

3.5 Trimester Final Exam**A2.A.APR.6****A2-APR.1 Perform operations with polynomials**

1. Find the sum in standard form $(x^2 - 4x - 7) + (2x^2 - 2x + 11)$.

2. Find the difference $f(x) - g(x)$ as a polynomial in standard form, given

$$f(x) = 3x^4 - 2x^3 + 5x^2 - 3x + 4 \text{ and } g(x) = 2x^4 + 2x^2 + x - 1.$$

3. Select each correct equation.

(a) $x^2 - 25 = x^2 - 5^2$

(d) $x^2 - 10x + 25 = (x - 5)^2$

(b) $x^2 - 25 = (x - 5)(x + 5)$

(e) $x^2 + 10x + 25 = (x + 5)^2$

(c) $x^2 + 25 = (x - 5)(x + 5)$

(f) $x^2 - 10x - 25 = (x - 5)^2$

4. Which equations represent correct polynomial identities?

(a) $x^3 - y^3 = (x - y)^3$

(c) $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

(b) $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

(d) $x^3 + y^3 = (x - y)(x^2 + xy + y^2)$

A2-F.IF.7a Graph linear and quadratic functions, show key features

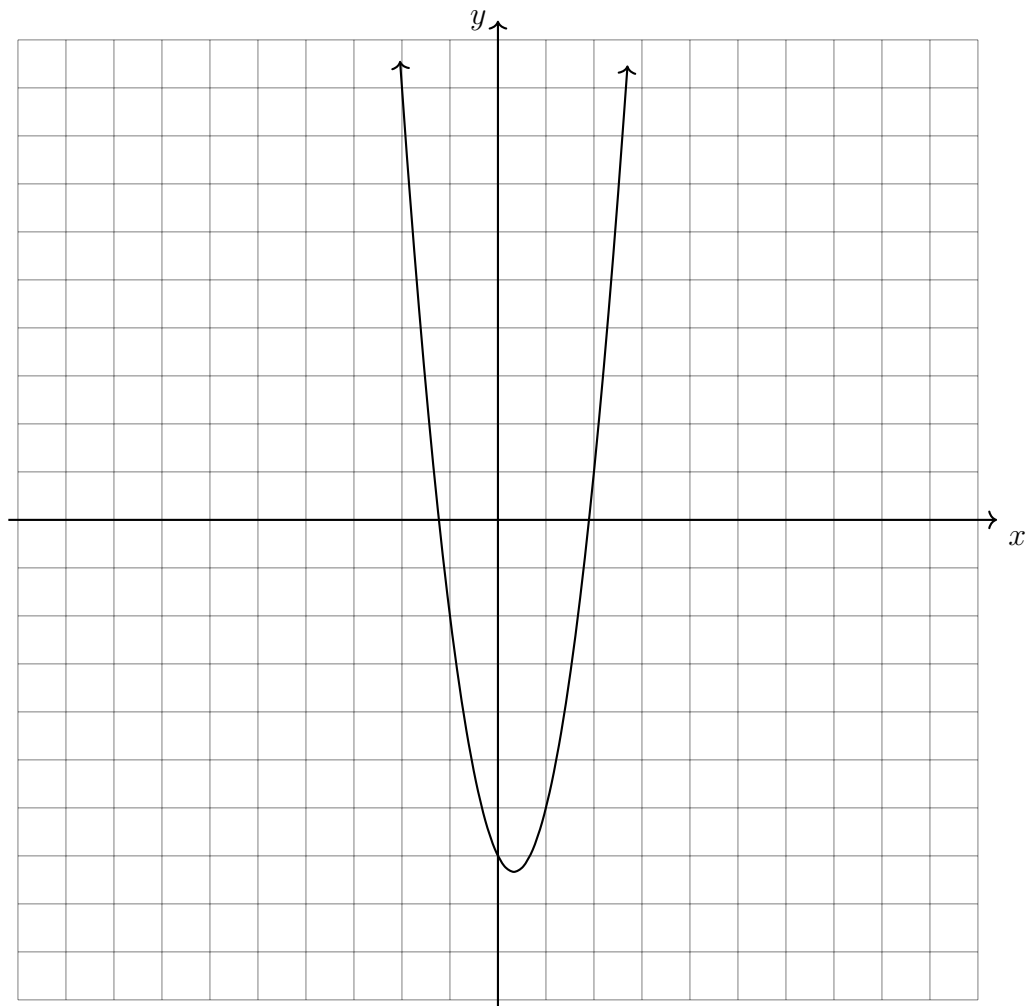
5. One equation of a system is graphed.

(a) Graph the second equation, labeling the intersections as ordered pairs.

(b) Find the value of the leading coefficient a of the quadratic equation.

$$y = ax^2 - 2x - 7$$

$$x - y = 1$$



A2-A.APR.3 Identify zeros of polynomials given suitable factorizations

6. Write down the solutions to the equation $x(3x - 1)(x + 5)(x - 1) = 0$.
7. The polynomial p is a function of x . The graph of p has three zeros at 7, $\frac{2}{3}$, and -1 . Select **all** the expressions that could represent p .

