1.4 Zeroes of Polynomials

PRACTICE

Directions: Find the zeroes.

1) $4r^2 - 7r - 15 = 0$

$\times -60$, $+ -7$

	r	-3
$4r$	$4r^2$	$-12r$
5	$5r$	-15

$(r-3)(4r+5)=0$

$r-3=0$ or $4r+5=0$

$r=3$ or $\frac{4r}{4}=\frac{-5}{4}$

$r=-5/4$

5) $7k^3 + 42k = -4k^2 + 24$

$+4k^2 \quad +24 \quad +4k^2 \quad +24$

$7k^3 + 4k^2 + 42k + 24 = 0$

	$7k$	4
k^2	$7k^3$	$+4k^2$
-6	$-42k$	24

$(7k+14)(k^2-6)=0$

$7k+14=0$

$-4 \quad -4$

$\frac{7k}{7}=\frac{-4}{7}$

$k=-4/7$

$k^2-6=0$

$+6 \quad +6$

$\sqrt{k^2}=\sqrt{6}$

$k=\pm\sqrt{6}$

3) $n^2 - 4n = -6 + n$

$-n \quad +n \quad +6 \quad -n$

$n^2-5n+6=0$

$(n-2)(n-3)=0$

$n-2=0$ or $n-3=0$

$n=2$ or $n=3$

4) $(a^2 + 14a + 45)(4m^2 + 8m + 3) = 0$

$\times 4m \quad +4m$

$(a+9)(a+5)$

$\times m \quad +8$

	$2m$	3
$2m$	$4m^2$	$6m$
1	$2m$	3

$(a+9)(a+5)(2m+1)(2m+3)=0$

$a=-9 \quad a=-5$

$2m+1=0$

$2m=-1$

$m=-1/2$

$2m+3=0$

$2m=-3$

$m=-3/2$

Directions: Solve.

5) $7v^2 - 28 = -v^3 + 4v$

$+v^3 \quad -4v \quad +v^3 \quad -4v$

$v^3+7v^2-4v-28=0$

	v	7
v^2	v^3	$7v^2$
-4	$-4v$	-28

$(v+7)(v^2-4)=0$

$(v+7)(v-2)(v+2)=0$

$-7, \quad 2, \quad -2$

6) $(p^2 - 11p + 28)(p^2 - 16) = 0$

$(p-7)(p-4)$

$7, \quad 4$

$(p-4)(p+4)=0$

$4, \quad -4$

$7, 4, -4$

7) $5m^2 - 17m - 20 = 4m$

$-4m \quad -4m$

$5m^2 - 21m - 20 = 0$

	m	-5
$5m$	$5m^2$	$-25m$
4	$4m$	-20

$(m-5)(5m+4)=0$

$m-5=0$, $5m+4=0$

$m=5$, $5m=-4$

$m=-4/5$

8) $p^2 + 13p + 36 = -4$

$+4 \quad +4$

$p^2+13p+40=0$

$(p+8)(p+5)=0$

$-8, -5$

9) $(2k+1)^2 - 6(2k+1) - 27=0$

$2k+1=x$

$x^2 - 6x - 27 = 0$

$(x-9)(x+3)=0$

$x=9$ $\quad x=-3$

$2k+1=9$ $\quad 2k+1=-3$

$2k=8$ $\quad 2k=-4$

$k=4$ $\quad k=-2$

10) $(x-5)^2 = 4(x-5) + 32$

$x-5=y$

$y^2 = 4y + 32$

$-4y \quad -32 \quad -4y \quad -32$

$y^2 - 4y - 32 = 0$

$(y-8)(y+4)=0$

$y=8$ $\quad y=-4$

$x-5=8$ $\quad x-5=-4$

$x=13$ $\quad x=1$

Directions: Given one solution, find ALL possible solutions to the equation.

11) $x = 3$ is ONE solution of $x^3 + 15x^2 + 26x - 240 = 0$, find all possible solutions.

	1	15	26	-240
3		3	54	240
	1	18	80	0

$x^2 + 18x + 80 = 0$

$(x+8)(x+10)=0$

$-8, -10, 3$

12) $x = -2$ is ONE solution of $4x^3 + x^2 - 11x + 6 = 0$, find all possible solutions.

	4	1	-11	6
-2		-8	14	-6
	4	-7	3	0

$4x^2 - 7x + 3 = 0$

$x \quad -1$

± 12

± 7

	x	-1
$4x$	$4x^2$	$-4x$
-3	$-3x$	3

$(4x-3)=0$ $\quad x-1=0$

$4x=3$

$x=3/4$ $\quad x=1$ $\quad x=-2$