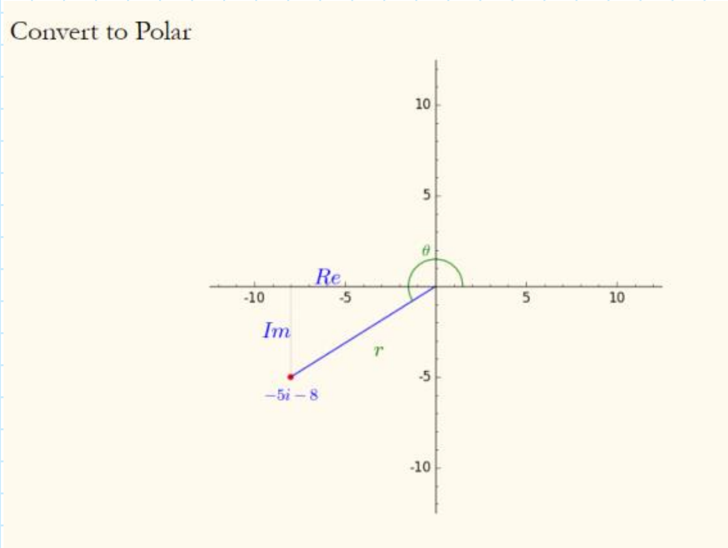
Q1

Sunday, May 10, 2020 11:47 AM



$$\boxed{A)\quad -8+5i = \sqrt{89}\, e^{212^\circ i}}$$

Q2

Sunday, May 10, 2020 11:54 AM

select expression/s equivalent to -1

$$\frac{1}{2}\sqrt{3} - \frac{1}{2}i$$

$$= \frac{\sqrt{3}}{2} - \frac{i}{2}$$

$$= \frac{\sqrt{3} - i}{2}$$

B) none of these

Q3

Sunday, May 10, 2020 12:02 PM

select expression/s equivalent to i

$i = i$
$i^2 = -1$
$i^3 = -i$
$i^4 = 1$

$$i^{69} = (i^4)^{15} \cdot i^9$$
$$= (1)^{15} \cdot i$$
$$= 1 \cdot i$$
$$i^{69} = i$$

$$i^{85} = (i^4)^{21} \cdot i$$
$$= 1 \cdot i$$
$$i^{85} = i$$

$$i^{38} = (i^2)^{19}$$
$$= (-1)^{19}$$
$$= -1$$

$$i^{103} = (i^4)^{25} \cdot i^3$$
$$= (1)^{25} \cdot -i$$
$$= 1 \cdot -i$$
$$= -i$$

$$i^{60} = (i^4)^{15}$$
$$= (1)^{15}$$
$$= 1$$

$$i^{113} = (i^4)^{28} \cdot i$$
$$= (1)^{28} \cdot i$$
$$= 1 \cdot i$$
$$i^{113} = i$$

A) i^{69} F) i^{113}

C) i^{85}

Q4

Sunday, May 10, 2020 12:31 PM

Simplify if possible: $\sqrt{-9}$

$$\sqrt{-9} = i\sqrt{9}$$
$$= i3$$
$$\sqrt{-9} = 3i$$

$\boxed{c)\ 3i}$

Q5

Sunday, May 10, 2020 12:34 PM

$$2e^{(90^o)i}$$

$$2e^{(90^\circ)i} = 2(\cos 90^\circ + i\sin 90^\circ)$$

$$= 2\cos 90^\circ + i \cdot 2\sin 90^\circ$$

$$= 2(0) + i \cdot 2(2)$$

$$= 0 + i \cdot 4$$

$$= 4i$$

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

A) $2(\cos(90^\circ) + i\sin(90^\circ))$

B) $2\cos(90^\circ) + i \cdot 2\sin(90^\circ)$

Q6

Sunday, May 10, 2020 1:00 PM

$$9\cos(90^o) + i \cdot 9\sin(90^o)$$

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

$9\cos(90^\circ) + i \cdot 9\sin(90^\circ) = 9e^{(90^\circ)i}$

$= -9e^{(-90^\circ)i}$

$= 9(\cos(90^\circ) \cdot i\sin(90^\circ))$

$$\boxed{\begin{array}{l} \text{A) } 9e^{(90^\circ)i} \\ \text{D) } -9e^{(-90^\circ)i} \end{array}}$$

