ANSWER PRESENTATION TOOL

Algebra 2 - Student Edit 4 5 - Practice 1-43 ALL EVEN Show Solu

ODD

1. $z^3 - z^2 - 12z = 0$

$z(z^2 - z - 12) = 0$

$z(z - 4)(z + 3) = 0$

The solutions are $z = -3$, $z = 0$, and $z = 4$.

3. $2x^4 - 4x^3 = -2x^2$

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

$2x^2(x^2 - 2x + 1) = 0$

$2x^2(x - 1)^2 = 0$

The solutions are $x = 0$ and $x = 1$.

5. $5w^3 = 50w$

$5w^3 - 50w = 0$

$5w(w^2 - 10) = 0$

$5w(w - \sqrt{10})(w + \sqrt{10}) = 0$

The solutions are $w = -\sqrt{10}$, $w = 0$, and $w = \sqrt{10}$.

7. $$2c^4 - 6c^3 = 12c^2 - 36c$$
$$2c^4 - 6c^3 - 12c^2 + 36c = 0$$
$$2c(c^3 - 3c^2 - 6c + 18) = 0$$
$$2c[c^2(c - 3) - 6(c - 3)] = 0$$
$$2c[(c^2 - 6)(c - 3)] = 0$$
$$2c(c - \sqrt{6})(c + \sqrt{6})(c - 3) = 0$$
The solutions are $c = -\sqrt{6}$, $c = 0$, $c = \sqrt{6}$, and $c = 3$.

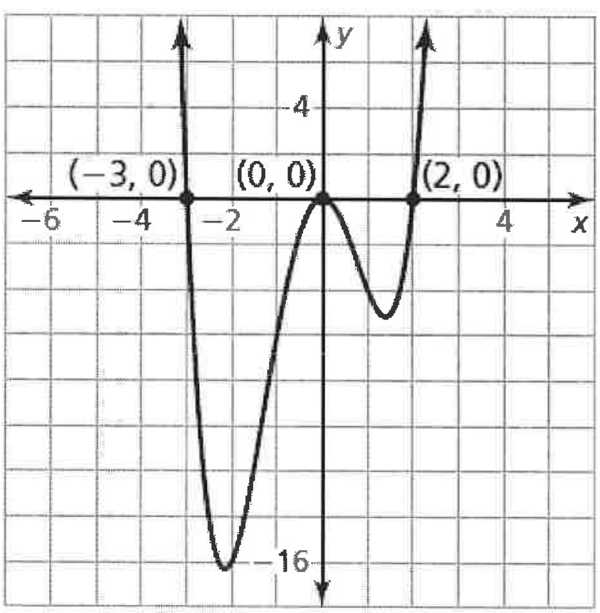
9. $$12n^2 + 48n = -n^3 - 64$$
$$n^3 + 12n^2 + 48n + 64 = 0$$
$$(n + 4)^3 = 0$$
The solution is $n = -4$.

11. $0 = x^4 + x^3 - 6x^2$

$0 = x^2(x^2 + x - 6)$

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

The zeros of h are $x = -3$, $x = 0$, and $x = 2$.

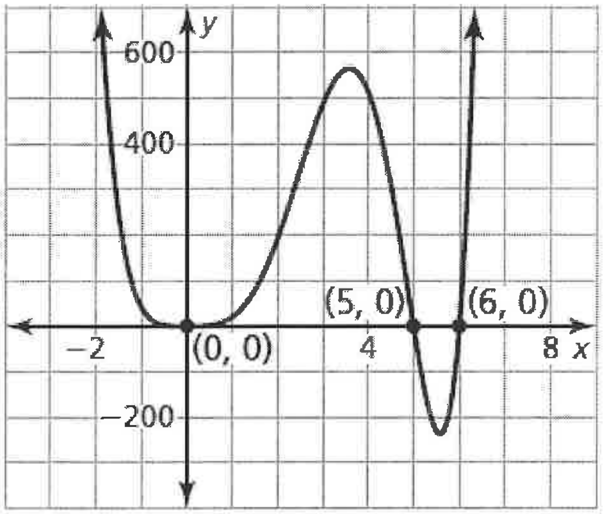


13. $0 = x^6 - 11x^5 + 30x^4$

$0 = x^4(x^2 - 11x + 30)$

$0 = x^4(x - 5)(x - 6)$

The zeros of f are $x = 0$, $x = 5$, and $x = 6$.

