ANSWER PRESENTATION TOOL

Algebra 2 - Student Edit | 4 | 5 - Practice | 2-44 | ALL EVEN ODD | Show Solı

2. $a^3 - 4a^2 + 4a = 0$

$a(a^2 - 4a + 4) = 0$

$a(a - 2)^2 = 0$

The solutions are $a = 0$ and $a = 2$.

4. $v^3 - 2v^2 - 16v = -32$

$v^3 - 2v^2 - 16v + 32 = 0$

$v^2(v - 2) - 16(v - 2) = 0$

$(v^2 - 16)(v - 2) = 0$

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

The solutions are $v = -4$, $v = 2$, and $v = 4$.

6. $9m^5 = 27m^3$

$9m^5 - 27m^3 = 0$

$9m^3(m^2 - 3) = 0$

$9m^3(m - \sqrt{3})(m + \sqrt{3}) = 0$

The solutions are $m = -\sqrt{3}$, $m = 0$, and $m = \sqrt{3}$.

8.

$$p^4 + 40 = 14p^2$$
$$p^4 - 14p^2 + 40 = 0$$
$$(p^2 - 4)(p^2 - 10) = 0$$
$$(p - 2)(p + 2)\left(p - \sqrt{10}\right)\left(p + \sqrt{10}\right) = 0$$

The solutions are $p = -\sqrt{10}$, $p = -2$, $p = 2$, and $p = \sqrt{10}$.

10.

$$y^3 - 27 = 9y^2 - 27y$$
$$y^3 - 9y^2 + 27y - 27 = 0$$
$$(y - 3)^3 = 0$$

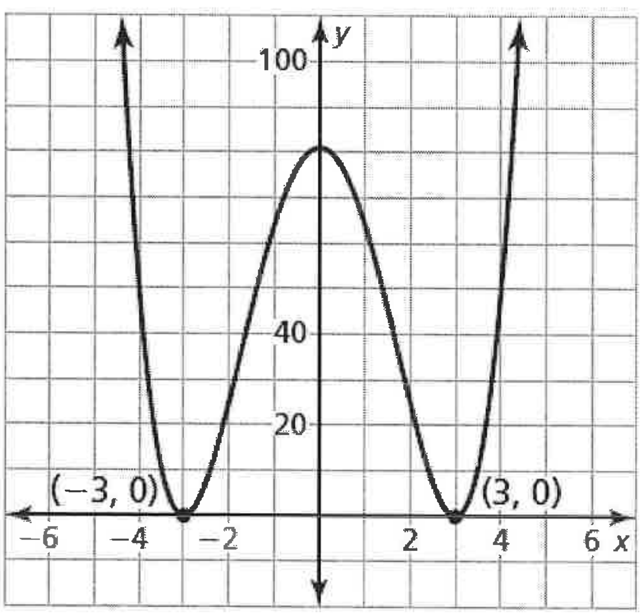
The solution is $y = 3$.

12. $0 = x^4 - 18x^2 + 81$

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

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

The zeros of f are $x = -3$ and $x = 3$.

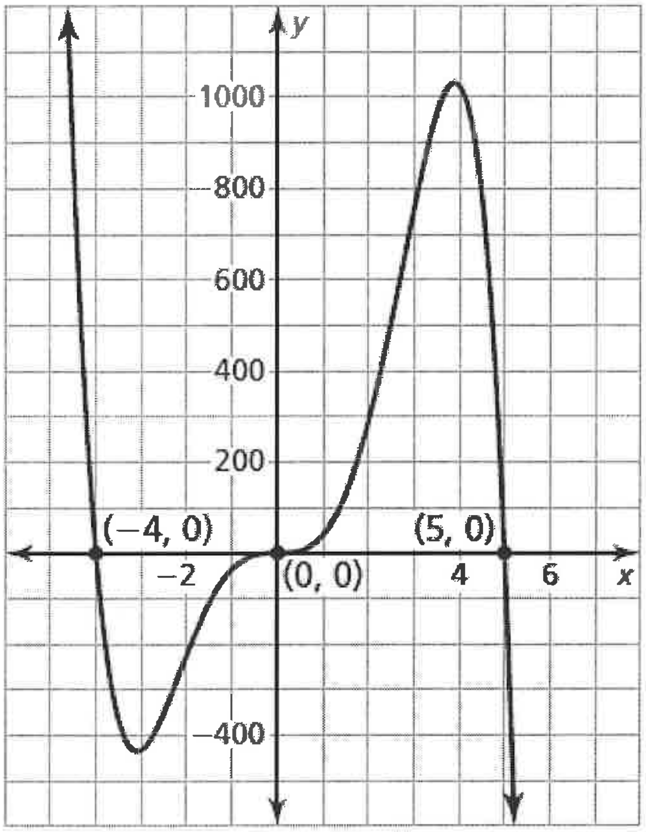


14. $0 = -2x^5 + 2x^4 + 40x^3$

$0 = -2x^3(x^2 - x - 20)$

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

The zeros of g are $x = -4$, $x = 0$, and $x = 5$.

