Math 180 Midterm Version 1. Please answer all questions on the scantron provided.

1. If you decompose 40320 into a product of primes, the sum of the exponents is

   (a) 8
   (b) 9
   (c) 10
   (d) 11
   (e) none of the above

2. The sum of the exponents of the prime decomposition of $\text{lcm}(121, 99)$ is

   (a) 2
   (b) 3
   (c) 4
   (d) 5
   (e) none of the above

3. 1362 modulo 11 is congruent to

   (a) 9
   (b) 8
   (c) 7
   (d) 6
   (e) none of the above

4. Which of the following is a zero divisor of $\mathbb{Z}_{15}$

   (a) 14
   (b) 9
   (c) 7
   (d) 4
   (e) 1

5. Decode the "word" izt knowing it was encoded using the cipher $3x-1$

   (a) man
   (b) set
   (c) day
   (d) lcw
   (e) none of the above

6. Which of the following is irreducible?

   (a) x^4+2x^2+2
   (b) x^2-2x-2
   (c) x^2+2x+1
   (d) x^3+x^2+1
   (e) x^2+2x+4

7. If $\dfrac{4-i}{1-2i} = a+ib$ for $a,b \in \mathbb{R}$ then $b=$

   (a) $\dfrac{6}{5}$
   (b) $\dfrac{7}{5}$
   (c) $\dfrac{8}{5}$
   (d) $\dfrac{9}{5}$
   (e) none of the above

8. If $\sqrt{2+i} = a+ib$ for $a,b \in \mathbb{R}$ then $b=$

   (a) $\sqrt{1+\frac{1}{2}\sqrt{5}}$
   (b) $\sqrt{2+\frac{1}{2}\sqrt{5}}$
   (c) $\sqrt{3+\frac{1}{2}\sqrt{5}}$
   (d) $\sqrt{5+\frac{1}{2}\sqrt{5}}$
   (e) none of the above

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