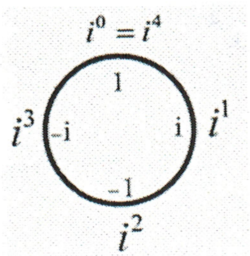
Name: Key

Unit 1 Review – Polynomials & Complex Numbers

Helpful Information:

iClock



Procedure to solve a radical equation.

1) Isolate the radical
2) Square both sides of the equation
3) Solve for all values of x
4) Check both answers and name any **extraneous roots**
5) State the solution set

Level I Practice:

1. The solution set for the equation $\sqrt{56-x} = x$ is

   1) {−8, 7}
   2) {−7, 8}
   3) {7}
   4) { }

Can check on Calculator.

$(\sqrt{56-x})^2 = x^2$

$56 - x = x^2$
$-56 \quad\quad -56$

$-x = x^2 - 56$
$+x \quad\quad +x$

$0 = x^2 + x - 56$

$(x+8)(x-7)=0$

$x=-8 \quad x=7$

Check

$\sqrt{56-(-8)} \neq -8$

$\sqrt{56-7} = 7$ ✓

2. Express $(1-i)^3$ in $a+bi$ form.

$(1-i)(1-i)(1-i)$
$(1-i-i+i^2)(1-i)$
$(1-2i-1)(1-i)$
$-2i(1-i)$
$-2i+2i^2$
$-2i+2(-1)$
$-2i-2$ → $a+bi$ form is $-2-2i$

$-2-2i$

3. Simplify each of the expressions completely:

a. $5\sqrt[3]{9y^2} \cdot \sqrt[3]{24y}$

$5\sqrt[3]{9 \cdot 24 \cdot y^2 \cdot y}$

$5\sqrt[3]{216 \cdot y^3}$

$5\sqrt[3]{216} \cdot \sqrt[3]{y^3}$

$5 \cdot 6 \cdot y = 30y$

b. $\dfrac{\sqrt[3]{81x^5y^3}}{\sqrt[3]{3x^2}} = \sqrt[3]{\dfrac{81x^5y^3}{3x^2}}$

$\sqrt[3]{27x^3y^3}$

$\sqrt[3]{27} \cdot \sqrt[3]{x^3} \cdot \sqrt[3]{y^3}$

$3 \cdot x \cdot y$

$3xy$

Level II Practice:

4. Given i is the imaginary unit, $(2-yi)^2$ in simplest form is

   1) $y^2-4yi+4$
   2) $-y^2-4yi+4$
   3) $-y^2+4$
   4) y^2+4

$(2-yi)(2-yi)$

$4-2yi-2yi+y^2i^2$

$4-4yi+y^2(-1)$

$4-4yi-y^2$

$-y^2-4yi+4$

5. The power P, in watts, that a circular solar cell produces and the radius of the cell r in centimeters are related by the square root equation $r=\sqrt{\frac{P}{0.02\pi}}$. About how much power is produced by a cell with a radius of 12 cm?

P

r= 12cm

$(12)^2=\left(\sqrt{\frac{P}{0.02\pi}}\right)^2$

$\frac{144}{1}=\frac{P}{0.02\pi}$

$144(0.02\pi)=P$

$9.047786842=P$

$P\approx 9$ watts

6. Twyla and Ben are simplifying $4\sqrt{32}+6\sqrt{18}$. Is either of them correct? Explain your reasoning.

TWYLA	BEN
$4\sqrt{32}+6\sqrt{18}$	$4\sqrt{32}+6\sqrt{18}$
$4\cdot\sqrt{4^2\cdot 2}+6\sqrt{3^2\cdot 2}$	$4\cdot\sqrt{16\cdot 2}+6\sqrt{9\cdot 2}$
$16\sqrt{2}+18\sqrt{2}$	$64\sqrt{2}+54\sqrt{2}$
$34\sqrt{2}$	$118\sqrt{2}$

Twyla is correct. Ben did not take the sq root of 16 & 9. He multiplied 4 by 16 & 6 by 9.

Level III Practice:

7. The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$. How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.

$S = \sqrt{t} - 2t + 6$

$0 = \sqrt{t} - 2t + 6$

$(2t-6)^2 = (\sqrt{t})^2$

$4t^2 - 24t + 36 = t$

$4t^2 - 25t + 36 = 0$

s=0 @ 4hrs.

Quadratic eq.

$t = \frac{25 \pm \sqrt{49}}{8}$

$t = \frac{32}{8} = 4$ 4 hrs.

$t = \frac{18}{8} = 2.25$ check

$t = 1$

$S = \sqrt{1} - 2(1) + 6$

$= \sqrt{1} - 2 + 6$

$= \sqrt{1} + 4$

~~50mph~~

$S = 500$ mph

$t = 3$

$S = \sqrt{3} - 2(3) + 6$

$= \sqrt{3} - 6 + 6$

$= \sqrt{3}$

1.73205

173 mph

a tidal wave slows down as hrs increase

$500 - 173$

327 mph

8. Simplify completely: $[(2 + i)x^2 - ix + 5 + 1] - [(-3 + 4i)x^2 + (5 - 5i)x - 6]$

$[2x^2 + ix^2 - ix + 6] - [-3x^2 + 4ix^2 + 5x - 5ix - 6]$

$2x^2 + ix^2 - ix + 6 + 3x^2 - 4ix^2 - 5x + 5ix + 6$

$(2x^2 + 3x^2) + (ix^2 - 4ix^2) + (-ix + 5ix) - 5x + 12$

$5x^2 - 3ix^2 + \cancel{3}4ix - 5x + 12$

Ans: $5x^2 - 3ix^2 + 4ix - 5x + 12$

9. The expression $\sqrt[3]{27a^3} \cdot \sqrt[4]{16b^8}$ is equivalent to

1) $6ab^2$

2) $6ab^4$

3) $12ab^2$

4) $12ab^4$

$\sqrt[3]{27a^3} \cdot \sqrt[4]{16b^8}$

$3a \cdot \sqrt[4]{16} \cdot \sqrt[4]{b^8}$

$3a \cdot 2b^2$

$6ab^2$