Q7

Sunday, May 10, 2020 4:23 PM

Solve: $(4x+1)^2 = 39$

$$\sqrt{(4x+1)^2} = \sqrt{39}$$

$$4x+1 = \pm\sqrt{39}$$

$$\frac{\cancel{4}x}{\cancel{4}} = \frac{\pm\sqrt{39} - 1}{4}$$

$$x = \frac{\pm\sqrt{39} - 1}{4}$$

$$x = \frac{\sqrt{39} - 1}{4} \quad \text{or} \quad \frac{-\sqrt{39} - 1}{4}$$

$$= \frac{1}{4}\sqrt{39} - \frac{1}{4} \qquad = -\frac{1}{4}\sqrt{39} - \frac{1}{4}$$

$$\boxed{\text{B)}\ x = \frac{1}{4}\sqrt{39} - \frac{1}{4},\ x = -\frac{1}{4}\sqrt{39} - \frac{1}{4}}$$

Q8

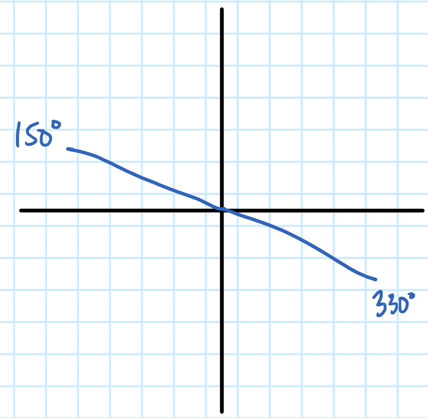
Sunday, May 10, 2020 4:44 PM

$$12\cos(330^o) + i \cdot 12\sin(330^o)$$

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

$12\cos(330°) + i \cdot 12\sin(330°) = 12e^{(330°)i}$

$= -12e^{(150°)i}$



B) $12e^{(330)i}$

c) $-12e^{(150°)i}$

Q9

Sunday, May 10, 2020 5:00 PM

$$i^{43}$$

$$i^{43} = (i^4)^{10} \cdot i^3$$
$$= (1)^{10} \cdot -i$$
$$= 1 \cdot -i$$
$$= -i$$

$$\boxed{A)\ -i}$$

$i = i$
$i^2 = -1$
$i^3 = -i$
$i^4 = 1$

Q10

Sunday, May 10, 2020 5:02 PM

$$\sqrt[3]{10e^{i(420^\circ)}}$$

$$\sqrt[3]{10e^{i(420^\circ)}} = \sqrt[3]{10(\cos(420^\circ) + i \cdot \sin(420^\circ))}$$

$$= 10^{\frac{1}{3}} e^{i\left(\frac{420^\circ}{3}\right)}$$

$$= \sqrt[3]{10}\left[\cos\left(\frac{420^\circ}{3}\right) + i\sin\left(\frac{420^\circ}{3}\right)\right]$$

A) $10^{\frac{1}{3}} e^{i\left(\frac{420^\circ}{3}\right)}$

E) $\sqrt[3]{10}\left[\cos\left(\frac{420^\circ}{3}\right) + i\sin\left(\frac{420^\circ}{3}\right)\right]$