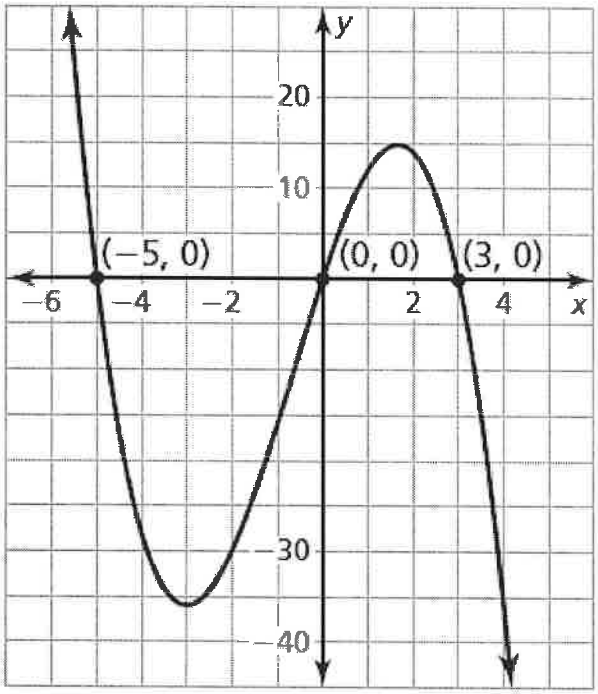


16. $0 = -x^3 - 2x^2 + 15x$

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

$0 = -x(x + 5)(x - 3)$

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



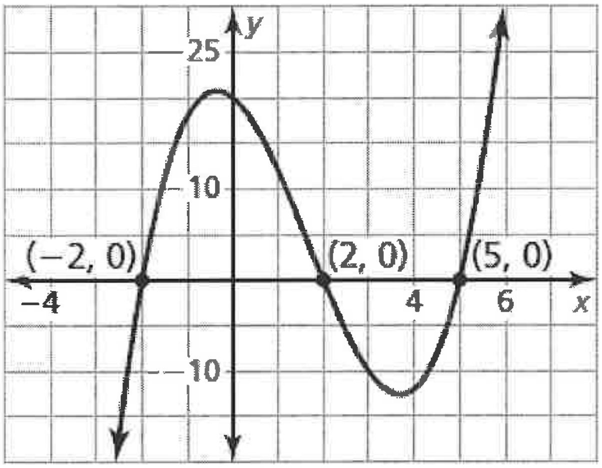
18. $0 = x^3 - 5x^2 - 4x + 20$

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

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

$0 = (x - 2)(x + 2)(x - 5)$

The zeros of p are $x = -2$, $x = 2$, and $x = 5$.



20. yes; The graph touches the x-axis, but does not cross the x-axis at $x = 3$, so $x = 3$ is a repeated real solution.

22. Step 1 The possible rational solutions are $\pm 1, \pm 2, \pm 3, \pm 6$.

Step 2

$$\begin{array}{r|rrrr} 1 & 1 & -2 & -5 & 6 \\ & & 1 & -1 & -6 \\ \hline & 1 & -1 & -6 & 0 \end{array}$$

So, $x - 1$ is a factor.

Step 3 $x^3 - 2x^2 - 5x + 6 = 0$

$(x - 1)(x^2 - x - 6) = 0$

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

So, the real solutions are $x = -2$, $x = 1$, and $x = 3$.

24. Step 1 The possible rational solutions are $\pm1, \pm2, \pm3, \pm5, \pm6, \pm10, \pm15, \pm30$.

Step 2

$$\begin{array}{r|rrrr} -2 & 1 & 4 & -11 & -30 \\ & & -2 & -4 & 30 \\ \hline & 1 & 2 & -15 & 0 \end{array}$$

So, $x + 2$ is a factor.

Step 3 $x^3 + 4x^2 - 11x - 30 = 0$

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

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

So, the real solutions are $x = -5$, $x = -2$, and $x = 3$.

26. Step 1 The possible rational solutions are $\pm1, \pm2, \pm3, \pm4, \pm6, \pm8, \pm9, \pm12, \pm18, \pm24, \pm36, \pm72$.

Step 2

$$\begin{array}{r|rrrr} -1 & 1 & -16 & 55 & 72 \\ & & -1 & 17 & -72 \\ \hline & 1 & -17 & 72 & 0 \end{array}$$

So, $x + 1$ is a factor.

Step 3 $x^3 - 16x^2 + 55x + 72 = 0$

$(x + 1)(x^2 - 17x + 72) = 0$

$(x + 1)(x - 9)(x - 8) = 0$

So, the real solutions are $x = -1$, $x = 8$, and $x = 9$.

28. Step 1 The possible rational solutions are $\pm 1, \pm 2, \pm 3, \pm 4,$ $\pm 6, \pm 8, \pm 12, \pm 24, \pm\frac{1}{3}, \pm\frac{2}{3}, \pm\frac{4}{3}, \pm\frac{8}{3}$.

