

Name _____

Banner: _____

Do write your name in the blank.
Do write your Banner in the blank.

Do use a #2 pencil.
Do NOT use anything but a #2 pencil.

Do fill in the entire rectangle to mark your answer.
Do erase errors completely. If your eraser leaves smudges, consider carefully copying your answers to a new parscore without smudges.

Do ignore the @ symbol if it is in your banner I.D.
Do write the **last 8 digits** of your banner I.D. here.
Do start entering digits at the far left.
Do fill in the appropriate oval below each digit.

Fill in the bubble for Test Form A.

Do NOT fill in an exam number.

Do write your last name, first name and middle name here.

Do replace the x with the appropriate number for the section that you are enrolled. Look at the chart below if you don't know your section.

Class Days	Time	1093.section
MWF	10am	1093.002
MWF	2pm	1093.003

Do circle your answers on this exam. Do fill in the corresponding bubble on your ParScore.

Do NOT use a calculator. Do NOT use a formula sheet.

Do cover your scratch work. Do cover your answers on your exam. Do cover your Parscore.

Do NOT cheat. Do NOT even appear to be cheating.

Do notify me if something is illegible. Do ask me to clarify if a question is ambiguous.

Do use the back of the exam pages for scratch work. Do feel free to unstaple the pages of the exam.

Grades will be available in WebCT when the Parscore Office finishes grading your exams. I don't know when this will be so do NOT ask me.

#1) $\sin(\pi/6) =$

- A) $\sqrt{3}/2$ B) 0 C) $1/2$ D) 1 E) None of the above
-

#2) $\cos(2\pi/3) =$

- A) $\sqrt{3}/2$ B) 1 C) 0 D) $-1/2$ E) None of the above
-

#3) $\sin(630^\circ) =$

- A) $-\sqrt{3}/2$ B) $\sqrt{2}/2$ C) 0 D) -1 E) None of the above
-

#4) $\tan(-11\pi/6) =$

- A) $\sqrt{3}/2$ B) $1/\sqrt{3}$ C) 0 D) 1 E) None of the above
-

#5) $\sec(1080^\circ) =$

- A) $\sqrt{2}$ B) $-2\sqrt{3}/3$ C) 2 D) -1 E) None of the above
-

#6) $\csc(11\pi/6) =$

- A) $2/\sqrt{3}$ B) -2 C) $4/(\sqrt{6}-\sqrt{2})$ D) $\sqrt{3}$ E) None of the above
-

