

PRECALCULUS EXAM #3 FALL 2006

NAME: _____ BANNER: _____

Write your name and banner I.D. number in the appropriate places on this exam and your Parscore.

Be sure to fill in the corresponding bubbles on your Parscore for your Banner I.D.

Do NOT replace the @ in your I.D. with a zero. Simply ignore it.

Place your I.D number in the parscore from left to right starting from the far left side.

This is TEST FORM A. Fill in this bubble on your Parscore under TEST FORM.

The EXAM NUMBER need not be filled in. Subject, Date, Hour/Day are also not necessary.

Circle your answers on this test as well as fill in the corresponding bubbles on the Parscore.

Feel free to tear the pages of this exam apart as to write on the backsides for scratch work.

Return this exam and your Parscore to me when you are done.

Do the easier problems first. Don't cheat. Cover your work. Ask me if a question is unclear, ambiguous, or illegible.

THERE IS ONE ANSWER PER PROBLEM. SELECT ONE LETTER.

#1 Completely factor the polynomial: $z^6 - 1 = 0$

A) $(z-1)(z+1)(z-i)(z+i) \left[z - \left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i \right) \right] \left[z + \left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i \right) \right] = 0$

B) $(z-1)(z+1) \left[z - \left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i \right) \right] \left[z + \left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i \right) \right] \left[z - \left(\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}i \right) \right] \left[z + \left(\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}i \right) \right] = 0$

C) $(z-1)(z+1) \left[z - \left(\frac{1}{2} + \frac{\sqrt{3}}{2}i \right) \right] \left[z + \left(\frac{1}{2} + \frac{\sqrt{3}}{2}i \right) \right] \left[z - \left(\frac{1}{2} - \frac{\sqrt{3}}{2}i \right) \right] \left[z + \left(\frac{1}{2} - \frac{\sqrt{3}}{2}i \right) \right] = 0$

D) $(z-1)(z+1) \left[z - \left(\frac{\sqrt{3}}{2} + \frac{1}{2}i \right) \right] \left[z + \left(\frac{\sqrt{3}}{2} + \frac{1}{2}i \right) \right] \left[z - \left(\frac{\sqrt{3}}{2} - \frac{1}{2}i \right) \right] \left[z + \left(\frac{\sqrt{3}}{2} - \frac{1}{2}i \right) \right] = 0$

E) NONE OF THE ABOVE

#2 Find $(-2 + \sqrt{3}i)^6$ in polar form.

A) $7^3 \left(\cos \left[6 \tan^{-1} \left(\frac{\sqrt{3}}{2} \right) \right] + i \sin \left[6 \tan^{-1} \left(\frac{\sqrt{3}}{2} \right) \right] \right)$

B) $7^3 \left[\cos \left(\frac{\pi}{2} \right) + i \sin \left(\frac{\pi}{2} \right) \right]$ C) $7^3 \left[\cos \left(\frac{3\pi}{2} \right) + i \sin \left(\frac{3\pi}{2} \right) \right]$

D) $7^3 \left(\cos \left[6\pi - 6 \tan^{-1} \left(\frac{\sqrt{3}}{2} \right) \right] + i \sin \left[6\pi - 6 \tan^{-1} \left(\frac{\sqrt{3}}{2} \right) \right] \right)$

E) NONE OF THE ABOVE

#3 Which of the following is completely true?

A) $z\bar{z} = r^2$, $z = x + yi = r(\cos\theta + i\sin\theta) = re^{i\theta}$, $\sqrt{i} = \pm \left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i \right)$

B) $z\bar{z} = r$, $\bar{z} = x + yi \Rightarrow z = x - yi$, $\sqrt{-i} = -\sqrt{i}$

C) $|z| = \sqrt{z\bar{z}} = r$, $z = x + yi = r\cos\theta + i\sin\theta$, $0 = e^{i\pi} + 1$

D) $\overline{2i} = -2i$, $\overline{\bar{z}} = z^2$, $-\overline{2} = -2$

E) NONE OF THE ABOVE

#4 Which of the following is completely true?

A) $\ln[e^{\ln(e)}] = 1$

B) $e^{\ln(e^{\ln(e)})} = 1$

C) $\ln(\ln[\ln(e^e)]) = 1$

D) ALL OF THE ABOVE

E) NONE OF THE ABOVE

#5 Which of the following is completely true?

A) $\log_{\ln(e^2)}([\ln(e^2)]^2) = 1$

B) $\log_x(x^x) = x$

C) $x^{\log_x(x^x)} = x$

D) ALL OF THE ABOVE

E) NONE OF THE ABOVE

#6 Which of the following is completely true?

A) If $4^x - 2^x = 0$ then $8^x = 1$

B) $\frac{1}{2} \log_2(x) = \log_4(x)$

C) If $5^{-x} = 3$ then $5^{3x} = 1/27$

D) ALL OF THE ABOVE

E) NONE OF THE ABOVE

#7 Which of the following is completely true?

A) $\log_5(x^2 + x + 4) = 2 \Leftrightarrow x = \frac{-1 \pm \sqrt{85}}{2}$

B) $a(1-x)^2 + b(1-x) + c = 0 \Leftrightarrow x = \frac{b \pm \sqrt{b^2 - 4ac}}{2a} + 1$

C) $\log_2(x^2 - 2x + 1) = 2 \Leftrightarrow x = -1, 3$

D) ALL OF THE ABOVE

E) NONE OF THE ABOVE

#8 Which of the following is completely true?

A) $\log_5(x^2 - 2^2)$ and $\log_2[(x-2)^2]$ have the same domain.

B) $\log_3\left(\frac{x+3}{x-3}\right)$ and $\log_4\left(\frac{x-3}{x+3}\right)$ have the same domain.

C) $\log_6\left(\frac{3-x}{x+3}\right)$ and $\log_2\left(-\frac{x}{3}\right)$ have the same domain.

D) ALL OF THE ABOVE

E) NONE OF THE ABOVE

#9 Which of the following is completely true?

A) $\mathbb{N} \subset \mathbb{Z} \subset \mathbb{Q} \subset \mathbb{R} \subset \mathbb{C}$

B) You can find the complex conjugate of z by looking at its reflection over the real axis.

C) The real numbers are Well-Ordered.

D) ALL OF THE ABOVE

E) NONE OF THE ABOVE

#10 Which of the following is completely true?

A) Irrational numbers are numbers that have a square root on the bottom of the fraction.

B) The number i has to do with parallel directions.

C) $x = r \cos \theta$ and $y = r \sin \theta$ are the transformation equations from the real numbers to the complex numbers.

D) ALL OF THE ABOVE

E) NONE OF THE ABOVE
