Final Exam

Math 1103, Fall 2010

1. Find the equation of the line that passes through the points $(-2,3)$ and $(-1,-1)$.
   a. $4x - y + 5 = 0$
   b. $4x - y - 5 = 0$
   c. $-4x + y - 5 = 0$
   d. $4x + y + 5 = 0$
   e. None of the above

2. Find the domain of the function $f(x) = \frac{1}{\sqrt{19x+16}}$.
   a. $\left(-\infty, -\frac{16}{19}\right) \cup \left(-\frac{16}{19}, \infty\right)$
   b. $\left(-\infty, \frac{16}{19}\right]$
   c. $[\frac{16}{19}, \infty)$
   d. $(-\frac{16}{19}, \infty)$
   e. $(\frac{16}{19}, \infty)$

3. The point $(2,-1)$ is on the graph of $f(x)$ and $f(x)$ is an **even function**. Find another point that must be on the graph of $f(x)$.
   a. $(-2,-1)$
   b. $(2,1)$
   c. $(-2,1)$
   d. $(1,-1)$
   e. $(0,-1)$

7. If $(2,-5)$ is a point on the graph of $f(x)$, which of the following points MUST be on the graph of $y=\frac{1}{3}f(x-1)$?

   a. $(\frac{2}{3},-4)$
   b. $(1,-5)$
   c. $(\frac{1}{3},-5)$
   d. $(1,-\frac{5}{3})$
   e. $(3,-\frac{5}{3})$

8. Find the inverse function of $f(x)=3^{x+2}$.

   a. $f^{-1}(x)=\frac{1}{3^{x+2}}$
   b. $f^{-1}(x)=-3^{x+2}$
   c. $f^{-1}(x)=\log_3(x+2)$
   d. $f^{-1}(x)=-2+\log_3(x)$
   e. None of the above

9. Which of the following properties are true of the function $f(x)=-2(x+4)^2+8$?

   I. The vertex is $(-4,8)$
   II. $f(x)$ opens upwards
   III. $f(x)$ has been vertically stretched by a factor of 2.
   IV. $f(x)$ has x $-$intercepts at 2 and -6.
   V. $f(x)$ has y $-$intercept at -24.

   a. Only I, III, IV, and V
   b. Only I and II
   c. Only I and III
   d. Only III and V
   e. Only I, III, and V

14. Find the exponential function $f(x) = Ca^x$ whose graph goes through the points $(0, \frac{1}{5})$ and $(-2, \frac{1}{125})$. The value of C and a are:

a. $C = \frac{1}{5}; a = -2$
b. $C = \frac{1}{5}; a = 5$
c. $C = \frac{1}{5}; a = \frac{1}{5}$
d. $C = 1; a = \frac{1}{125}$
e. $C = 1; a = 5$

15. Convert the equation $2^3 = 8$ into logarithmic form

a. $\log_8 2 = 3$
b. $\log_8 3 = 2$
c. $\log_2 8 = 3$
d. $\log_2 3 = 8$
e. $\log_3 8 = 3$

16. Find the solution(s) to the following equation:

$$\ln(x-3) + \ln(x-2) = \ln(2x+24)$$

a. $x = 9; x = -2$
b. $x = -2$
c. $x = 9$
d. $x = 2; x = 3; x = -12$
e. None of the above

17. Which of the following statements are true?

I. $(\ln x)^2 = 2\ln x$
II. $\log_4(3x^4) = 4\log_4(3x)$
III. $\log(x-y) = \frac{\log x}{\log y}$
IV. $\log_3 \frac{9}{4} = 2 - \log_3 4$
V. $\ln(x^2) = 2\ln x$

a. I and II only
b. I, II, and III only
c. I and III only

22. Given the function $f(x) = x^2 - 3x + 3$, the value of $\frac{f(5+h)-f(5)}{h}$ is

a. 1
b. $14 + 7h + h^2$
c. $7 + h$
d. $7h + h^2$
e. $28 + h + h^2$

23. Find the **exact** value of $\cos(-690°)$

a. $\frac{1}{2}$
b. $-\frac{1}{2}$
c. $\frac{\sqrt{3}}{2}$
d. $\frac{\sqrt{2}}{2}$
e. $-\frac{\sqrt{3}}{2}$

24. Use the appropriate sum or difference identity to find the exact value of $\cos(\frac{7\pi}{12})$

a. $\frac{\sqrt{2}-\sqrt{6}}{4}$
b. $\frac{\sqrt{2}+\sqrt{6}}{4}$
c. $\frac{\sqrt{6}-\sqrt{2}}{4}$
d. $\frac{\sqrt{6}+\sqrt{2}}{4}$
e. None of the above

28. Find the exact value of $\tan(sin^{-1}\left(\frac{1}{\sqrt{2}}\right))$.

a. $\frac{\pi}{4}$

b. $-\frac{\pi}{4}$

c. 1

d. 0

e. -1

29. A ladder with length L leans against a vertical wall. The foot of the ladder makes an angle of 70° with the ground when the foot of the ladder is 3 feet from the wall. Find the length of the ladder

a. $L = \frac{3}{\sin(70°)}\ ft$

b. $L = 3\sin(70°)\ ft$

c. $L = \frac{3}{\cos(70°)} ft$

d. $L = 3\cos(70°) ft$

e. $L = \cos(70°)\ ft$

30. Simplify $\cos 2k \cos k + \sin 2k \sin k$ using an appropriate trigonometric identity.

a. $\cos 3k$

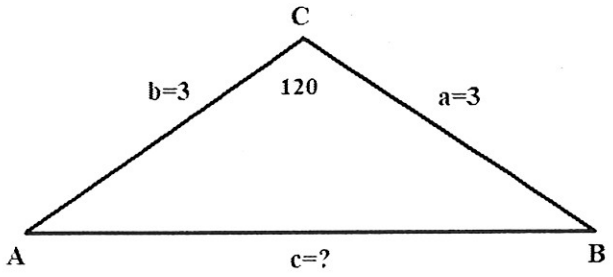
b. $\cos k$

c. $\sin k$

d. $\sin 3k$

e. None of the above

34. Find the length of the side c in the triangle ABC where $a = 3, b = 3$ and $\angle ACB = 120°$



a. $\sqrt{27}$

b. 27

c. $\sqrt{18 - 9\sqrt{3}}$

d. $\sqrt{18 + 9\sqrt{3}}$

e. $\sqrt{10}$

35. Suppose that $\sin\theta = -\frac{2}{5}$ and θ is in Quadrant 4. Evaluate $\sec\theta$

a. $\frac{-2}{\sqrt{29}}$

b. $\frac{5}{\sqrt{21}}$

c. $\frac{\sqrt{29}}{2}$

d. $\frac{\sqrt{21}}{5}$

e. $-\frac{5}{\sqrt{21}}$