#7) $\cot(690^\circ) =$

- A) $5\pi/2$ B) $1/\sqrt{3}$ C) 0 D) $-\sqrt{3}$ E) None of the above
-

#8) $\sin^2(7\pi/3) =$

- A) $3\sqrt{3}/8$ B) $3/4$ C) $9/16$ D) 8 E) None of the above
-

#9) $\cot^2(9\pi/4) =$

- A) $-\sqrt{3}$ B) -2 C) -1 D) 1 E) None of the above
-

#10) $\sin(27\pi/6) =$

- A) $1/2$ B) $-\sqrt{3}/2$ C) $\sqrt{3}/2$ D) 1 E) None of the above
-

#11) $\sin^{-1}(1/2) =$

- A) $\sqrt{3}/2$ B) 0 C) $1/2$ D) 1 E) None of the above
-

#12) $\cos^{-1}(1/2) =$

- A) $\pi/2$ B) $\pi/3$ C) 0 D) $\pi/6$ E) None of the above
-

#13) $\sin^{-1}(-1/2) =$

- A) $\pi/2$ B) $-\pi/3$ C) 0 D) $-\pi/6$ E) None of the above
-

#14) $\cos^{-1}(-1/2) =$

- A) $\pi/2$ B) $-\pi/3$ C) 0 D) $-\pi/6$ E) None of the above
-

#15) $\arctan(-1) =$

- A) $-\pi/4$ B) $3\pi/4$ C) $-3\pi/4$ D) -1 E) None of the above
-

#16) $\arcsin(1/\sqrt{2}) =$

- A) $\pi/6$ B) $3\pi/4$ C) $\pi/4$ D) $\sqrt{3}/2$ E) None of the above
-

#17) $\arccos(-\sqrt{3}/2) =$

- A) $5\pi/6$ B) $-\pi/6$ C) $-\pi/3$ D) $2\pi/3$ E) None of the above
-

#18) $\sin(\arccos(-\sqrt{2}/2)) =$

- A) $-\sqrt{2}/2$ B) $-\pi/4$ C) $3\pi/4$ D) $\sqrt{2}/2$ E) None of the above
-

#19) $\cos(\arcsin(-\sqrt{2}/2)) =$

- A) $-\sqrt{2}/2$ B) $-\pi/4$ C) $3\pi/4$ D) $\sqrt{2}/2$ E) None of the above
-

#20) $\sin(\arctan(-1)) =$

- A) $-\sqrt{2}/2$ B) $-\pi/4$ C) $3\pi/4$ D) $\sqrt{2}/2$ E) None of the above

#21) $\sin(\arccos(3/4)) =$

- A) $\sqrt{7}/4$ B) $2\sqrt{2}/3$ C) $3/2$ D) $\sqrt{3}/4$ E) None of the above
-

#22) $\cos(\arctan(3/4)) =$

- A) $3/2$ B) $4/5$ C) $2/3$ D) $\sqrt{7}/2$ E) None of the above
-

#23) What is the period of $3\sin(5x-3)+2$?

- A) 3 B) $\pi/5$ C) $2\pi/5$ D) $\pi/3$ E) None of the above
-

#24) What is the period of $2\tan(3x-1)+1$?

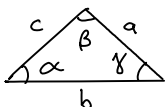
- A) 3 B) $\pi/5$ C) $2\pi/5$ D) $\pi/3$ E) None of the above
-

#25) If $\sin(\alpha) = 2/3$ and $\cos(\beta) = 1/3$ where $0 < \alpha < \pi/2$ and $0 < \beta < \pi/2$ then $\cos(\alpha+\beta) =$

- A) $\sqrt{2}$ B) $\frac{\sqrt{5}-4\sqrt{2}}{9}$ C) $\frac{\sqrt{5}+4\sqrt{2}}{9}$ D) $\frac{\sqrt{5}}{3}$ E) None of the above
-

#26) If $\sin(\alpha) = 1/3$ and $\cos(\beta) = 3/4$ where $0 < \alpha < \pi/2$ and $0 < \beta < \pi/2$ then $\sin(\alpha+\beta) =$

- A) $\frac{\sqrt{2-\sqrt{3}}}{2}$ B) $\frac{\sqrt{2+\sqrt{3}}}{2}$ C) $\frac{4}{\sqrt{6}-\sqrt{2}}$ D) $\frac{3+2\sqrt{14}}{12}$ E) None of the above
-

#27) If triangles are labeled in this way  and if $a=2, \beta = \gamma = 15^\circ$, solve for b, c and α .

- A) $\alpha = 150^\circ, b = c = \sqrt{3} - \sqrt{2}$
B) $\alpha = 150^\circ, b = \sqrt{6} - \sqrt{2}, c = \sqrt{6} + \sqrt{2}$
C) $\alpha = 150^\circ, b = c = \sqrt{6} - \sqrt{2}$
D) $\alpha = 150^\circ, b = c = \sqrt{6} + \sqrt{2}$
E) None of the above
-

#28) Convert 212 degrees to radians: $212^\circ =$

- A) 212π B) $\pi/212$ C) 212 D) $53\pi/45$ E) None of the above

#29) Linear speed is given by $v = s/t$ and angular speed is $\omega = \theta/t$ where s is arclength and t is time. Assume the Earth's orbit to be circular and the distance between the Earth and Sun to be 1 AU (AU stands for Astronomical Unit). What is the Earth's linear speed relative to the sun?