Q11

Monday, May 11, 2020 8:22 AM

$$e^{(240^o)i}$$

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

$$e^{(240^\circ)i} = \cos(240^\circ) + i\sin(240^\circ)$$

D) $\cos(240^\circ) + i\sin(240^\circ)$

F) $\approx -0.5 + i(-0.866)$

Q12

Monday, May 11, 2020 8:28 AM

$$\sqrt{-1}$$

is equivalent to

$\boxed{c)\ i}$

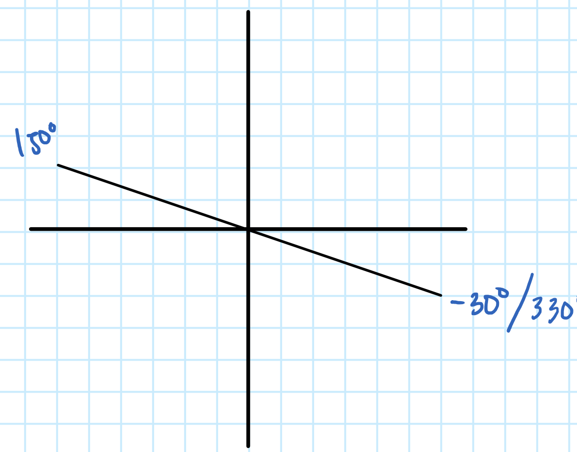
Q13

Monday, May 11, 2020 8:31 AM

$$6e^{(150^o)i}$$

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

$6e^{(150^\circ)i} = 6(\cos(150^\circ) + i\sin(150^\circ))$



~~A) $-6e^{(-30^\circ)i}$~~

D) $6e^{(510^\circ)i}$

E) $-6e^{(330^\circ)i}$

Q14

Monday, May 11, 2020 8:47 AM

$$\frac{4\cos(-90^o) + i4\sin(-90^o)}{10\cos(210^o) + i10\sin(210^o)}$$

$$\frac{4\cos(-90^\circ) + i\,4\sin(-90^\circ)}{10\cos(210^\circ) + i\,10\sin(210^\circ)} = \frac{4e^{(-90)i}}{10e^{(210^\circ)i}}$$

$$= \frac{4}{10} \cdot e^{i(-90-210^\circ)}$$

$$= \frac{4}{10}\cos(-90^\circ - 210^\circ) + i\frac{4}{10}\sin(-90^\circ - 210^\circ)$$

$$= \frac{4}{10}\cos(-300^\circ) + i \cdot \frac{4}{10}\sin(-300^\circ)$$

c) $\frac{4}{10}\cos(-90^\circ - 210^\circ) + i\frac{4}{10}\sin(-90^\circ - 210^\circ)$

D) $\frac{4}{10}\cos(-300^\circ) + i \cdot \frac{4}{10}\sin(-300^\circ)$

Q15

Monday, May 11, 2020 8:59 AM

$$8e^{i(30^o)} \cdot 10e^{i(270^o)}$$

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

$8e^{i(30^\circ)} \cdot 10e^{i(270^\circ)} = (8 \cdot 10) \cdot e^{i(30^\circ + 270^\circ)}$

$\boxed{B)\ (8 \cdot 10) \cdot e^{i(30^\circ + 270^\circ)}}$

Q16

Monday, May 11, 2020 9:03 AM

Solve: $(3x-4)^2 = 24$

$$\sqrt{(3x-4)^2} = \sqrt{24}$$

$$3x - 4 = \pm\sqrt{24}$$

$$\frac{3x}{3} = \frac{\pm\sqrt{24} + 4}{3}$$

$$x = \frac{\pm\sqrt{24} + 4}{3}$$

$$x = \frac{\sqrt{24} + 4}{3}$$

$$= \frac{\sqrt{4 \cdot 6} + 4}{3}$$

$$= \frac{2\sqrt{6} + 4}{3}$$

$$\underline{x = \frac{2}{3}\sqrt{3} + \frac{4}{3}}$$

$$x = \frac{-\sqrt{24} + 4}{3}$$

$$= \frac{-\sqrt{4 \cdot 6} + 4}{3}$$

$$= \frac{-2\sqrt{6} + 4}{3}$$

$$\underline{x = -\frac{2}{3}\sqrt{6} + \frac{4}{3}}$$

$$\boxed{A)\ x = \frac{2}{3}\sqrt{6} + \frac{4}{3},\ x = -\frac{2}{3}\sqrt{6} + \frac{4}{3}}$$

Q17

Monday, May 11, 2020 9:13 AM

Solve solve $x^3 = (-i)$

$i = i$

$i^2 = -1$

$i^3 = -i$

$i^4 = 1$

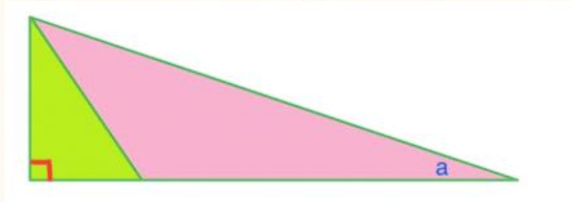
~~A) $\frac{1}{2}\sqrt{3} + \frac{1}{2}i, -\frac{1}{2}\sqrt{3} + \frac{1}{2}i, -i$~~

