ANSWER PRESENTATION TOOL

Algebra 2 - Student Edit 4 8 - Practice 2-40 ALL EVEN Show Solı

ODD

2. C; The graph has x-intercepts -2 (repeated) and -1.

4. B; The graph has x-intercepts -1, 1, and -2.

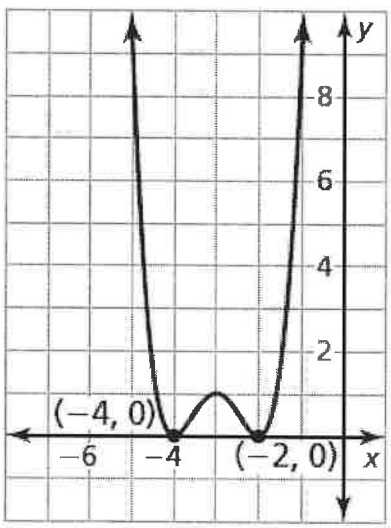
6. Step 1 Plot the x-intercepts. Because -2 and -4 are zeros of f, plot $(-2, 0)$ and $(-4, 0)$.

Step 2 Plot points between and beyond the x-intercepts.

x	-5	-3	-1
y	18	2	18

Step 3 Determine end behavior. Because f has four factors of the form $x - k$, it is a quartic function with a positive leading coefficient. So, $f(x) \to +\infty$ as $x \to -\infty$ and $f(x) \to +\infty$ as $x \to +\infty$.

Step 4 Draw the graph so that it passes through the plotted points and has the appropriate end behavior.



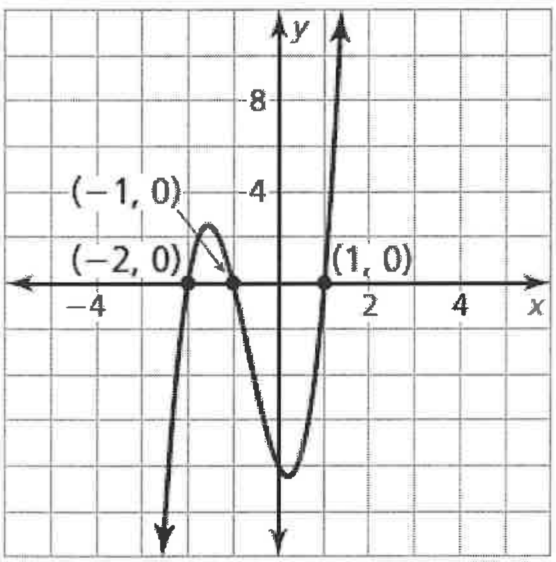
8. Step 1 Plot the x-intercepts. Because -1, -2, and 1 are zeros of g, plot $(-1, 0)$, $(-2, 0)$, and $(1, 0)$.

Step 2 Plot points between and beyond the x-intercepts.

x	-3	0	0.5	2
y	-32	-8	-7.5	48

Step 3 Determine end behavior. Because g has three factors of the form $x - k$ and a constant factor 4, it is a cubic function with a positive leading coefficient. So, $g(x) \to -\infty$ as $x \to -\infty$ and $g(x) \to +\infty$ as $x \to +\infty$.

Step 4 Draw the graph so that it passes through the plotted points and has the appropriate end behavior.



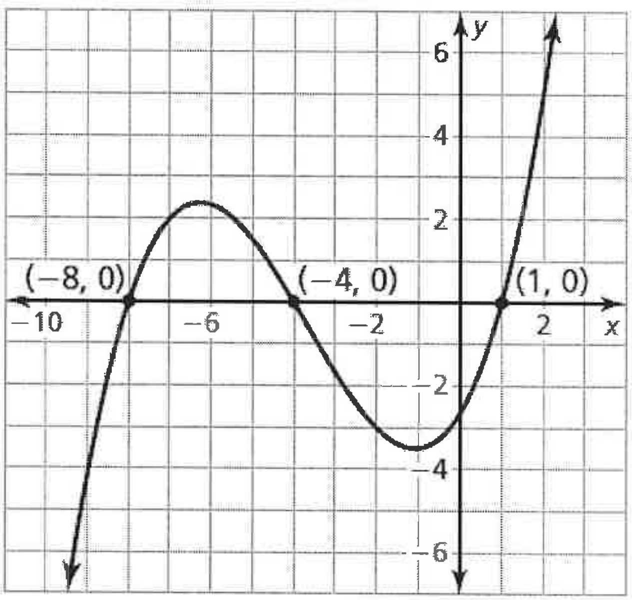
10. Step 1 Plot the x-intercepts. Because -4, -8, and 1 are zeros of g, plot $(-4, 0)$, $(-8, 0)$, and $(1, 0)$.

