

1.4 Zeroes of Polynomials

PRACTICE

Directions: Find the zeroes. $x = 60 / + - 7$

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

$(4r^2 - 12r) + (5r - 15) = 0$
 $4r(r-3) + 5(r-3) = 0$
 $(r-3)(4r+5) = 0$
 $r-3=0$ or $4r+5=0$
 $r=3$ or $r = -\frac{5}{4}$

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

$(7k^3 + 42k) + (4k^2 - 24) = 0$
 $k^2(7k+4) - 6(7k+4) = 0$
 $(7k+4)(k^2-6) = 0$
 $7k+4=0$ or $k^2-6=0$
 $7k=-4$ or $\sqrt{k^2} = \sqrt{6}$
 $k = -\frac{4}{7}$ or $k = \pm\sqrt{6}$

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

$n^2 - 5n + 6 = 0$
 $(n-2)(n-3) = 0$

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

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

$(a+9)(a+5) [(4a^2 + 6a + 2a + 3)] = 0$
 $(a+9)(a+5) [2a(2a+3) + 1(2a+3)] = 0$
 $(a+9)(a+5)(2a+3)(2a+1) = 0$
 $a+9=0$ or $a+5=0$ or $2a+3=0$ or $2a+1=0$
 $a=-9$ or $a=-5$ or $a=-\frac{3}{2}$ or $a=-\frac{1}{2}$

Directions: Solve.

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

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

$v+7=0$ or $v-2=0$ or $v+2=0$
 $v=-7$ or $v=2$ or $v=-2$

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

$(p-7)(p-4)(p-4)(p+4) = 0$
 $p-7=0$ or $p-4=0$ or $p+4=0$
 $p=7$ or $p=4$ or $p=-4$

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

$$\begin{array}{r} 5m^2 - 17m - 20 = 4m \\ -4m \quad -4m \\ \hline 5m^2 - 21m - 20 = 0 \\ (5m^2 - 25m)(4m - 20) = 0 \\ 5m(m-5) + 4(m-5) = 0 \\ (m-5)(5m+4) = 0 \end{array}$$

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

$m=5$ OR $5m=-4$
 $m=-4/5$

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

$$\begin{array}{r} p^2 + 13p + 36 = -4 \\ 14 \quad 14 \\ \hline p^2 + 13p + 40 = 0 \\ (p+8)(p+5) = 0 \end{array}$$

$p+8=0$ OR $p+5=0$

$p=-8$ OR $p=-5$

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

$$\begin{array}{r} x^2 - 6x - 27 = 0 \\ (x-9)(x+3) = 0 \end{array}$$

$x-9=0$ OR $x+3=0$

$x=9$ OR $x=-3$

$2k+1=9$ OR $2k+1=-3$

$2k=8$ OR $2k=-4$

$k=4$ OR $k=-2$

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

$$\begin{array}{r} y^2 = 4y + 32 \\ -4y - 32 \quad -4y - 32 \\ \hline y^2 - 4y - 32 = 0 \\ (y-8)(y+4) = 0 \end{array}$$

$y-8=0$ OR $y+4=0$

$y=8$ OR $y=-4$

$x-5=8$ OR $x-5=-4$

$x=13$ OR $x=1$

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.

$$\begin{array}{r} x^3 + 15x^2 + 26x - 240 \\ x-3 \overline{) x^3 + 15x^2 + 26x - 240} \\ \underline{-x^3 - 3x^2} \\ 18x^2 + 26x \\ \underline{-18x^2 - 54x} \\ 80x - 240 \\ \underline{80x - 240} \\ 0 \end{array}$$

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

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

$x+10=0$ OR $x+8=0$

$x=-10$ OR $x=-8$

MOST HAVE ALL!!

$x=3$
 $x=-10$
 $x=-8$

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

$$\begin{array}{r} 4x^3 + x^2 - 11x + 6 \\ x+2 \overline{) 4x^3 + x^2 - 11x + 6} \\ \underline{-4x^3 + 8x^2} \\ -7x^2 - 11x \\ \underline{-7x^2 - 14x} \\ 3x + 6 \\ \underline{3x + 6} \\ 0 \end{array}$$

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

$(4x^2 - 4x)(-3x + 3) = 0$

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

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

$x-1=0$ OR $4x-3=0$

$x=1$ OR $4x=3$

$x=3/4$

MOST HAVE ALL!!

$x=2$
 $x=3/4$
 $x=1$