$\boxed{C)\ \frac{1}{2}\sqrt{3} - \frac{1}{2}i,\ i,\ -\frac{1}{2}\sqrt{3} - \frac{1}{2}i}$

Q18

Monday, May 11, 2020 9:30 AM

Suppose the pink area is $18\,in^2$ and the other area is $6\,in^2$, select the correct statements about angle a. Also assume the angle complementary to a is bisected by the hypothenuse line of the green triangle.



18	A	B	C	D	E	F	G	H

Suppose the pink area is $18\,in^2$ and the other area is $6\,in^2$, select the correct statements about angle a. Also assume the angle complementary to a is bisected by the hypothenuse line of the green triangle.

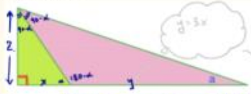
A) $a \approx 34.9°$ B) $a \approx 18.3°$

C) $a \approx 27.2°$ D) $a \approx 16.3°$

E) $a \approx 11.5°$ F) $a \approx 31.2°$

G) $a \approx 19.5°$ H) $a \approx 12.7°$

I) none of these



$y = 3x$

edit

115

$\text{area}_1 = \frac{1}{2} b \cdot h$, $6 = \frac{1}{2} x z$, $z = \frac{12}{x}$

$\text{area}_2 = \frac{1}{2} b h$, $18 = \frac{1}{2} y z$, $z = \frac{36}{y}$

$\frac{12}{x} = \frac{36}{y}$

$12y = 36x$

$y = 3x$

sum of angles rule

$90° - \alpha + 180° - \alpha + a = 180°$

$90 - 2\alpha + a = 0$

$90° + a = 2\alpha$

$45° + \frac{a}{2} = \alpha$

OR $a = 2\alpha - 90°$

$\tan a = \frac{z}{4x} \Rightarrow z = 4x \tan a$

$\tan \alpha = \frac{z}{x} \Rightarrow z = x \tan \alpha$

$\Rightarrow 4x \tan a = x \tan \alpha$

$\Rightarrow x = 0$ OR $4 \tan a = \tan \alpha$

$\Rightarrow 4 \tan(2\alpha - 90°) = \tan \alpha$

now it's just a trig equation....

we could change to sines + cosines + use double angle identities and solve

OR use double angle identities on tangent

lets try tangent route

$\Rightarrow -4 \cot(2\alpha) = \tan \alpha$

$$\tan(2x) = \frac{2\tan(x)}{1 - \tan^2(x)}$$

$\Rightarrow \frac{-4}{\tan(2\alpha)} = \tan \alpha$

$\Rightarrow \frac{-4}{\frac{2\tan \alpha}{1 - \tan^2 \alpha}} = \tan \alpha$

$\Rightarrow \frac{-4(1 - \tan^2 \alpha)}{2 \tan \alpha} = \tan \alpha$

$\Rightarrow -2(1 - \tan^2 \alpha) = \tan^2 \alpha$

$\Rightarrow -2 + 2\tan^2 \alpha = \tan^2 \alpha$

$\Rightarrow$

$\Rightarrow \tan^2 \alpha = 2$

$\Rightarrow \tan \alpha = \pm\sqrt{2}$

$\Rightarrow \alpha = \arctan(\sqrt{2})$

or $\alpha = \arctan(-\sqrt{2})$

$\Rightarrow \alpha \approx 54.73°$

or $\alpha \approx -54.73°$

since α is an interior angle $\Rightarrow \alpha = 54.73°$

$\Rightarrow a = 2\alpha - 90°$

$a \approx 2(54.73°) - 90°$

$a \approx 19.47°$

yippie kae yay!!