Step 2 Plot points between and beyond the x-intercepts.

x	-9	-7	-5	0	2
y	-4.167	2	1.5	-2.333	5

Step 3 Determine end behavior. Because g has three factors of the form $x - k$ and a constant factor $\frac{1}{12}$, it is a cubic function with a positive leading coefficient. So, $g(x) \to -\infty$ as $x \to -\infty$ and $g(x) \to +\infty$ as $x \to +\infty$.

Step 4 Draw the graph so that it passes through the plotted points and has the appropriate end behavior.



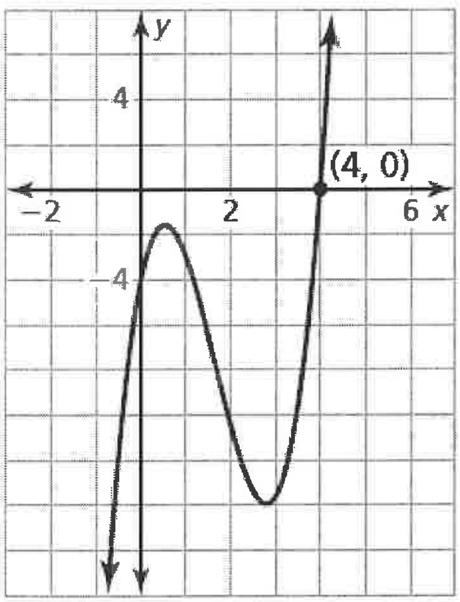
12. Step 1 Plot the x-intercepts. Because 4 is the zero of f, plot (4, 0).

Step 2 Because there is only one x-intercept, plot a few additional points.

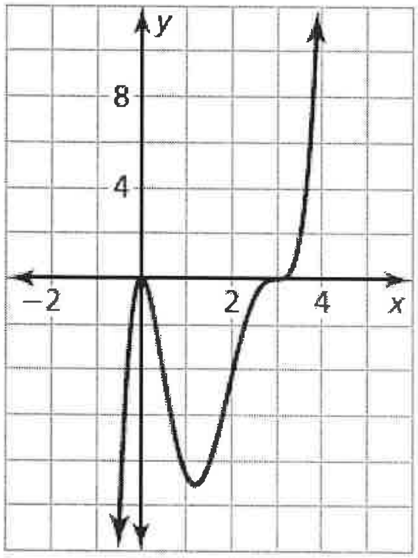
x	0	$\frac{1}{2}$	1	2	3
y	-4	-1.75	-3	-10	-13

Step 3 Determine end behavior. Because $f(x) = 2x^3 - 10x^2 + 9x - 4$, it is a cubic function with a positive leading coefficient. So, $f(x) \to -\infty$ as $x \to -\infty$ and $f(x) \to +\infty$ as $x \to +\infty$.

Step 4 Draw the graph so that it passes through the plotted points and has the appropriate end behavior.



14. Because 0 is a repeated zero with an even power, the graph should only touch the x-axis at 0, not cross it; Because 3 is a repeated zero with an odd power, the graph should cross the x-axis at 3.



16. Step 1 Use a graphing calculator to make a table.

Step 2 Use the Location Principle. From the table, $f(-3) < 0$ and $f(-1) > 0$. So, by the Location Principle, f has a zero between -3 and -1. Because f is a polynomial function of degree 3, it has three zeros. The only possible rational zero between -3 and -1 is -2. Using synthetic division, you can confirm that -2 is a zero.

Step 3 Write $f(x)$ in factored form. Dividing $f(x)$ by its known factor $x + 2$ gives a quotient of $x^2 - 5x + 6$. So, you can factor f as

$$f(x) = (x + 2)(x^2 - 5x + 6)$$
$$= (x + 2)(x - 2)(x - 3).$$

From the factorization, there are three zeros. The zeros of f are -2, 2, and 3.

18. Step 1 Use a graphing calculator to make a table.

Step 2 Use the Location Principle. From the table, $h(2) < 0$ and $h(4) > 0$. So, by the Location Principle, h has a zero between 2 and 4. Because h is a polynomial function of degree 3, it has three zeros. The only possible rational zeros between 2 and 4 are $\frac{9}{4}$ and 3. Using synthetic division, you can confirm that 3 is a zero.

