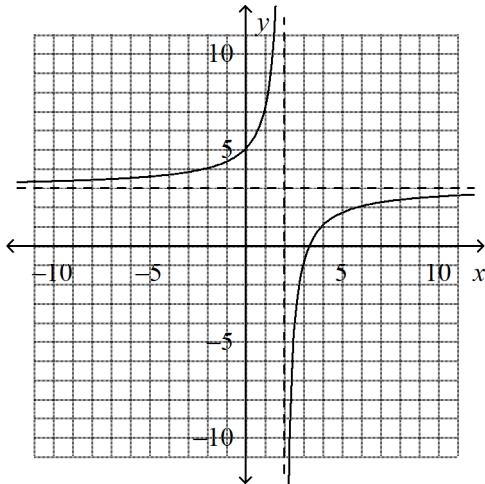




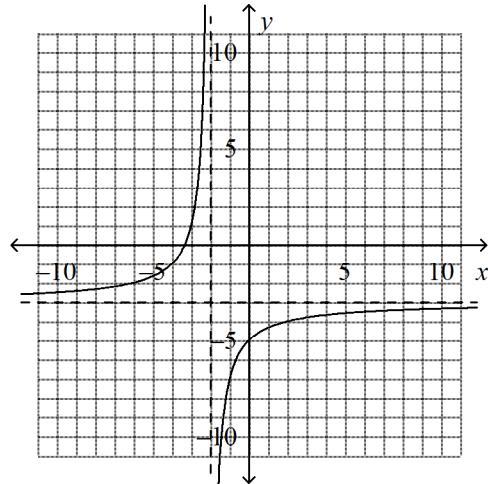
Sketch the asymptotes and graph the function.

4.  $y = \frac{-4}{x+2} - 3$

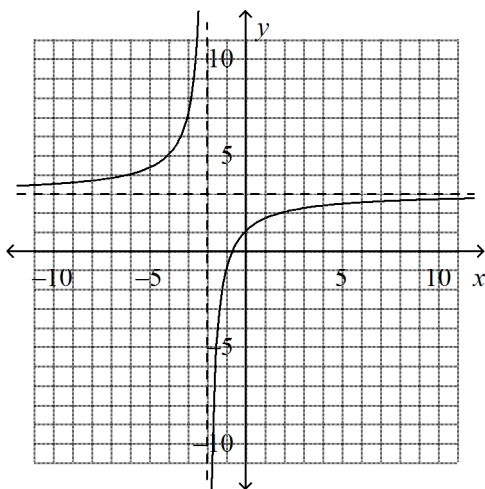
a.



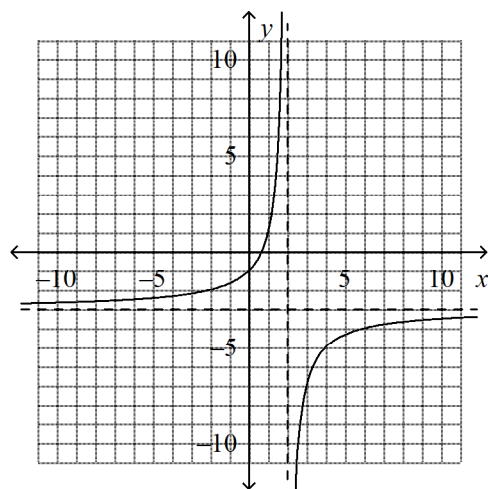
c.



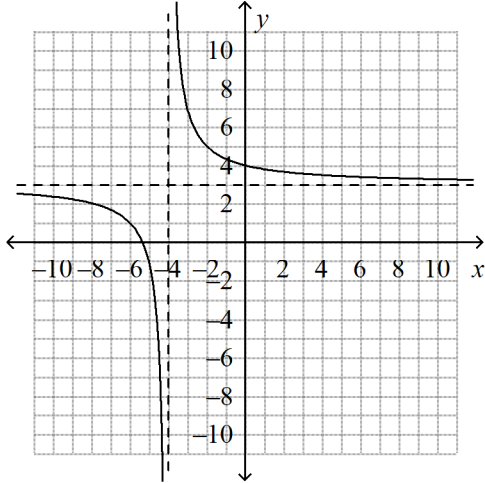
b.



d.



- \_\_\_\_\_ 5. This graph of a function is a translation of  $y = \frac{4}{x}$ . What is an equation for the function?



- a.  $y = \frac{4}{x+3} + 4$                       c.  $y = \frac{4}{x+4} - 3$   
 b.  $y = \frac{4}{x+3} - 4$                       d.  $y = \frac{4}{x+4} + 3$
- \_\_\_\_\_ 6. Write an equation for the translation of  $y = \frac{4}{x}$  that has the asymptotes  $x = 7$  and  $y = 6$ .