- A) 1 AU/yr
 - B) 2π AU/yr
 - C) π AU/yr
 - D) π^2 AU/yr
 - E) None of the above
-

#30) $2 \sin(\pi/12) \cos(\pi/12) =$

- A) $(\sqrt{6} + \sqrt{2})/4$
 - B) $(\sqrt{6} - \sqrt{2})/4$
 - C) $\sqrt{3}/2$
 - D) $1/2$
 - E) None of the above
-

#31) What is the domain of $\sin(x)$?

- A) $[-1, 1]$
 - B) \mathbb{Z}
 - C) \mathbb{N}
 - D) \mathbb{R}
 - E) None of the above
-

#32) Complete the identity: $\sin(\pi/2 - \theta) =$

- A) $\cos(\theta)$
 - B) $-\sin(\theta)$
 - C) $\sin(\theta/2)$
 - D) $-\cos(\theta)$
 - E) None of the above
-

#33) If $\tan(\theta) = 3/2$ and $\cos(\theta) > 0$ then $\sin(\theta) =$

- A) 3
 - B) 2
 - C) $3/\sqrt{13}$
 - D) $3/\sqrt{7}$
 - E) None of the above
-

#34) If $\cot^2(\theta) = 4$ then $\csc^2(\theta) =$

- A) $1/2$
 - B) 2
 - C) 17
 - D) 13
 - E) None of the above
-

#35) Complete the identity: $\cos(-x) =$

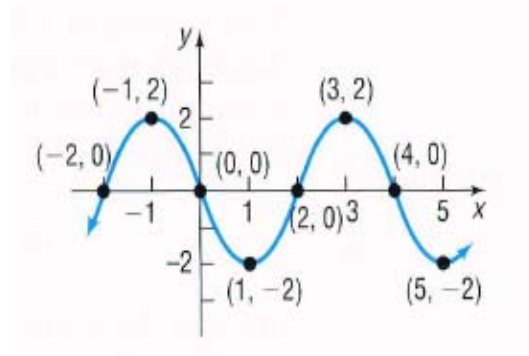
- A) $\cos(x)$
- B) $\sin(x)$
- C) $-\cos(x)$
- D) $\sin(x - \pi/2)$
- E) None of the above

#36) What is the amplitude of $4\sin(3x-2)+1$?

- A) $2/3$ B) 1 C) 4 D) $2\pi/3$ E) None of the above

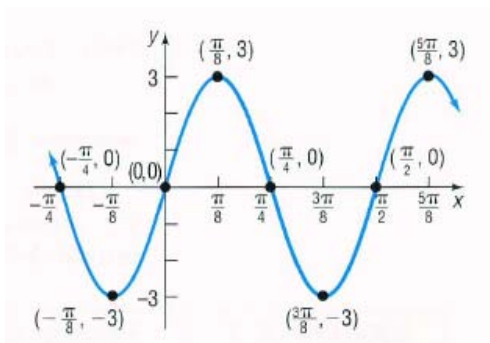
#37) The following graph is a graph of what function?

- A) $-4\sin(x)$
 B) $(1/2)\sin(\pi x)$
 C) $2\sin(-4x)$
 D) $2\sin(-\frac{\pi}{2}x)$
 E) None of the above

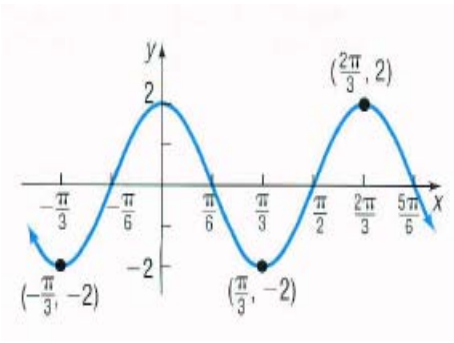


#38) Which is the graph of $f(x) = 3\sin(4x)$?