Step 2

3	3	1	−38	24
		9	30	−24
	3	10	−8	0

So, $x - 3$ is a factor.

Step 3 $3x^3 + x^2 - 38x + 24 = 0$

$(x - 3)(3x^2 + 10x - 8) = 0$

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

So, the real solutions are $x = -4$, $x = \frac{2}{3}$, and $x = 3$.

30. A; 3 is not a factor of 40.

32. The possible rational zeros of the function are $\frac{p}{q}$, where p is a factor of 8 and q is a factor of 3; The zeros described are of the form $\frac{q}{p}$, which is incorrect. So, the possible rational zeros are $\pm 1, \pm\frac{1}{3}, \pm 2, \pm 4, \pm 8, \pm\frac{2}{3}, \pm\frac{4}{3}, \pm\frac{8}{3}$.

34. Step 1 The possible rational zeros of g are $\pm1, \pm2, \pm3, \pm4, \pm6, \pm8, \pm12, \pm16, \pm24, \pm48$.

Step 2

$$\begin{array}{r|rrrr} -2 & 1 & 0 & -28 & -48 \\ & & -2 & 4 & 48 \\ \hline & 1 & -2 & -24 & 0 \end{array}$$

So, -2 is a zero.

Step 3

$$x^3 - 28x - 48 = 0$$
$$(x + 2)(x^2 - 2x - 24) = 0$$
$$(x + 2)(x - 6)(x + 4) = 0$$

So, the real zeros of g are -4, -2, and 6.

36. Step 1 The possible rational zeros of g are $\pm1, \pm2, \pm4, \pm5, \pm8, \pm10, \pm20, \pm40, \pm\frac{1}{3}, \pm\frac{2}{3}, \pm\frac{4}{3}, \pm\frac{5}{3}, \pm\frac{8}{3}, \pm\frac{10}{3}, \pm\frac{20}{3}, \pm\frac{40}{3}$.

Step 2

$$\begin{array}{r|rrrr} 2 & 3 & -25 & 58 & -40 \\ & & 6 & -38 & 40 \\ \hline & 3 & -19 & 20 & 0 \end{array}$$

So, 2 is a zero.

Step 3

$$3x^3 - 25x^2 + 58x - 40 = 0$$
$$(x - 2)(3x^2 - 19x + 20) = 0$$
$$(x - 2)(3x - 4)(x - 5) = 0$$

So, the real zeros of g are $\frac{4}{3}$, 2, and 5.

38. The list of possible rational zeros of f are ± 1, ± 2, ± 3, ± 4, ± 5, ± 6, ± 10, ± 12, ± 15, ± 20, ± 30, ± 60, $\pm \frac{1}{2}$, $\pm \frac{3}{2}$, $\pm \frac{5}{2}$, $\pm \frac{15}{2}$, $\pm \frac{1}{4}$, $\pm \frac{3}{4}$, $\pm \frac{5}{4}$, $\pm \frac{15}{4}$.

Using the graph of f, the reasonable zeros are $x = 4$, $x = -\frac{3}{2}$, $x = -\frac{5}{2}$.

4	4	0	−49	−60
		16	64	60
	4	16	15	0

So, 4 is a zero of f.

$$4x^3 - 49x - 60 = 0$$

$$(x - 4)(4x^2 + 16x + 15) = 0$$

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

The real zeros of f are $-\frac{5}{2}$, $-\frac{3}{2}$, and 4.

40. The possible rational zeros of f are $\pm 1, \pm 2, \pm 4, \pm\frac{1}{3}, \pm\frac{2}{3}, \pm\frac{4}{3}$.

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

−2	3	−2	−25	−20	−4
		−6	16	18	4
	3	−8	−9	−2	0

So, -2 is a zero.

$(x + 2)(3x^3 - 8x^2 - 9x - 2) = 0$

Use synthetic division to find another zero.

$-\frac{1}{3}$	3	−8	−9	−2
		−1	3	2
	3	−9	−6	0

So, $-\frac{1}{3}$ is a zero.

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

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

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

Find the remaining zeros of f.

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

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-2)}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{17}}{2}$$

So, the real zeros of f are $-2, -\frac{1}{3}, \frac{3 + \sqrt{17}}{2}$ and $\frac{3 - \sqrt{17}}{2}$.

42. $f(x) = (x + 4)(x + 2)(x - 5)$
$= (x + 4)(x^2 - 3x - 10)$
$= x^3 - 3x^2 - 10x + 4x^2 - 12x - 40$
$= x^3 + x^2 - 22x - 40$

44. $f(x) = \left[x - \left(-2 + \sqrt{5}\right)\right]\left[x - \left(-2 - \sqrt{5}\right)\right]$
$= \left[(x + 2) - \sqrt{5}\right]\left[(x + 2) + \sqrt{5}\right]$
$= (x + 2)^2 - 5$
$= x^2 + 4x + 4 - 5$
$= x^2 + 4x - 1$