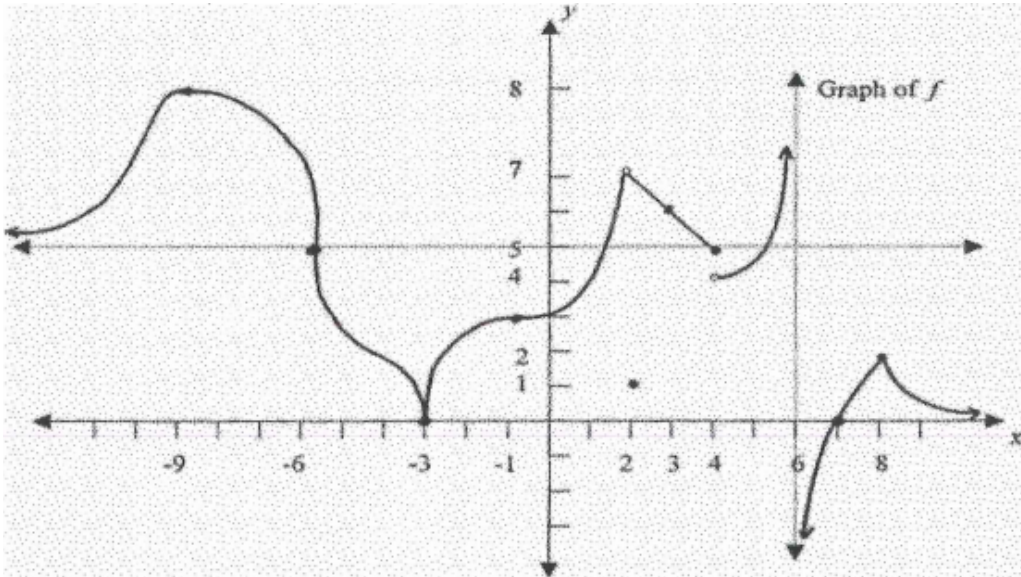
$$\frac{\frac{16}{m-1}}{\frac{16}{5} - \frac{16}{25}}$$

QUESTION 31

 /16

Topic Resource: Limits

Use the graph below to answer questions 1-16.



1. $\lim_{x \rightarrow 3^-} f(x) =$
2. $\lim_{x \rightarrow 3^+} f(x) =$
3. $\lim_{x \rightarrow 3} f(x) =$
4. $\lim_{x \rightarrow -6^-} f(x) =$
5. $\lim_{x \rightarrow -6^+} f(x) =$
6. $\lim_{x \rightarrow -6} f(x) =$
7. $\lim_{x \rightarrow 2^-} f(x) =$
8. $\lim_{x \rightarrow 2^+} f(x) =$
9. $\lim_{x \rightarrow 2} f(x) =$
10. $\lim_{x \rightarrow 4^-} f(x) =$
11. $\lim_{x \rightarrow 4^+} f(x) =$
12. $\lim_{x \rightarrow 4} f(x) =$
13. $\lim_{x \rightarrow -\infty} f(x) =$
14. $\lim_{x \rightarrow \infty} f(x) =$
15. $f(2) =$
16. $f(3) =$

QUESTION 32

Topic Resource: Difference Quotient

Let $f(x) = 2x - x^2$.

a) Find $f(3)$

b) Find $f(3+h)$

c) Find $\frac{f(3+h)-f(3)}{h}$

d) Find the instantaneous rate of change of f at $x = 3$.

QUESTION 33

 /1**Topic Resource: Derivatives**

Find the derivative of the given function.

$$f(x) = \sqrt{x+1}$$