- a.  $y = \frac{4}{x-6} + 7$                       c.  $y = \frac{4}{x-7} + 6$   
 b.  $y = \frac{4}{x+7} + 6$                       d.  $y = \frac{4}{x+6} + 7$

**What are the vertical asymptotes for the graph of the rational function?**

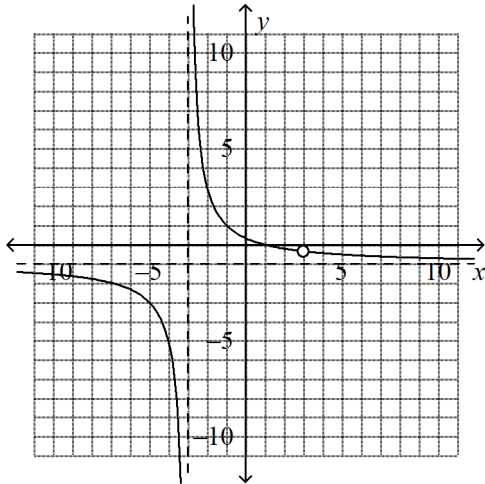
- \_\_\_\_\_ 7.  $y = \frac{(x+3)(x-5)(x+7)}{(x+1)(x+4)}$
- a.  $x = 1, x = 4$                       c.  $x = 3, x = -5, x = 7$   
 b.  $x = -1, x = -4$                       d.  $x = -3, x = 5, x = -7$

- \_\_\_\_\_ 8. Find the horizontal asymptote of the graph of  $y = \frac{3x^6 - 7x + 9}{7x^2 + 7x + 9}$ .
- a.  $y = 3$                       c.  $y = 0$   
 b.  $y = \frac{3}{7}$                       d. no horizontal asymptote

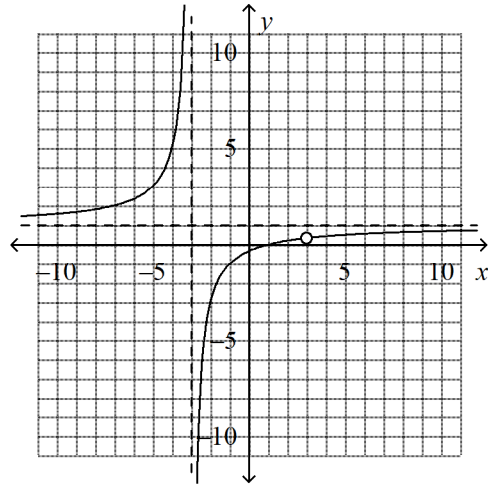
What is the graph of the rational function?

9.  $y = \frac{x^2 - 4x + 3}{x^2 - 9}$

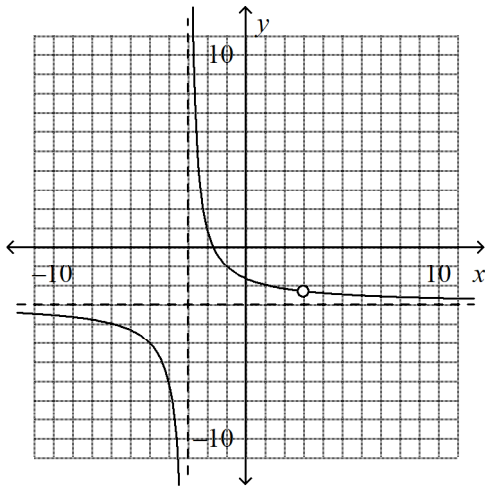
a.



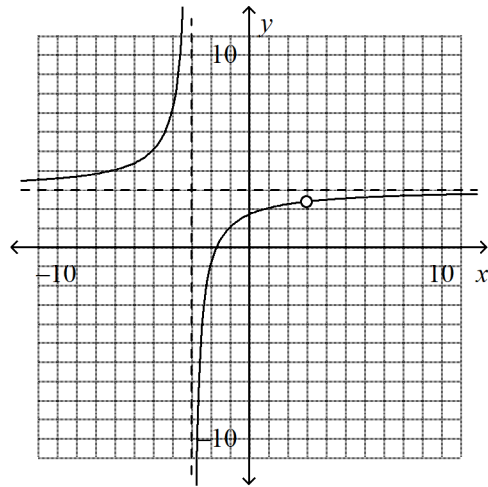
c.



b.