- | | |
|---|---|
| (a) $(x - 7)(x - \frac{2}{3})(x + 1)$ | (e) $(x - 7)(x + \frac{2}{3})(x - 1)$ |
| (b) $(x - 7)(3x - 2)(x - 1)$ | (f) $(x - 7)(3x - 2)(x + 1)$ |
| (c) $3(x - 7)(x - \frac{2}{3})(x + 1)$ | (g) $3(x - 7)(x - \frac{2}{3})(x - 1)$ |
| (d) $3x(x + 7)(x + \frac{2}{3})(x - 1)^2$ | (h) $3x(x + 7)(x - \frac{2}{3})(x + 1)^2$ |

A2-A.APR.6 Rewrite rational expressions in different forms

8. Select the expression that is equivalent to $\frac{2x^2 + 11x - 21}{x + 3}$ for $x \neq -3$.

- (a) $2x + 5 - \frac{6}{x + 3}$
- (b) $2x + 17 - \frac{20}{x + 3}$
- (c) $2x + 17 - \frac{36}{x + 3}$
- (d) $2x + 5 - \frac{36}{x + 3}$

A2-A.SSE.3c Apply the properties of exponents

9. Identify the expressions that are equal to $\frac{3^3}{3^5}$

(a) 3^{-2}

(d) 3^8

(b) $\frac{1}{9}$

(e) $\frac{1}{3^2}$

(c) 3^3

(f) 0.111

10. Identify the expressions that are equal to 5^{-2}

(a) $\frac{1}{5^2}$

(d) $\frac{1}{25}$

(b) 5.5

(e) 0.04

(c) $\sqrt{5}$

(f) 10

11. Identify the expressions that are equal to $16^{\frac{1}{4}}$

(a) 2

(d) $\sqrt[4]{16}$

(b) 4

(e) 16.25

(c) $\sqrt{4}$

(f) 256

A2-F.BF.2 Write arithmetic and geometric sequences with recursive formulas

12. Write a recursive definition of the sequence $a_1 = 8$, $a_2 = 4$, $a_3 = 2$, $a_4 = 1, \dots$

13. Write a recursive definition of the arithmetic sequence b .

n	b_n
1	-2
2	-0.5
3	1

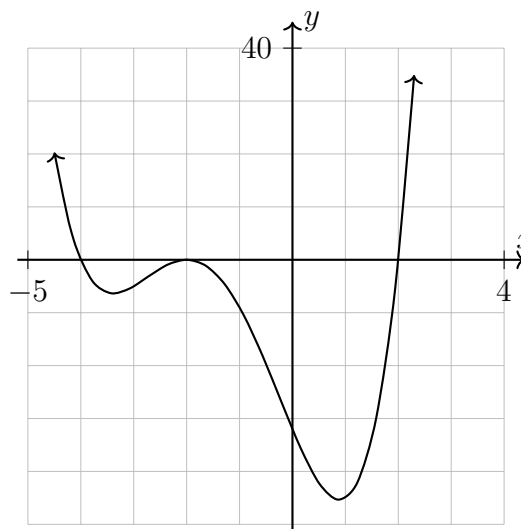
A2-F.IF.7c Graph polynomials, identify zeros, end behavior

14. Below is a graph of the polynomial $f(x)$.

(a) Is the leading coefficient positive or negative?

(b) Which of the following could be its equation?

- i. $f(x) = (x + 2)(x - 4)(x - 2)^2$
- ii. $f(x) = (x - 2)(x - 4)(x + 2)^2$
- iii. $f(x) = (x + 2)(x + 4)(x - 2)^2$
- iv. $f(x) = (x - 2)(x + 4)(x + 2)^2$



15. The graph of the polynomial $f(x) = x^4 - 9x^2 - 4x + 12$ is shown.

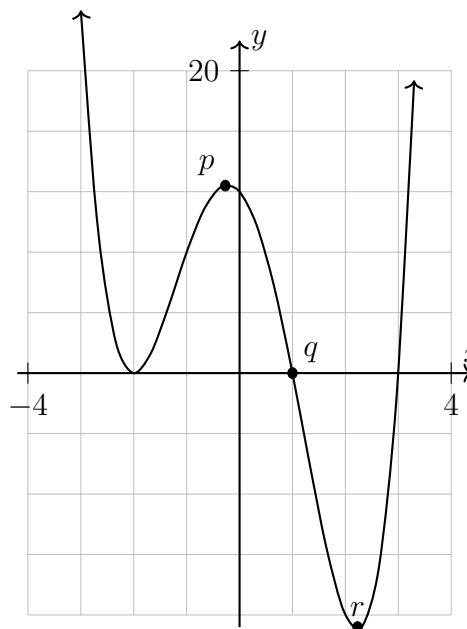
(a) What is the degree of the function?

