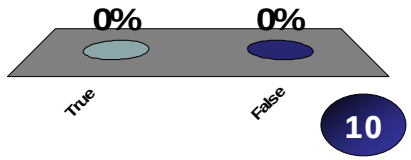
Complex Numbers

Concept tests

Every nonnegative real number has a real square root

✓1. True
2. False



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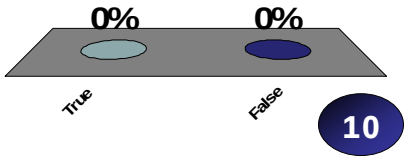
For any complex number z, the product $z \cdot \bar{z}$ is a real number

✓1. True
2. False



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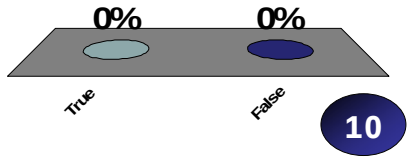
It is possible for a function of a complex variable to be multi-valued

✓1. True
2. False



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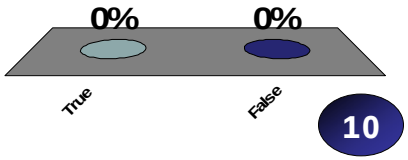
The square of any complex number is a real number

1. True
2. ✓ False



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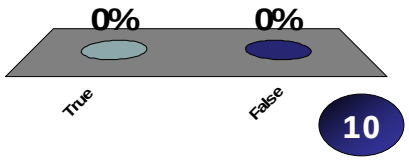
If f is a polynomial and $f(z) = i$, then $f(\bar{z}) = i$

1. True
2. ✓ False



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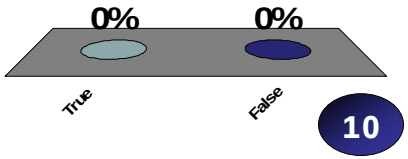
If $z = x + i\,y$, where x and y are positive, then $z^2 = a + i\,b$ has a and b positive.

1. True
2. ✓ False



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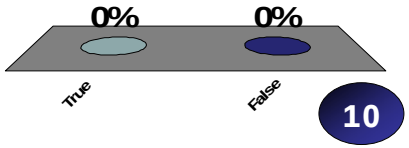
Every nonzero complex number z can be written in the form $z = e^w$, where w is another complex number.

1. ✓ True
2. False



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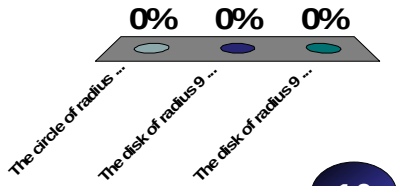
Which of the statements below describes the region of the complex plane corresponding to $|z - i| \leq 9$?

1. The circle of radius 3 centered at i
2. The disk of radius 9 centered at the origin
3. ✓ The disk of radius 9 centered at i



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The product of two analytic functions is analytic

1. ✓ True
2. False

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If z is a complex number, then e^{iz} has modulus 1

1. True
2. ✓ False

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Any solution of the equation $z^4 - 16 = 0$ may be written in the form $z = 2w$, where w is a fourth root of unity

1. ✓ True
2. False

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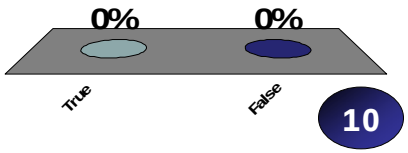
The curve of equation $e^{(a+ib)t}$, where a and b are given real numbers and t varies in [0,1], is a piece of a spiral in the complex plane

✔1. True
2. False



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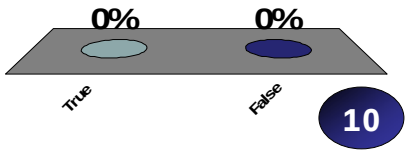
The curve of equation e^{a+ib}, where a and b are real numbers, a varies and b is fixed, is a straight line in the complex plane

✔1. True
2. False



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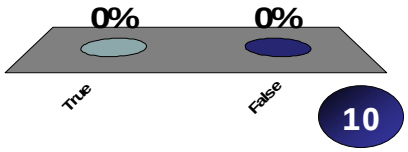
The curve of equation e^{a+ib}, where a and b are real numbers and a is fixed and b varies, is a straight line in the complex plane

1. True
✔2. False



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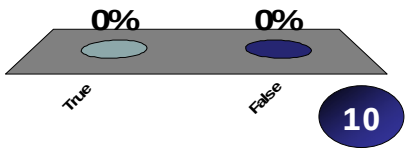
If a function has a limit as $z \to z_0$, then the limit does not depend on the path followed by z as it approaches z_0

✔1. True
2. False



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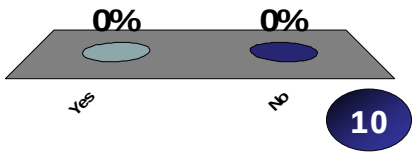
Is the function $|z|^2$ entire?

1. Yes
2. ✓ No



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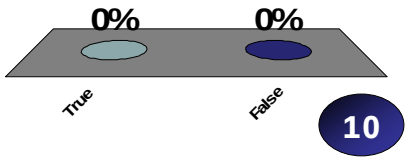
The function $|z|^2$ is differentiable at the origin

1. ✓ True
2. False



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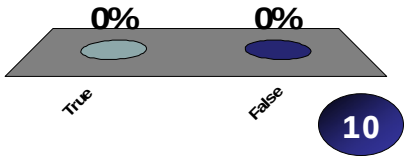
The function $|z|^2$ is analytic at the origin

1. True
2. ✓ False



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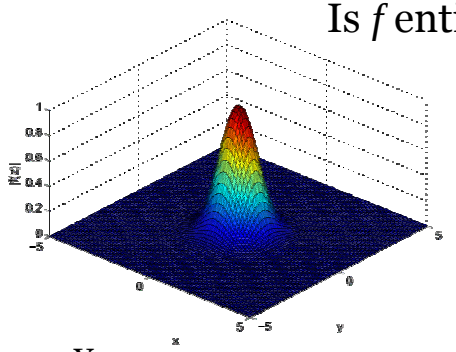
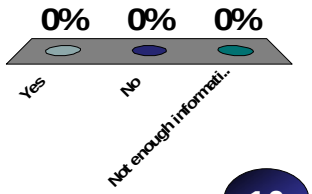
The graph below shows the modulus of a function of a complex variable $f(z)$.
Is f entire?



1. Yes
2. ✓ No
3. Not enough information to decide



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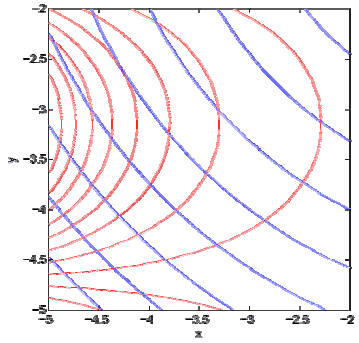
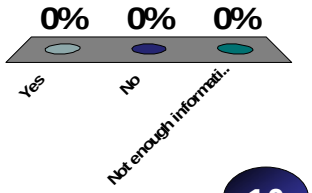
The graph below shows a contour plot of two functions $u(x,y)$ and $v(x,y)$. Is the function $f(z) = u(x,y) + i\, v(x,y)$ analytic?



1. Yes
2. ✔ No
3. Not enough information to decide



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