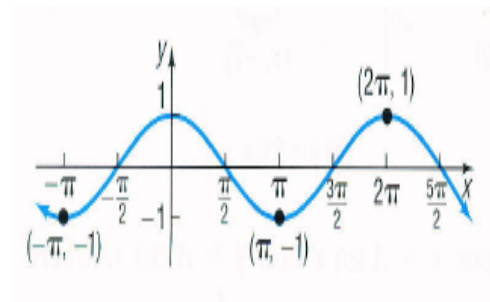
A)



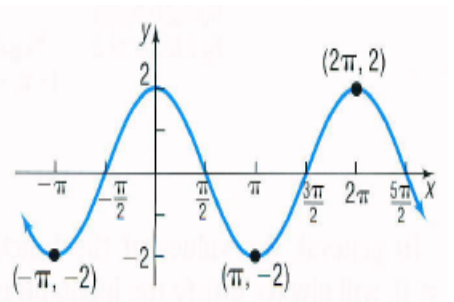
B)



C)



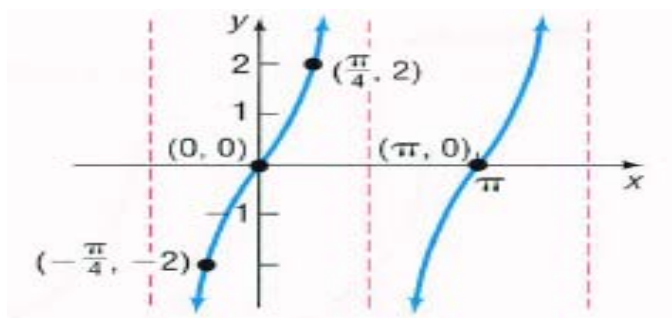
D)



E) None of the above

#39) The following graph is a graph of what function?

- A) $\tan(2x)$
 B) $2\cot(x)$
 C) $2\tan(x)$
 D) $2\tan(-\frac{\pi}{2}x)$
 E) None of the above



#40) Solve for x : $3\sin^{-1}(x) = \pi/2$

- A) 0 B) 1 C) $\sqrt{3}/2$ D) $1/2$ E) None of the above
-

#41) $\sin(75^\circ) =$

- A) $(\sqrt{6} + \sqrt{2})/4$ B) $(\sqrt{6} - \sqrt{2})/4$ C) $\sqrt{2 - \sqrt{3}}/2$ D) $5\pi/12$ E) None of the above
-

#42) Solve for x : $2\sin(3x) = 1$

- A) $x = \frac{\pi}{6} + 2\pi k, \frac{5\pi}{6} + 2\pi k; k \in \mathbb{Z}$
B) $x = \frac{\pi}{18} + \frac{2\pi k}{3}, \frac{5\pi}{18} + \frac{2\pi k}{3}; k \in \mathbb{Z}$
C) $x = \frac{\pi}{18} + 2\pi k, \frac{5\pi}{18} + 2\pi k; k \in \mathbb{Z}$
D) $x = \frac{\pi}{6} + \frac{2\pi k}{3}, \frac{5\pi}{6} + \frac{2\pi k}{3}; k \in \mathbb{Z}$
E) None of the above
-

#43) Solve for x : $2\sin(3x)\cos(3x) = 1$

- A) $x = \frac{\pi}{6} + 2\pi k, \frac{5\pi}{6} + 2\pi k; k \in \mathbb{Z}$
B) $x = \frac{\pi}{12} + \frac{\pi k}{3}; k \in \mathbb{Z}$
C) $x = \pm \frac{\pi}{2} + 2\pi k; k \in \mathbb{Z}$
D) $x = \frac{\pi}{6} + \frac{\pi k}{3}, \frac{5\pi}{6} + \frac{\pi k}{3}; k \in \mathbb{Z}$
E) None of the above
-

