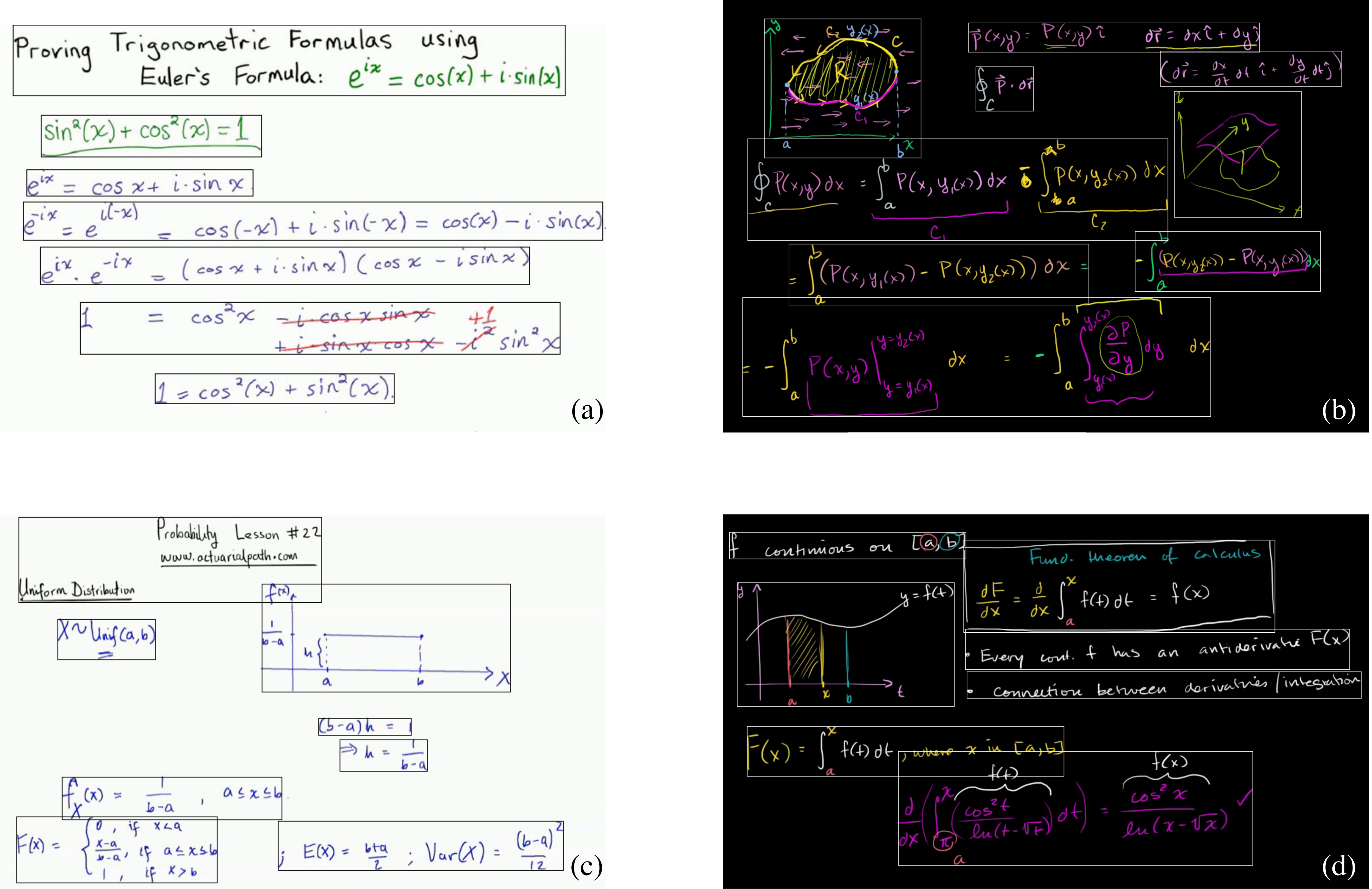
Proving Trigonometric Formulas using Euler's Formula: e^{ix} = cos(x) + i·sin(x)
sin²(x) + cos²(x) = 1
e^{ix} = cos x + i·sin x
e^{-ix} = e^{i(-x)} = cos(-x) + i·sin(-x) = cos(x) − i·sin(x)
e^{ix}·e^{-ix} = (cos x + i·sin x)(cos x − i sin x)
1 = cos²(x) + sin²(x)
(a)
∮_C P(x,y) dx = ∫_a^b P(x, y_1(x)) dx − ∫_a^b P(x, y_2(x)) dx
= ∫_a^b (P(x,y_1(x)) − P(x,y_2(x))) dx
= −∫_a^b P(x,y) |_{y=y_1(x)}^{y=y_2(x)} dx = −∫_a^b ∫_{y_1(x)}^{y_2(x)} ∂P/∂y dy dx
(b)
Probability Lesson #22
www.actuarialpath.com
Uniform Distribution
X ~ Unif(a,b)
(b−a)h = 1
⇒ h = 1/(b−a)
f_X(x) = 1/(b−a), a ≤ x ≤ b
F(x) = 0, if x<a; (x−a)/(b−a), if a ≤ x ≤ b; 1, if x > b
E(X) = (b+a)/2 ; Var(X) = (b−a)²/12
(c)
f continuous on [a,b]
Fund. theorem of calculus
dF/dx = d/dx ∫_a^x f(t) dt = f(x)
• Every cont. f has an antiderivative F(x)
• Connection between derivatives/integration
F(x) = ∫_a^x f(t) dt, where x in [a,b]
d/dx ∫_π^x (cos²t / ln(t−√t)) dt = cos²x / ln(x−√x)
(d)