Step 3 Write $h(x)$ in factored form. Dividing $h(x)$ by its known factor $x - 3$ gives a quotient of $4x^2 + 10x + 6$. So, you can factor h as

$$\begin{aligned} h(x) &= (x - 3)(4x^2 + 10x + 6) \\ &= 2(x - 3)(2x^2 + 5x + 3) \\ &= 2(x - 3)(x + 1)(2x + 3). \end{aligned}$$

From the factorization, there are three zeros. The zeros of h are 3, -1, and $-\frac{3}{2}$.

20. Step 1 Use a graphing calculator to make a table.

Step 2 Use the Location Principle. From the table, $f(4) < 0$ and $f(6) > 0$. So, by the Location Principle, f has a zero between 4 and 6. Because f is a polynomial function of degree 3, it has three zeros. The only possible rational zero between 4 and 6 is 5. Using synthetic division, you can confirm that 5 is a zero.

Step 3 Write $f(x)$ in factored form. Dividing $f(x)$ by its known factor $x - 5$ gives a quotient of $2x^2 + 7x + 3$. So, you can factor f as

$$\begin{aligned} f(x) &= (x - 5)(2x^2 + 7x + 3) \\ &= (x - 5)(2x + 1)(x + 3). \end{aligned}$$

From the factorization, there are three zeros. The zeros of f are 5, $-\frac{1}{2}$, and -3.

22. Step 1 Use technology to make a table.

Step 2 Use the Location Principle. From the table, $f(1) < 0$ and $f(2) > 0$. So, by the Location Principle, f has a zero between 1 and 2. Because f is a polynomial function of degree 4, it has 4 zeros. The only possible rational zero between 1 and 2 is $\frac{3}{2}$. Using synthetic division, you can confirm that $\frac{3}{2}$ is a zero.

Step 3 Write $f(x)$ in factored form. Dividing $f(x)$ by its known factor $x - \frac{3}{2}$ gives a quotient of $24x^3 + 22x^2 - 4x - 2$. So, you can factor f as

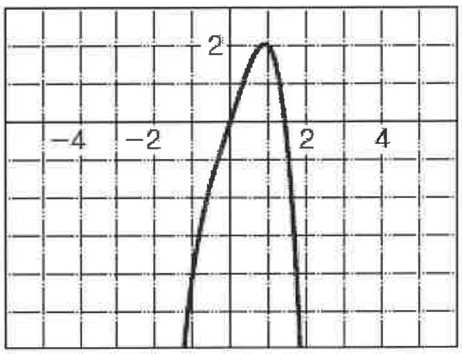
$$f(x) = \left(x - \tfrac{3}{2}\right)(24x^3 + 22x^2 - 4x - 2)$$
$$= 2\left(x - \tfrac{3}{2}\right)(12x^3 + 11x^2 - 2x - 1)$$

Using synthetic division, you can confirm that -1 is a zero.

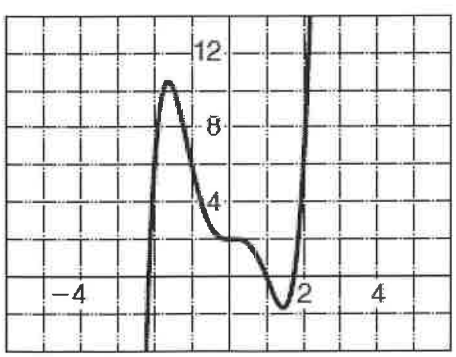
$$f(x) = 2\left(x - \tfrac{3}{2}\right)(12x^3 + 11x^2 - 2x - 1)$$
$$= 2\left(x - \tfrac{3}{2}\right)(x + 1)(12x^2 - x - 1)$$
$$= 2\left(x - \tfrac{3}{2}\right)(x + 1)(3x - 1)(4x + 1)$$

From the factorization, there are 4 zeros. The zeros of f are $\frac{3}{2}$, -1, $\frac{1}{3}$ and $-\frac{1}{4}$.

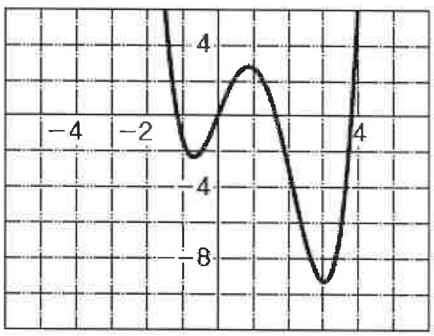
24. Use a graphing calculator to graph the function. The graph of g has two x-intercepts and one turning point. Use the graphing calculator's *zero*, *maximum*, and *minimum* features to approximate the coordinates of the points. The x-intercepts of the graph are $x = 0$ and $x \approx 1.44$. The function has a local maximum at $(0.91, 2.04)$. The function is increasing when $x < 0.91$ and decreasing when $x > 0.91$.



