**Final exam**

Choose the correct answer

1. If$ cotα=\sqrt{3}$ and $cosα<0$ then$tan\left(α+\frac{π}{6}\right) $is equal to

 (a) $\sqrt{3}$ (b) $-\sqrt{3}$ (c) $\frac{1}{\sqrt{3}}$ (d) $-\frac{1}{\sqrt{3}}$

1. $ cos\left(x+\frac{π}{2}\right)$ is equal to

 (a) $ cosx$ (b) $-sinx$ (c) $sinx$ (d) $-cosx$

1. $4sin\frac{x}{2}cos\frac{x}{2}$ is equal to

 (a) $sinx$ (b) $2cosx$ (c) $2sinx$ (d) $-2sinx$

1. $\frac{sinα×sinβ}{sin\left(β-α\right)}$ is equal to

 (a) $\frac{1}{cotα-cotβ}$ (b) $\frac{1}{tanα-tanβ}$ (c) $\frac{1}{cotα+cotβ}$ (d) $\frac{1}{tanα+tanβ}$

1. $cos5x-cos3x$ is equal to

 (a)$ sin4xsinx$ (b) $-2sin4xsinx$ (c) $cos4xcosx$ (d) $2sin4xsinx$

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1. The rate of change of $ K\left(s\right)=πe^{2s}+2sin\left(πs\right)$ at $s=0$ is equal to

 (a) $2π$ (b) $π$ (c) $4π$ (d) 0

1. Suppose a boat leaves port, travels 10 miles north, turns 30 degrees west, and travels another 8 miles. How far from port is the boat?

(a) $2\sqrt{21}$ mi (b) $2\sqrt{61} mi$ (c) $164+80\sqrt{3}mi$ (d) $164+80\sqrt{3}mi$

1. If $ y\left(x\right)=\frac{2}{\left(5x+1\right)^{3 }}$ then $\frac{dy}{dx}$ is equal to

(a) $\frac{-30}{\left(5x+1\right)^{4 }}$ (b) $\frac{-6}{\left(5x+1\right)^{4 }}$ (c) $\frac{30}{\left(5x+1\right)^{4 }}$ (d) $\frac{6}{\left(5x+1\right)^{4 }}$

1. If $ y\left(x\right)=ln\frac{e^{x}}{e^{x}-1}$ then $\frac{dy}{dx}$ is equal to

(a) $-\frac{1}{e^{x}-1}$ (b) $\frac{1}{e^{x}-1}$ (c) $\frac{2e^{x}+1}{e^{x}-1}$ (d) $\frac{2e^{x}-1}{e^{x}-1}$

1. If $ y\left(x\right)=x+lnx^{3}$ then $\frac{d^{2}y}{dx^{2}}$ at $x=1$ is equal to

(a) $0$ (b) $-3$ (c) $3$ (d) $-\frac{1}{3}$

1. If $ y\left(x\right)=1+\left(x-3\right)^{2}-xlnx,$ then $\frac{d^{3}y}{dx^{3}}$ is equal to

(a) $-\frac{1}{x^{2}}$ (b) $\frac{1}{x^{2}}$ (c) $\frac{1}{x}$ (d) $-\frac{1}{x}$

1. In $ ∆ ABC$ : $AC=8 cm,BC=6 cm, and angle BAC=35^{°}$ then $angle ABC$ is equal to

(a) $130.1^{°}$ (b) $14.9^{°}$ (c) $49.9^{°}$ (d) $164.1^{°}$

1. In $ ∆ ABC$ : $AC=10.0 in,BC=15.0 in, and angle ACB=45^{°}$ then the $angle BAC$ is equal to

(a) $41^{°}\acute{40}$ (b) $138^{°}\acute{60}$ (c) no solution (d) $45^{°}\acute{40}$

1. the values of *a* in the equation $\frac{a-2}{a}+\frac{a-3}{3}=\frac{1}{a}$ is equal to

(a) $3$ (b) $\left\{3,-3\right\}$ (c) $-3$ (d) $0$

1. Which equation is equivalent to $4x^{2}+12x+9=3 $?

 (a) $\left(x-\frac{3}{2}\right)^{2}= \frac{3}{4}$ (b) $\left(x+\frac{3}{2}\right)^{2}= \frac{3}{4}$ (c) $\left(x+\frac{3}{2}\right)^{2}= \frac{9}{4}$ (d) $\left(x+\frac{3}{2}\right)^{2}= \frac{-3}{4}$

1. A triangular swimming pool measures 40 feet on one side and 65 feet on another side. These sides form an angle that measures 50°, then the length of the third side (to the nearest tenth) is equal to

(a) $ 211ft$ (b) $ 112ft$ (c) $122$ (d)

 **Fill in the blanks and true false**

1. Using De Moivre’s theorem. The value of $z^{2}$the for a complex number $z=r\left(cosθ+isinθ\right)$is$r^{2}\left(cosθ+isinθ\right)$
2. One of the cube roots of 8 for $k=1$ in rectangular form is equal to $-1-i\sqrt{3}$
3. The rate of change of $ H\left(t\right)=ln\left(e^{3t}\right)+sint$ at $t=0$ is equal to $2$
4. If $z=7\left(cos\frac{π}{4}+isin\frac{π}{4}\right)$, then $z^{2}$ is equal to $49i$
5. The polar form of $z=1-i$ is $\sqrt{2}\left(cos\frac{π}{4}+isin\frac{π}{4}\right)$
6. If $-2\left(x+1\right)^{2}=-18,$ then $x$ is equal to $\left\{4,-2\right\}$
7. $Z=cosθ+isinθ$, then $\frac{1}{Z}$ is equal to $cosθ-isinθ$
8. $\left(i\right)^{\frac{2i}{π}}$ is equal to \_\_\_\_\_$e^{-1}$\_\_\_\_\_\_\_
9. The range of possible values of an angle $β$ such that $cosβ>0$ and $tanβ<0$ is \_\_\_\_\_\_
10. If $\left(1+x\right)^{p}=1+px+\frac{p\left(p-1\right)}{2!}x^{2}+\frac{p\left(p-1\right)\left(p-2\right)}{3!}x^{3}+…for-1<x<1,$ then Maclaurin series expansion for $f\left(x\right)=\frac{1}{1+x}$ when $p=3$ is $1+3x+3x^{2}+x^{3}$
11. If $cosx=1-\frac{1}{2!}x^{2}+\frac{1}{4!}x^{4}+…for all x,$ then the first three terms of Maclaurin series expansion for $f\left(x\right)=cos\frac{x}{2}$ is $1-\frac{x^{2}}{8}+\frac{x^{4}}{384}$