

21S1 MH1810,  
SCSE HENDY, 8/24/21 at 2:32:19 PM SGT

Question1: Score 1/1

QUESTION 1

Given that  $z = 1 + \sqrt{3}i$  and  $w = -\frac{1}{2}\sqrt{2} + \frac{1}{2}\sqrt{2}i$ , find  $\left|\frac{z}{w}\right|$ .

Answer :

Your response	Correct response
2	2

Auto graded Grade: 1/1.0 ✓

✓ Total grade: 1.0×1/1 = 100%

Question2: Score 1/1

QUESTION 2

Express  $\frac{1}{1+3i} + \frac{1}{1+5i}$  in the form  $a + bi$ ,  
  
Express your answer as a fraction.

Answer :

a =

Your response	Correct response
$\frac{9}{65}$	9/65

Auto graded Grade: 1/1.0 ✓

b =

Your response	Correct response
$-\left(\frac{32}{65}\right)$	-32/65

Auto graded Grade: 1/1.0 ✓

✓ Total grade: 1.0×1/2 + 1.0×1/2 = 50% + 50%

Question3: Score 1/1

QUESTION 3

Find the principal argument  $\theta$  of the complex number  $3 - 5i$ . (i.e.,  $-\pi < \theta \leq \pi$ , express your answer in radians, up to 2 decimal places.)

Your response	Correct response
-1.03	-1.03

Auto graded Grade: 1/1.0 ✓

✓ Total grade: 1.0×1/1 = 100%

Question4: Score 0/1

QUESTION 4

Find the principal argument  $\theta$  of the complex number  $-1 + 5i$ . (i.e.,  $-\pi < \theta \leq \pi$ , express your answer in radians, up to 2 decimal places.)

Your response	Correct response
-1.77	1.77

Auto graded Grade: 0/1.0 ✗

✗ Total grade: 0.0×1/1 = 0%

Question5: Score 1/1

QUESTION 5

Suppose  $2 + 8i$  is a solution of  $5z^2 + Az + B = 0$ , where  $A, B \in \mathbb{R}$ . Find  $A$  and  $B$ .

Answer :

A =

Your response	Correct response
-20	-20

Auto graded Grade: 1/1.0

B =

Your response	Correct response
340	340

Auto graded Grade: 1/1.0

Total grade: 1.0×1/2 + 1.0×1/2 = 50% + 50%

Question6: Score 0/1

QUESTION 6

Suppose  $z = \frac{3+ai}{4+bi}$  for some constant  $a$  and  $b$ . If  $\text{Re}(z) = 1$  and  $\text{Im}(z) = 6$ , find  $a$  and  $b$ .

Express your answer as a fraction.

Answer:

a =

Your response	Correct response
$-\frac{145}{6}$	145/6

Auto graded Grade: 0/1.0

b =

Your response	Correct response
$-\frac{1}{6}$	1/6

Auto graded Grade: 0/1.0

Total grade: 0.0×1/2 + 0.0×1/2 = 0% + 0%

Question7: Score 1/1

QUESTION 7

Suppose  $z_1$  and  $z_2$  are complex numbers with  $z_1 \bar{z}_2 = 2 + 3i$ . Find  $|z_1 z_2|$ .

Express your answer in  $a\sqrt{b}$ .

Answer :

Your response	Correct response
$\sqrt{13}$	$13^{(1/2)}$

Auto graded Grade: 1/1.0

Total grade: 1.0×1/1 = 100%

Question8: Score 1/1

QUESTION 8

Let  $z$  be a complex number with  $\text{Im}(z) \neq 0$ . If  $5z + \frac{1}{z}$  is a real number, find the value of  $z\bar{z}$ .

Express your answer as a fraction.

Answer :

Your response	Correct response
$\frac{1}{5}$	1/5

Auto graded	Grade: 1/1.0

Total grade: 1.0×1/1 = 100%

Question9: Score 1/1

QUESTION 9

Suppose  $z$  is a non-zero complex number satisfying  $(2 + i)z = (2 - i)\bar{z}$ . Find the ratio  $\frac{\text{Im}(z)}{\text{Re}(z)}$ .

Express your solution as a fraction.

Answer :

Your response	Correct response
$-(1/2)$	$-1/2$

Auto graded Grade: 1/1.0

Total grade: 1.0×1/1 = 100%

Question10: Score 1/1

QUESTION 10

Let  $z$  be the complex number that satisfies  $|z + \bar{z}| + |z - \bar{z}| = 2z + 6$ . Find  $z$ .

Express your answer as a fraction.

Answer :

$z =$

Your response	Correct response
$-6/4$	$-6/4$

Auto graded Grade: 1/1.0

$+ i$

Your response	Correct response
$0$	$0$

Auto graded Grade: 1/1.0

Total grade: 1.0×1/2 + 1.0×1/2 = 50% + 50%

Question11: Score 1/1

QUESTION 11

Express  $\left(\frac{1+\sqrt{3}i}{2}\right)^{132}$  in terms of  $a + bi$ , where  $a, b \in \mathbb{R}$ .

Answer :

$a =$

Your response	Correct response
$1$	$1$

Auto graded Grade: 1/1.0

.

$b =$

Your response	Correct response
$0$	$0$

Auto graded Grade: 1/1.0

Total grade: 1.0×1/2 + 1.0×1/2 = 50% + 50%

Question12: Score 1/1

QUESTION 12

If  $z = 2e^{ik\pi}$  and  $z^n = 2^4e^{i\frac{\pi}{6}}$  for some integer  $n$ , find  $k$  such that  $z$  has the smallest positive principal argument.

Express your answer as a fraction.

Answer :

Your response	Correct response
1/24	1/(6*4)

Auto graded Grade: 1/1.0

Total grade: 1.0×1/1 = 100%

Question13: Score 0/1

QUESTION 13

Let  $z$  and  $w$  be complex numbers that satisfy  $z^2 + z\bar{w} = 32$  and  $2\bar{z} = \bar{w}(1 - i)$  with  $\text{Re}(z) > 0$ . Find  $w$ .

Answer :  $w =$

Your response	Correct response
5.66	0

Auto graded Grade: 0/1.0

+

Your response	Correct response
0	-8

Auto graded Grade: 0/1.0

i.

Total grade: 0.0×1/2 + 0.0×1/2 = 0% + 0%

Question14: Score 1/1

QUESTION 14

Find the region containing all points  $z$  that satisfy the following :  
 $|z - i| \geq |z - 1|$  and  $|z + i| \geq |z - 1|$ .

Your response

Correct response

Auto graded Grade: 1/1.0

Total grade: 1.0×1/1 = 100%

Question15: Score 1/1

QUESTION 15

Suppose  $z$  is a complex number satisfying  $z - \frac{1}{z} = 1 + 3i$ . Find the length (or modulus) of  $z + \frac{1}{z}$ .

Express your solution in closed form.

Note : If the answer is  $\sqrt[3]{12345}$  then input  $12345^{\frac{1}{3}}$  or  $12345^{(1/3)}$ .

Answer :

Your response	Correct response
$\frac{1}{52^{\frac{1}{4}}}$	$52^{(1/4)}$

Auto graded    Grade: 1/1.0

Total grade: 1.0×1/1 = 100%