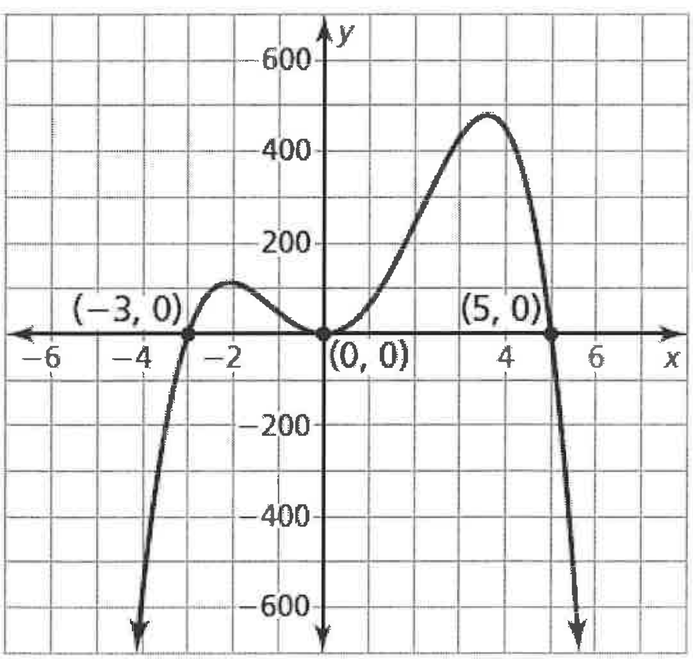


15. $0 = -4x^4 + 8x^3 + 60x^2$

$0 = -4x^2(x^2 - 2x - 15)$

$0 = -4x^2(x - 5)(x + 3)$

The zeros of g are $x = -3$, $x = 0$, and $x = 5$.



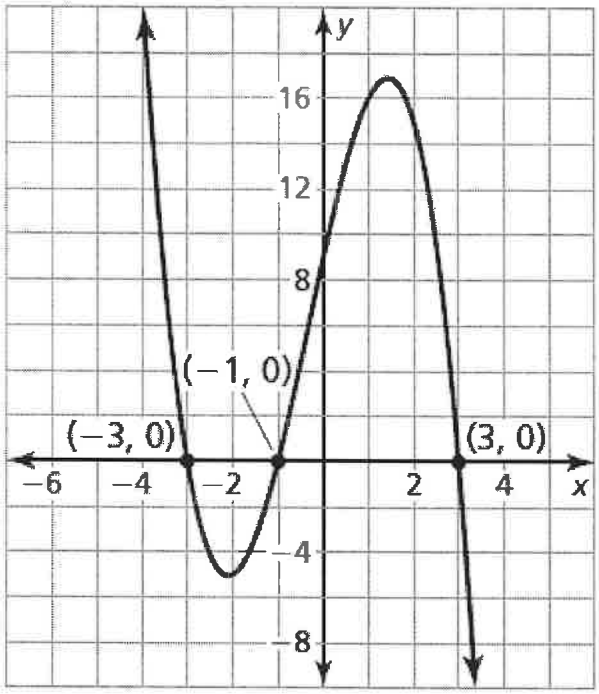
17. $0 = -x^3 - x^2 + 9x + 9$

$0 = -x^2(x + 1) + 9(x + 1)$

$0 = (-x^2 + 9)(x + 1)$

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

The zeros of h are $x = -3$, $x = -1$, and $x = 3$.



19. no; The graph crosses through the x-axis at each x-intercept.

21. Step 1 The possible rational solutions are ± 1, ± 3, ± 5, ± 15.

Step 2

1	1	1	−17	15
		1	2	−15
	1	2	−15	0

So, $x - 1$ is a factor.

Step 3

$$x^3 + x^2 - 17x + 15 = 0$$
$$(x - 1)(x^2 + 2x - 15) = 0$$
$$(x - 1)(x + 5)(x - 3) = 0$$

So, the real solutions are $x = -5$, $x = 1$, and $x = 3$.

23 . Step 1 The possible rational solutions are ± 1, ± 2, ± 3, ± 5, ± 6, ± 10, ± 15, ± 30.

Step 2

−1	1	−10	19	30
		−1	11	−30
	1	−11	30	0

So, $x + 1$ is a factor.

Step 3

$$x^3 - 10x^2 + 19x + 30 = 0$$
$$(x + 1)(x^2 - 11x + 30) = 0$$
$$(x + 1)(x - 5)(x - 6) = 0$$

So, the real solutions are $x = -1$, $x = 5$, and $x = 6$.

25. Step 1 The possible rational solutions are $\pm1, \pm2, \pm3, \pm4, \pm5, \pm6, \pm10, \pm12, \pm15, \pm20, \pm30, \pm60$.

Step 2

$$\begin{array}{r|rrrr} 4 & 1 & -6 & -7 & 60 \\ & & 4 & -8 & -60 \\ \hline & 1 & -2 & -15 & 0 \end{array}$$

So, $x - 4$ is a factor.

Step 3

$$x^3 - 6x^2 - 7x + 60 = 0$$
$$(x - 4)(x^2 - 2x - 15) = 0$$
$$(x - 4)(x - 5)(x + 3) = 0$$

So, the real solutions are $x = -3$, $x = 4$, and $x = 5$.

27. Step 1 The possible rational solutions are $\pm1, \pm2, \pm3, \pm4, \pm6, \pm8, \pm12, \pm24, \pm\frac{1}{2}, \pm\frac{3}{2}$.

Step 2

$$\begin{array}{r|rrrr} 6 & 2 & -3 & -50 & -24 \\ & & 12 & 54 & 24 \\ \hline & 2 & 9 & 4 & 0 \end{array}$$

So, $x - 6$ is a factor.