#44) Solve for x : $\sin^2(x) - \cos^2(x) - 1 = \cos(x)$

- A) $x = \pm \frac{\pi}{2} + 2\pi k; k \in \mathbb{Z}$
B) $x = \frac{\pi}{2} + \frac{\pi k}{3}, \frac{5\pi}{6} + \frac{\pi k}{3}; k \in \mathbb{Z}$
C) $x = \frac{\pi}{2} + \pi k, \pm \frac{\pi}{3} + 2\pi k; k \in \mathbb{Z}$
D) $x = \frac{\pi}{6} + 2\pi k, \frac{5\pi}{6} + 2\pi k; k \in \mathbb{Z}$
E) None of the above

#45) Solve for x : $\tan(x) - \cot(x) = 0$

A) $x = \frac{\pi}{6} + 2\pi k, \frac{5\pi}{6} + 2\pi k; k \in \mathbb{Z}$

B) $x = \frac{\pi}{4} + \frac{\pi}{2}k; k \in \mathbb{Z}$

C) $x = \pm \frac{\pi}{4} + 2\pi k; k \in \mathbb{Z}$

D) $x = \pm \frac{\pi}{2} + 2\pi k; k \in \mathbb{Z}$

E) None of the above

#46) Solve for x : $\sin(2x)\sin(x) - \cos(x) = 0$

A) $x = \frac{\pi}{2} + 2\pi k, \frac{\pi}{4} + \frac{\pi}{2}k; k \in \mathbb{Z}$

B) $x = \pm \frac{\pi}{4} + 2\pi k, \frac{\pi}{2} + 2\pi k; k \in \mathbb{Z}$

C) $x = \frac{\pi}{4} + 2\pi k, \frac{\pi}{2} + 2\pi k; k \in \mathbb{Z}$

D) $x = \pm \frac{\pi}{4} + 2\pi k; k \in \mathbb{Z}$

E) None of the above

#47) Solve for x : $\cos^2(x) + \sin^2(x) = 1$

A) $x = \frac{\pi}{2} + 2\pi k; k \in \mathbb{Z}$

B) $x = \pm 1$

C) $x \in \mathbb{R}$

D) $x = 2\pi k; k \in \mathbb{Z}$

E) None of the above

#48) Complete the identity: $\left(\frac{1 + \tan(\theta)}{1 + \cot(\theta)}\right)^2 =$

A) $\cot^2(\theta)$

B) $\tan^2(\theta)$

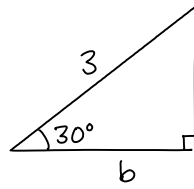
C) $\sin^2(\theta)/\cos(\theta)$

D) $\tan(\theta)$

E) None of the above

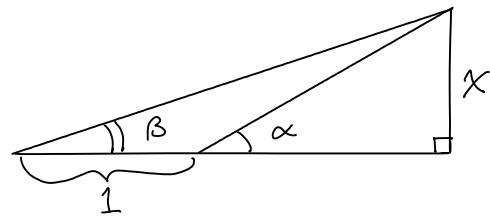
#49) Solve for b in the given triangle:

- A) $b = 3/2$
- B) $b = 3\sqrt{3}/2$
- C) $b = \sqrt{3}/6$
- D) $b = \sqrt{3}/3$
- E) None of the above



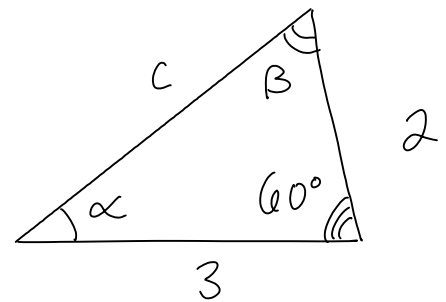
#50) Solve for x in terms of α and β .

