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p. 1

$i = \sqrt{-1}$

$3 + 4i \qquad \frac{1}{2} - .7i$

$\pi + ei$

$(3+4i) + (2-i) = 5 + 3i$

$(3+4i)(2-i) = 6 - 3i + 8i + 4i(-i)$

$= 6 + 5i + 4 = 10 + 5i$

$\frac{1}{1+\sqrt{3}} \qquad \frac{1-\sqrt{3}}{1-\sqrt{3}}$

$\frac{1}{3+4i} \qquad \frac{3-4i}{3-4i} = \frac{3-4i}{9+16 \cancel{-12i} \cancel{+12i}}$

$= \frac{3-4i}{25} = \frac{3}{25} + \frac{-4}{25} i$

Euler's formula

$$e^{i\theta} = \cos\theta + i\sin\theta$$

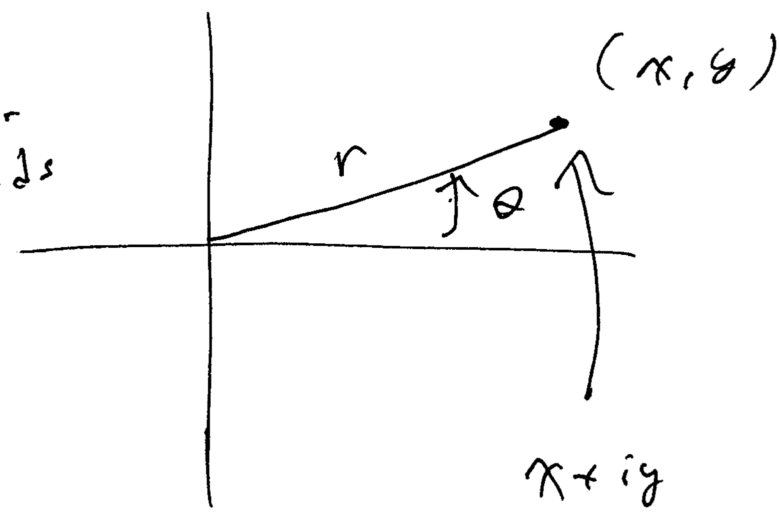
$$e^{a+ib} = e^{a} e^{ib}$$

$$= e^{a}\left[\cos b + i\sin\theta\right]$$

$$r e^{i\theta} = r\cos\theta + ir\sin\theta$$

$$= x + iy$$

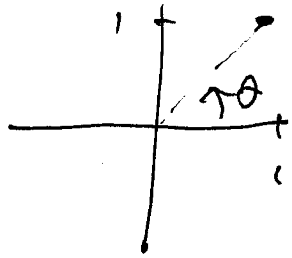
polar coords



$x = r\cos\theta$

$y = r\sin\theta$

$1+i$



$r = \sqrt{2}$

$\theta = \frac{\pi}{4}$

$$1+i = \sqrt{2}\, e^{i\pi/4}$$

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p. 3

$$1+i = \sqrt{2}\, e^{i\pi/4}$$

$$\sqrt{1+i} = \sqrt{\sqrt{2}}\, \sqrt{e^{i\pi/4}}$$

$$= 2^{1/4}\, e^{i\pi/8}$$

$$= 2^{1/4} \left[\cos\frac{\pi}{8} + i \sin\frac{\pi}{8}\right]$$

$$= 2^{1/4}\cos\frac{\pi}{8} + i\, 2^{1/4}\sin\frac{\pi}{8}$$