G) $a \approx 19.5°$

Q19

Monday, May 11, 2020 9:31 AM

$$14\left(\cos(330^o) + i\sin(330^o)\right)$$

$$14\left(\cos(330^\circ) + i\sin(330^\circ)\right) = 14e^{(330^\circ)i}$$

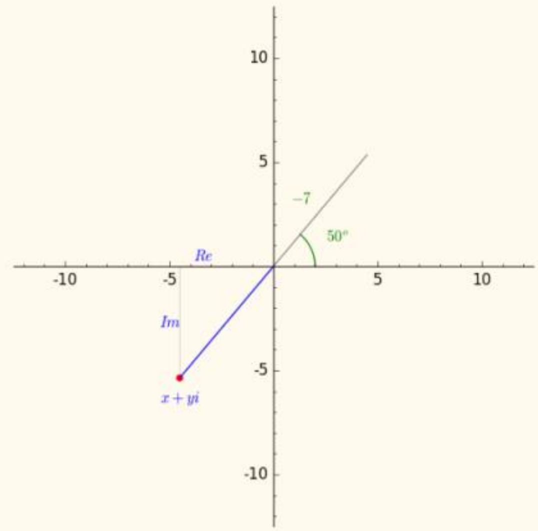
$$\approx 12.1244 + i(-7)$$

$$\boxed{A)\ 14e^{(330^\circ)i}}$$

Q20

Monday, May 11, 2020 9:36 AM

Convert the number $-7e^{50i}$ to Standard form



A) $x + iy = -7\cos(50^\circ) + -7i\sin(50^\circ)$

B) $x + iy = r\cos(\theta) + ri\sin(\theta)$

Q21

Monday, May 11, 2020 9:36 AM

Simplify: $(4\,i+5)(3\,i+1)(2\,i-3)$

$$(4i+5)(3i+1)(2i-3)$$
$$=(12i^2+19i+5)(2i-3)$$
$$=(12(-1)+19i+5)(2i-3)$$
$$=(19i-7)(2i-3)$$
$$=(38i^2-71i+21)$$
$$=(38(-1)-71i+21)$$
$$=(-71i-17)$$

$\boxed{\text{A) } -71i-17}$

Q22

Monday, May 11, 2020 9:49 AM

i^2

$i = i$

$i^2 = -1$

$i^3 = -i$

$i^4 = 1$

$$i^{46} = (i^4)^{11} \cdot i^2$$
$$= (1)^{11} \cdot i^2$$
$$= 1 \cdot i^2$$
$$= i^2$$

$$i^{50} = (i^4)^{12} \cdot i^2$$
$$= (1)^{12} \cdot i^2$$
$$= 1 \cdot i^2$$
$$= i^2$$

B) i^{46}

C) i^{50}

Q23

Monday, May 11, 2020 9:54 AM

$$e^{(240^o)i}$$

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

$$e^{(240^\circ)i} = \cos(240^\circ) + i\sin(240^\circ)$$
$$\approx -0.5 + i(-0.866)$$

$$\boxed{\begin{array}{l} \text{c) } \cos(240^\circ) + i\sin(240^\circ) \\ \text{D) } \approx -0.5 + i(-0.866) \end{array}}$$

Q24

Monday, May 11, 2020 9:59 AM

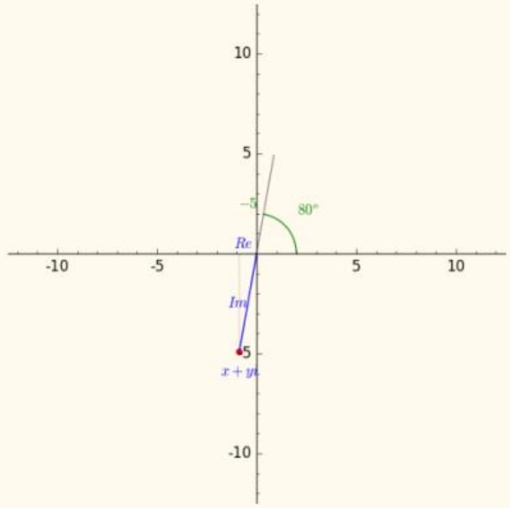
select expression/s equivalent to **1**

D) none of these

Q25

Monday, May 11, 2020 10:00 AM

Convert the number $-5e^{80i}$ to Standard form



$*)\ x + iy = -5\cos(80^\circ) + -5i\sin(80^\circ)$

$c)\ x + iy = r\cos(\theta) + ri\sin(\theta)$