- A) $x = 1 / [\cot(\beta) + \cot(\alpha)]$
- B) $x = 1 / [\cot(\beta) - \cot(\alpha)]$
- C) $x = 1 / [\tan(\beta) - \tan(\alpha)]$
- D) $x = 1 / [\tan(\beta) + \tan(\alpha)]$
- E) None of the above



#51) Solve the triangle:

- A) $c = \sqrt{7}, \alpha = \arccos(\sqrt{7}), \beta = 130^\circ - \arccos(\sqrt{7})$
- B) $c = 7, \alpha = \arcsin(7), \beta = 130^\circ - \arcsin(7)$
- C) $c = 1/\sqrt{7}, \alpha = \arcsin(\sqrt{7}), \beta = 130^\circ - \arcsin(\sqrt{7})$
- D) $c = \sqrt{7}, \alpha = \arcsin(1/\sqrt{7}), \beta = 130^\circ - \arcsin(1/\sqrt{7})$
- E) None of the above



#52) Find the area of a triangle with sides of lengths 4, 5 and 7 using Heron's Area Formula: $A = \sqrt{s(s-a)(s-b)(s-c)}$ where $s = (a+b+c)/2$.

- A) $23\sqrt{7}$
- B) 140
- C) 70
- D) $4\sqrt{6}$
- E) None of the above

#53) Convert the polar coordinate $(3, \pi/6)$ to rectangular.

- A) $(\sqrt{3}/2, 1/2)$
- B) $(1/2, 3/2)$
- C) $(\sqrt{3}/2, 3/2)$
- D) $(3\sqrt{3}/2, 3/2)$
- E) None of the above

#54) Convert the rectangular coordinate $(-\sqrt{3}, 1)$ to polar.

- A) $(\sqrt{3}, -\pi/6)$ B) $(2, -\pi/6)$ C) $(2, 5\pi/6)$ D) $(3, \pi/3)$ E) None of the above
-

#55) If $z = 2[\cos(33^\circ) + i\sin(33^\circ)]$ and $w = 3[\cos(27^\circ) + i\sin(27^\circ)]$ then $z \cdot w =$

- A) $6i$ B) $2 + 2\sqrt{2}i$ C) $3 + 3\sqrt{3}i$ D) $33 + 27i$ E) None of the above
-

#56) $(1 - \sqrt{3}i)^8 =$

- A) $-2^7 - 2^7\sqrt{3}i$ B) $1 - 3^4i$ C) $8 - 8\sqrt{3}i$ D) $2^8 + 2^8\sqrt{3}i$ E) None of the above
-

#57) $(2 + 3i)/(1 - 2i) =$

- A) $2 - \frac{3}{2}i$ B) $-\frac{4}{3} + \frac{7}{3}i$ C) $-\frac{2}{3} + 3i$ D) $1 + i$ E) None of the above
-

#58) Which of the following is a fourth root of i ?

A) $\cos(3\pi/7) + i\sin(3\pi/7)$

B) -1

C) $\sqrt{2}/2 + i\sqrt{2}/2$

D) $\cos(\pi/8) + i\sin(\pi/8)$

E) None of the above

#59) If $\vec{u} = (3, 4)$ and $\vec{v} = (-1, 2)$ then $3\vec{u} - \vec{v} =$

- A) $(10, 10)$ B) $(0, 2)$ C) $(8, 14)$ D) $(3, -1)$ E) None of the above
-

#60) Solve for x : $e^{-x^2} = (e^x)^2 \cdot 1/e^4$

- A) $-1 \pm \sqrt{5}$ B) $e^{\pm\sqrt{5}}$ C) $1 \pm \sqrt{5}$ D) $\pm\sqrt{5}$ E) None of the above
-

#61) Solve for x : $\log_x(\sqrt{10}) = 1/2$

- A) 10^2 B) 10 C) 2 D) $\sqrt{2}$ E) None of the above
-

#62) What is the domain of the function $f(x) = \ln(x - \pi)$?