Step 3

$$2x^3 - 3x^2 - 50x - 24 = 0$$
$$(x - 6)(2x^2 + 9x + 4) = 0$$
$$(x - 6)(2x + 1)(x + 4) = 0$$

So, the real solutions are $x = -4$, $x = -\frac{1}{2}$, and $x = 6$.

29. C; 9 is not a factor of 2.

31. The possible rational zeros of the function includes not just the positive, but also the negative values. So, all possible zeros are $\pm1, \pm3, \pm5, \pm9, \pm15, \pm45$.

33. Step 1 The possible rational zeros of f are $\pm1, \pm2$.

Step 2

-1	1	0	-3	-2
		-1	1	2
	1	-1	-2	0

So, -1 is a zero.

Step 3

$$x^3 - 3x - 2 = 0$$
$$(x + 1)(x^2 - x + 2) = 0$$
$$(x + 1)(x - 2)(x + 1) = 0$$

So, the real zeros of f are -1 and 2.

35. Step 1 The possible rational zeros of p are $\pm1, \pm2, \pm3, \pm4, \pm6, \pm9, \pm12, \pm18, \pm36, \pm\frac{1}{2}, \pm\frac{3}{2}, \pm\frac{9}{2}$.

Step 2

3	2	-1	-27	36
		6	15	-36
	2	5	-12	0

So, 3 is a zero.

Step 3

$$2x^3 - x^2 - 27x + 36 = 0$$
$$(x - 3)(2x^2 + 5x - 12) = 0$$
$$(x - 3)(2x - 3)(x + 4) = 0$$

So, the real zeros of p are $-4, \frac{3}{2}$, and 3.

37. The list of possible rational zeros of f are ± 1, ± 2, ± 4, ± 8, ± 16, $\pm \frac{1}{4}$, $\pm \frac{1}{2}$.

Using the graph of f, a reasonable zero is $x = 1$.

$$\begin{array}{r|rrrr} 1 & 4 & 0 & -20 & 16 \\ & & 4 & 4 & -16 \\ \hline & 4 & 4 & -16 & 0 \end{array}$$

So, 1 is a zero of f.

$$4x^3 - 20x + 16 = 0$$
$$(x - 1)(4x^2 + 4x - 16) = 0$$
$$4(x - 1)(x^2 + x - 4) = 0$$

Find the remaining zeros of f.

$$x^2 + x - 4 = 0$$
$$x = \frac{-1 \pm \sqrt{1 + 16}}{2}$$
$$x = \frac{-1 \pm \sqrt{17}}{2}$$

The real zeros of f are 1, $\frac{-1 + \sqrt{17}}{2}$, and $\frac{-1 - \sqrt{17}}{2}$.

39. The possible rational zeros of h are $\pm 1, \pm 3, \pm 9, \pm\frac{1}{2}, \pm\frac{3}{2}, \pm\frac{9}{2}, \pm\frac{1}{4}, \pm\frac{3}{4}, \pm\frac{9}{4}, \pm\frac{1}{8}, \pm\frac{3}{8}, \pm\frac{9}{8}, \pm\frac{1}{16}, \pm\frac{3}{16}, \pm\frac{9}{16}, \pm\frac{1}{32}, \pm\frac{3}{32}, \pm\frac{9}{32}, \pm\frac{1}{64}, \pm\frac{3}{64}, \pm\frac{9}{64}$.

Using the graph of h, the reasonable zeros are $x = \frac{1}{2}$ and $x = -\frac{3}{4}$.

$\frac{1}{2}$	64	32	−44	−12	9
		32	32	−6	−9
	64	64	−12	−18	0

So, $\frac{1}{2}$ is a zero.

$$\left(x - \frac{1}{2}\right)(64x^3 + 64x^2 - 12x - 18) = 0$$

$$\left(x - \frac{1}{2}\right)(2)(32x^3 + 32x^2 - 6x - 9) = 0$$

Use synthetic division to find another zero.

$\frac{1}{2}$	32	32	−6	−9
		16	24	9
	32	48	18	0

So, $\frac{1}{2}$ is a zero.

$$\left(x - \frac{1}{2}\right)(2)\left(x - \frac{1}{2}\right)(32x^2 + 48x + 18) = 0$$

$$\left(x - \frac{1}{2}\right)(2)\left(x - \frac{1}{2}\right)(2)(16x^2 + 24x + 9) = 0$$

$$(2x - 1)(2x - 1)(4x + 3)^2 = 0$$

So, the real zeros of h are $\frac{1}{2}$ and $-\frac{3}{4}$.

41. $$\begin{aligned} f(x) &= (x+2)(x-3)(x-6) \\ &= (x+2)(x^2-9x+18) \\ &= x^3-9x^2+18x+2x^2-18x+36 \\ &= x^3-7x^2+36 \end{aligned}$$

43. $$\begin{aligned} f(x) &= \left[x-\left(6-\sqrt{7}\right)\right]\left[x-\left(6+\sqrt{7}\right)\right] \\ &= \left[(x-6)+\sqrt{7}\right]\left[(x-6)-\sqrt{7}\right] \\ &= (x-6)^2-7 \\ &= x^2-12x+36-7 \\ &= x^2-12x+29 \end{aligned}$$