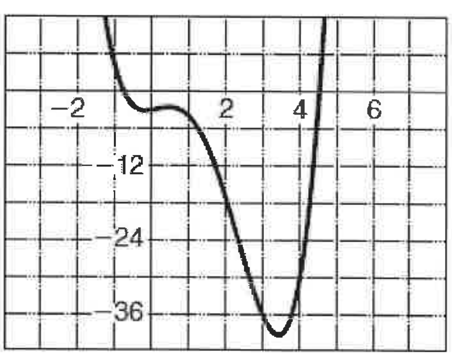
26. Use a graphing calculator to graph the function. The graph of f has three x-intercepts and two turning points. Use the graphing calculator's *zero*, *maximum*, and *minimum* features to approximate the coordinates of the points. The x-intercepts of the graph are $x \approx -2.16$, $x = 1$, and $x \approx 1.75$. The function has a local maximum at $(-1.63, 10.47)$ and a local minimum at $(1.46, -1.68)$. The function is increasing when $x < -1.63$ and $x > 1.46$ and decreasing when $-1.63 < x < 1.46$.



28. Use a graphing calculator to graph the function. The graph of f has four x-intercepts and three turning points. Use the graphing calculator's *zero*, *maximum*, and *minimum* features to approximate the coordinates of the points. The x-intercepts of the graph are $x \approx -1.15$, $x = 0$, $x \approx 1.64$, and $x \approx 3.79$. The function has a local maximum at $(0.87, 2.78)$ and local minimums at $(-0.68, -2.31)$ and $(3.02, -9.30)$. The function is increasing when $-0.68 < x < 0.87$ and $x > 3.02$, and decreasing when $x < -0.68$ and $0.87 < x < 3.02$.



30. Use a graphing calculator to graph the function. The graph of g has two x-intercepts and three turning points. Use the graphing calculator's *zero*, *maximum*, and *minimum* features to approximate the coordinates of the points. The x-intercepts of the graph are $x \approx -0.77$ and $x \approx 4.54$. The function has a local maximum at $(0.47, -2.56)$ and local minimums at $(-0.16, -3.09)$ and $(3.44, -39.40)$. The function is increasing when $-0.16 < x < 0.47$ and $x > 3.44$, and decreasing when $x < -0.16$ and $0.47 < x < 3.44$.

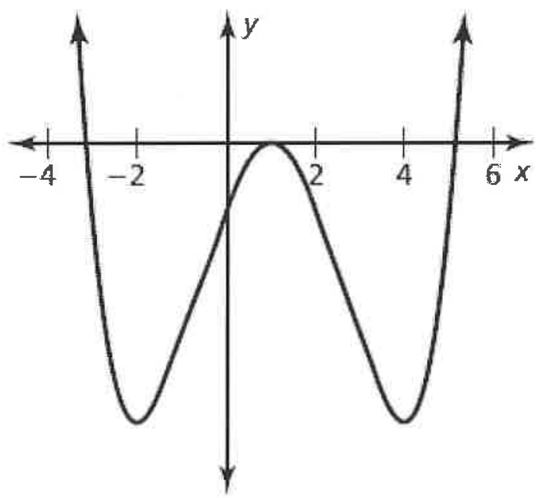


32. The graph of f has 2 turning points, so the least possible degree of f is 3.

34. The graph of f has 4 turning points, so the least possible degree of f is 5.

36. First plot the x-intercepts. Because the x-intercept $x = 1$ is also a local maximum, you know the graph touches but does not cross the x-axis at $x = 1$. Then at $x = -1$ and $x = 3$, plot points that are lower than all nearby points. Finally, draw the graph through the plotted points.

Sample answer:



38. Replace x with $-x$ in the equation for g.

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

Because $g(-x) = g(x)$, the function is even.

40. Replace x with $-x$ in the equation for f.

$$\begin{aligned} f(-x) &= (-x)^5 + 3(-x)^3 - (-x) \\ &= -x^5 - 3x^3 + x \\ &= -f(x) \end{aligned}$$

Because $f(-x) = -f(x)$, the function is odd.