- A) \mathbb{R} B) $x > \pi$ C) $0 < x < \pi$ D) $x > 0$ E) None of the above

#63) Solve for x : $\log_2(8^x) + 3 = 0$

- A) $x=0$ B) $x=\pm 1$ C) $x=1$ D) $x=-1$ E) None of the above
-

#64) Solve for x : $4e^{x+1} + 1 = 6$

- A) $\ln(5/4)$ B) $\ln(4/5)+1$ C) $\ln(5/4)-1$ D) $\ln(5/4)+1$ E) None of the above
-

#65) Solve for x : $\log_4(4^x) = -1$

- A) $x=e$ B) $x=0$ C) $x=-1$ D) $x=\pm 1$ E) None of the above
-

#66) $\log[\sqrt{x^2+1} \cdot \sqrt[3]{x^3-1}] =$

- A) $\frac{1}{2} \log(x^2+1) + \frac{1}{3} \log(x^3-1)$
B) $2 \log(x)$
C) $\frac{1}{6} \log(x^2+1) \cdot \log(x^3-1)$
D) $\log^2(x^2+1) + \log^3(x^3-1)$
E) None of the above
-

#67) $3 \log(x) - 4 \log(y^2) + 5 \log(z^3) =$

- A) $\log(x^3 z^{15} / y^8)$
B) $\log(y^8 / x^3 z^{15})$
C) $\log(x^4 z^8 / y^2)$
D) $\log(x^4 y^2 z^8)$
E) None of the above
-

#68) Solve for x : $3 \log_2(x-1) - 5 = -\log_2(4)$

- A) $x=1$ B) $x=-1$ C) $x=2$ D) $x=0$ E) None of the above
-

#69) Solve for x : $25^x - 2^3 \cdot 5^x = -16$

- A) $\log_2(5)$ B) 2 C) $\log_5(4)$ D) $\log_4(5)$ E) None of the above
-

Compound Interest: The amount after t years with an initial amount, P , called the Principal, with an annual interest rate r , where interest is compounded n times per year, is given by:

$$A(t) = P \left(1 + \frac{r}{n}\right)^{nt} \xrightarrow{n \rightarrow \infty} P e^{rt}$$

#70) How much money would you have if you invested \$100 at 6% compounded annually after two years?

- A) \$115 B) \$113.12 C) \$112.36 D) \$112.00 E) None of the above
-

#71) How much money would you have if you invested \$100 at 6% compounded quarterly after two and a half years?

- A) $\$100 (1.015)^{10}$
B) $\$100 (1.15)^{10}$
C) $\$100 (1.015)^5$
D) $\$100 (1.06)^{10}$
E) None of the above
-

#72) How much money would you have if you invested \$100 at 6% compounded continuously after two and a half years?

- A) \$112.17
B) $\$100 e^{0.15}$
C) $\$100 [1 + e^{.06}]^{5/2}$
D) $\$100 e^{5/2}$
E) None of the above

#73) How much money should you have invested two years ago at 6% compounded quarterly to have \$100 today?

- A) \$ 87.88
 - B) $\$ 100 (1.015)^{-8}$
 - C) $\$ 100 (1.015)^8$
 - D) $\$ 100 (.015)^{-8}$
 - E) None of the above
-

#74) What rate of interest compounded annually is required to double an investment in 10 years?

- A) $r = 2$
 - B) $r = 2^{1/10}$
 - C) $r = 0.06$
 - D) $r = 2^{1/10} - 1$
 - E) None of the above
-

#75) What rate of interest compounded monthly is required to double an investment in 10 years?

- A) $r = 12$
 - B) $r = 0.073$
 - C) $r = 12 \cdot 2^{1/120}$
 - D) $r = (2^{1/120} - 1) / 12$
 - E) None of the above
-