**Math 110 Final Exam Fall 2017**

# EXAM A

Name: _____

PID: _____

Lecture Instructor: _____

1. There are 20 problems on this exam. Each problem is worth 5 points.
2. Clearly circle your answer choices on problems 1–10.
3. Place your answers in the boxes provided on problems 11–20.
   No credit will be given for correct answers without supporting work on
4. You may NOT use a calculator.
5. Sign the Honor Pledge.

I pledge that I have neither given nor received any unauthorized assistance on this exam.

_____

1. Identify the vertical asymptote(s) for the function $f(x)=\dfrac{(x-k)(x-n)}{(x-k)(x+n)}$.

(a) $x=k,\ x=-n$ (b) $x=k$ (c) $x=-n$ (d) $x=-k,\ x=n$

2. Solve the given equation for the variable $x$. Give exact answer.

$$\ln(M+6x)=3$$

(a) $\dfrac{e^3-M}{6}$ (b) $\dfrac{e^3+M}{6}$ (c) $\dfrac{3e+M}{6}$ (d) $\dfrac{3e-M}{6}$

3. Identify the function that has a horizontal asymptote at $y=0$.

(a) $f(x)=\dfrac{(x-a)^6}{(x-p)^4}$ (b) $f(x)=\dfrac{(x-a)^4}{(x-p)^6}$ (c) $f(x)=\dfrac{(x-a)^6}{(x-p)^6}$ (d) not enough information

4. Mark buys one coffee and four donuts for a total of \$12. Linda buys two coffees and three donuts for a total of \$12. Choose the best strategy to determine the cost of a donut.

(a) Solve the equation $x+4y=2x+3y$

(b) Solve the system
$$x+2y=12$$
$$4x+3y=12$$

(c) Solve the system
$$x+4y=12$$
$$2x+3y=12$$

(d) Solve the equation $3x+7y=24$

5. An investment of \$3600 earns an annual interest rate of 4%, compounded continuously. How long will it take for the investment to grow to a value of \$7200?

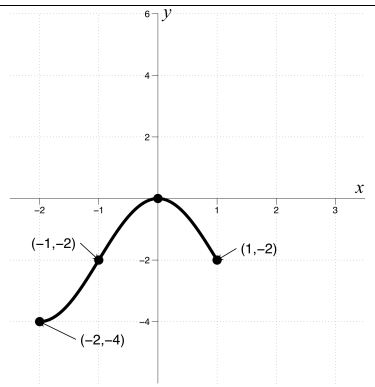
(a) $t=\dfrac{\log(2)}{0.04}$ (b) $t=\dfrac{\ln(2)}{4}$ (c) $t=\dfrac{\ln(2)}{0.04}$ (d) $t=\dfrac{\log(2)}{4}$

6. Suppose $\log(m)=4$, $\log(n)=100$, and $\log(w)=-2$, find the exact value of the given expression.

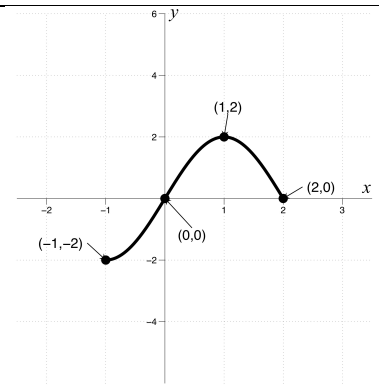
$$\log\left(\frac{m\cdot\sqrt{n}}{w^3}\right)$$

(a) 60 (b) 48 (c) –5 (d) 5

7. Basic transformations are applied to the graph of the original function $y = f(x)$ as shown below.




Original graph of $y = f(x)$

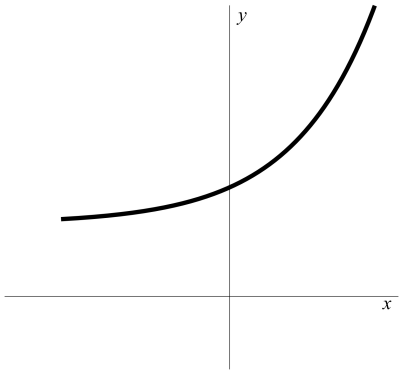



Transformation graph of $y = f(x)$

Identify the formula of the transformation graph of $y = f(x)$.

(a) $y = f(x+1)+2$ (b) $y = f(x-1)-2$ (c) $y = f(x+1)-2$ (d) $y = f(x-1)+2$

8. Choose the statement that best describes the function with the given graph.



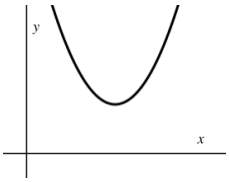

(a) Polynomial function

(b) Quadratic function

(c) Exponential function

(d) Rational function

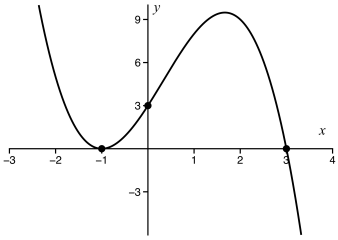
9. The graph of the quadratic function $f(x) = ax^2 + bx + c$ is shown below.




The value of $b^2 - 4ac$ is

(a) negative (b) positive (c) zero (d) not enough information

10. The graph of a polynomial function of degree 3 is shown below.




Determine the function formula for the graph.

(a) $f(x) = -(x-3)(x+1)^2$

(b) $f(x) = (x-3)(x+1)^2$

(c) $f(x) = -(x-3)^2(x+1)$

(d) $f(x) = (x-3)^2(x+1)$

11. Find the radius of the circle with equation $x^2 + y^2 - 14x + 18y + 6 = 0$.
Give exact answer.

radius

12. Find the slope of the line with equation $3(x+y) = 7x + 5$.

slope

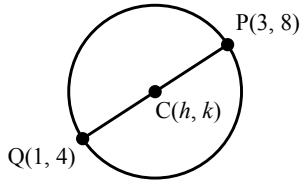
13. A ball is launched vertically upward from the top of a platform 5 feet tall with an initial velocity of 96 feet per second. The height $h$ in feet of the ball above the ground after $t$ seconds is $h = 5 + 96t - 16t^2$. What is the maximum height reached by the ball?

| maximum height |
|---|
| |

14. Write the equation of the line that is parallel to the line $24x - 4y - 8 = 0$ and passes through the point (–7, 2).

| equation |
|---|
| |

15. Construct an equation for the circle shown below, where point C is the center of the circle.




equation

16. Find the solution for the given system of equations. Give exact answer.
You must show work that supports your answer.

$$6x + 5y = 8$$
$$4x - 3y = 18$$

solution

17. Simplify the given expression. Write answer in factored form, reduced to lowest terms, using only positive exponents.

$$\left(\frac{9x^{-6}y^{5}}{y^{-7}x^{4}}\right)^{3/2}$$

answer

18. Find all solutions to the equation. Give exact answer.

$$\frac{x}{x+1}+\frac{1}{x-2}=\frac{6x}{x^{2}-x-2}$$

solution(s)

19. Determine the interval(s) where the graph of the given function is above the $x$-axis. Give answer using interval notation.

$$f(x) = \frac{9 - x}{x^2 + 5x - 66}$$

answer

20. Solve the inequality. Give answer using interval notation.

$$|2x - 3| \le 5$$

answer