NAME _____ DATE _____

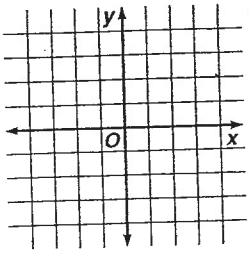
4-1

Practice Worksheet

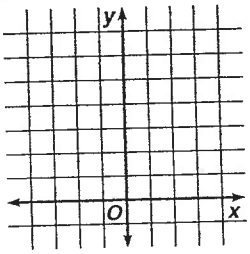
Polynomial Functions

State the number of complex roots of each equation. Then find the roots and graph the related function.

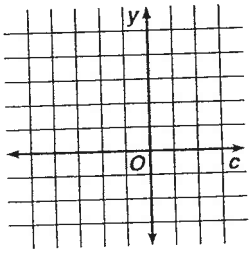
1. $3x - 5 = 0$



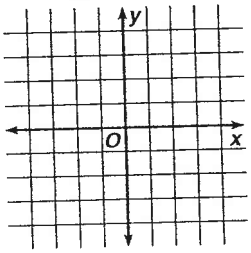
2. $x^2 + 4 = 0$



3. $c^2 + 2c + 1 = 0$



4. $x^3 + 2x^2 - 15x = 0$



Write the polynomial equation of least degree for each set of roots given.

5. 4, 0.5

6. 3, –0.5, 1

7. 3, 3, 1, 1, –2

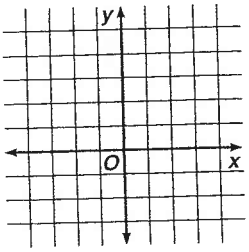
8. $1 \pm 2i$, 3

9. $\pm 2i$, 3, –3

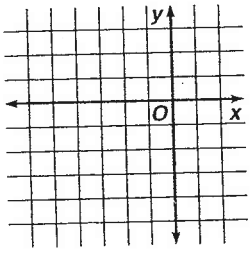
10. $-1, 3 \pm i, 2 \pm 3i$

Solve each equation and graph the related function.

11. $x^3 + 6x + 20 = 0$



12. $x^4 + 5x^3 + 9x^2 + 45x = 0$



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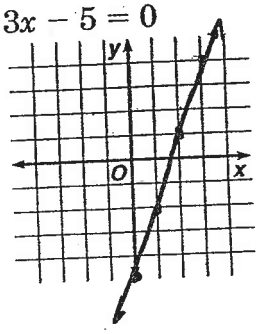
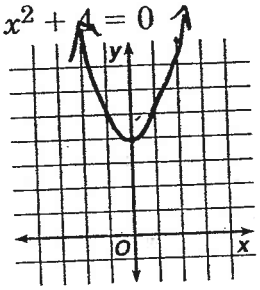


1

$x = 5/3$

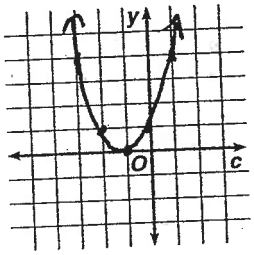
2. $x^2 + 4 = 0$



2

$x = \pm 2i$

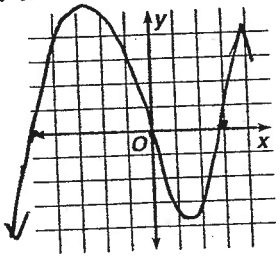
3. $c^2 + 2c + 1 = 0$



1 double root

$c = -1$

4. $x^3 + 2x^2 - 15x = 0$



3

$x = 0, -5, 3$

Write the polynomial equation of least degree for each set of roots given.

5. 4, 0.5

$y = (x-4)(x-\frac{1}{2})$

$y = (x-4)(2x-1)$

$y = 2x^2 - 9x + 4$

6. 3, −0.5, 1

$y = (x-3)(x-\frac{1}{2})(x-1)$

$y = (x-3)(2x-1)(x-1)$

$y = (2x^2-7x+3)(x-1) = 2x^3 - 5x^2 + 10x - 3$

7. 3, 3, 1, 1, −2

$f(x) = (x-3)^2(x-1)^2(x+2)$

$(x^2-6x+9)(x^2-2x+1)(x+2)$

8. $1 \pm 2i$, 3

$y = [x-(1+2i)][x-(1-2i)](x-3)$

$y = (x^2-2x+5)(x-3)$

$y = x^3 - 5x^2 + 11x - 15$

9. $\pm 2i$, 3, −3

$y = (x-2i)(x+2i)(x-3)(x+3)$

$y = (x^2+4)(x^2-9)$

$y = x^4 - 5x^2 - 36$

10. $-1, 3 \pm i, 2 \pm 3i$

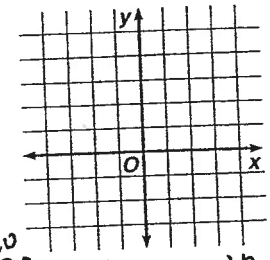
$y = (x-1)[x-(3+i)][x-(3-i)]$

$[x-(2+3i)][x-(2-3i)]$

$y = (x-1)(x^2-6x+10)(x^2-4x+13)$

Solve each equation and graph the related function.

11. $x^3 + 6x + 20 = 0$



$x = 2, 1 \pm 3i$

$-2 \mid 1 \quad 0 \quad 6 \quad 20$

$\quad\quad -2 \quad 4 \quad -20$

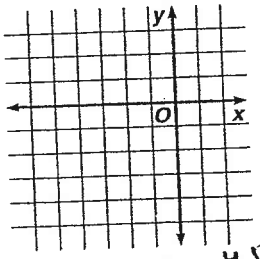
$\quad\quad 1 \quad -2 \quad 10 \quad 0$

$x^2 - 2x + 10 = 0$

$x = \frac{2 \pm \sqrt{4-40}}{2}$

$\frac{2 \pm 6i}{2} = 1 \pm 3i$

12. $x^4 + 5x^3 + 9x^2 + 45x = 0$



$x = 0, -5, \pm 3i$

$-5 \mid 1 \quad 5 \quad 9 \quad 45$

$\quad\quad -5 \quad 0 \quad -45$

$\quad\quad 1 \quad 0 \quad 9 \quad 0$

$x^2 + 9$