(b) What are the zeros of the function?

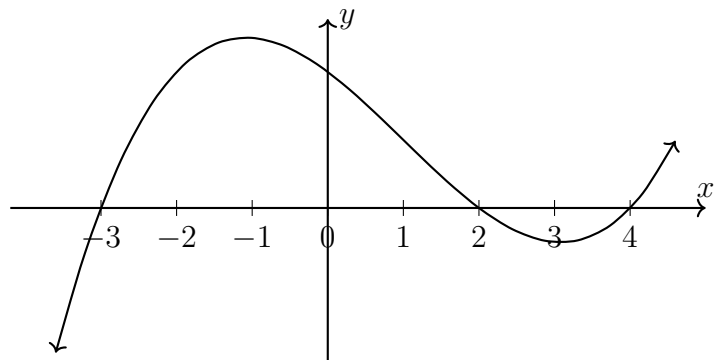
(c) Which factor has a multiplicity of 2?

(d) Write down the y -intercept as an ordered pair.

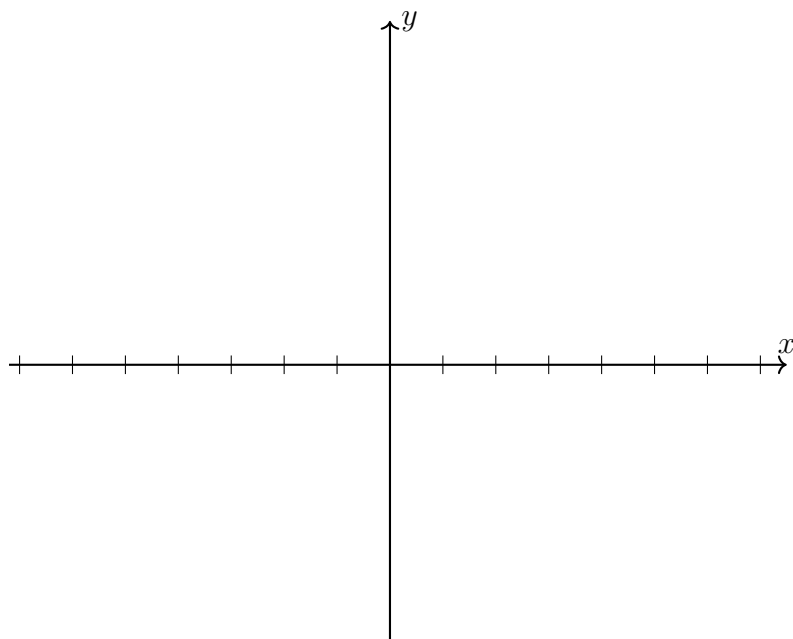
(e) Three points are marked on the graph, p , q , and r . Which one is a local minimum?



16. The graph of the function $f(x) = x^3 - 3x^2 - 10x + 24$ is shown. Write the function in factored form.



17. Let $j(x) = (x + 4)(x + 1)(x - 4)^2$ be a polynomial function.



- (a) Sketch a graph of the function. Label the x -intercepts.
- (b) Find the value of the y -intercept and mark it on the graph.
- (c) Identify the end behavior of the function.

i. As $x \rightarrow +\infty$, $y \rightarrow +\infty$; as $x \rightarrow -\infty$, $y \rightarrow -\infty$	iii. As $x \rightarrow +\infty$, $y \rightarrow +\infty$; as $x \rightarrow -\infty$, $y \rightarrow +\infty$
ii. As $x \rightarrow +\infty$, $y \rightarrow -\infty$; as $x \rightarrow -\infty$, $y \rightarrow +\infty$	iv. As $x \rightarrow +\infty$, $y \rightarrow -\infty$; as $x \rightarrow -\infty$, $y \rightarrow -\infty$

6.EE.b Reason about and solve one-variable equations and inequalities

18. Use the function $f(x) = \frac{1}{2}x + 11$ to answer the questions.

(a) Find the value of $f(4)$.

(b) Solve for x if $f(x) = 2$.

19. Solve each equation for x .

(a) $x^2 + 5x + 6 = 0$

(b) $x^3 - 7x^2 + 6x = 0$

20. The expression $2 - \frac{x-1}{x+2}$ is equivalent to

(a) $1 - \frac{3}{x+2}$

(c) $1 - \frac{1}{x+2}$

(b) $1 + \frac{3}{x+2}$

(d) $1 + \frac{1}{x+2}$

21. Find all of the values of x that make the equation true.

$$\frac{3}{x-4} = \frac{x-5}{x}$$

22. Given the rational function $r(x) = 3 - \frac{x-1}{x+2}$.

- (a) Sketch a graph of the function.
- (b) Mark the vertical asymptote as dotted line and label it with its equation.
- (c) Explain why the asymptote is located there.