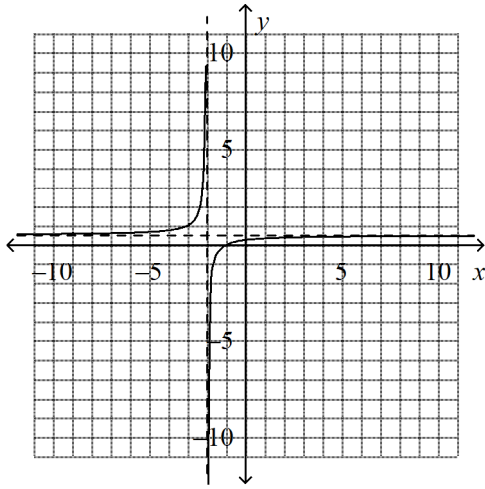


d.

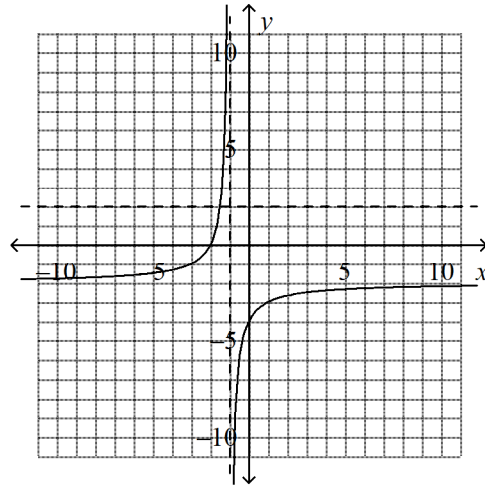


10.  $y = \frac{2x + 4}{x + 1}$

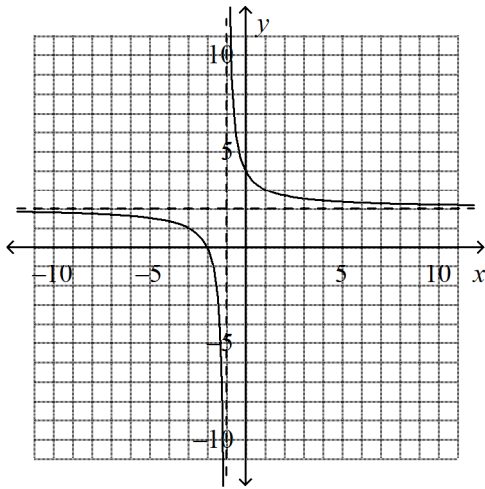
a.



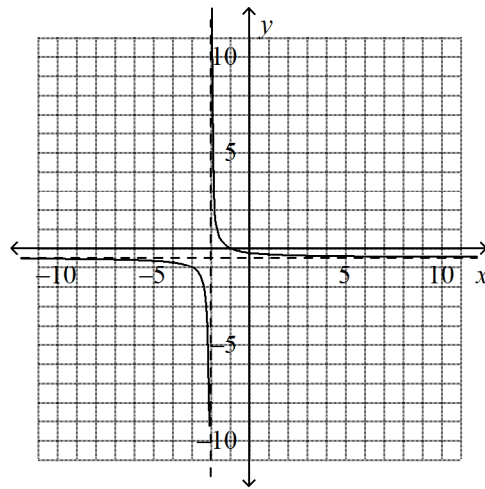
c.



b.



d.



**Simplify the rational expression. State any restrictions on the variable.**

11.  $\frac{k^2 - k - 2}{k^2 - 4k - 5}$

a.  $\frac{-(k - 2)}{k - 5}; k \neq 5$

c.  $\frac{k - 2}{k - 5}; k \neq -1, k \neq -5$

b.  $\frac{-(k - 2)}{k - 5}; k \neq -1, k \neq 5$

d.  $\frac{k - 2}{k - 5}; k \neq -1, k \neq 5$

\_\_\_\_\_ 12.  $\frac{t^2 - 4t - 32}{t - 8}$

a.  $t - 4; t \neq -8$

b.  $t + 4; t \neq 8$

c.  $-t - 4; t \neq 8$

d.  $-t + 4; t \neq -8$

**What is the product in simplest form? State any restrictions on the variable.**

\_\_\_\_\_ 13.  $\frac{y^2}{y - 3} \cdot \frac{y^2 - y - 6}{y^2 + 1y}$

a.  $\frac{y^2 + 2y}{y + 1}, y \neq 3, -1$

b.  $\frac{y^2 + 2y}{y + 1}, y \neq 3, 0, -1$

c.  $\frac{y + 2}{y + 1}, y \neq 3, 0, -1$

d.  $\frac{y + 2}{y + 1}, y \neq 3, -1$

\_\_\_\_\_ 14.  $\frac{3g^5}{10h^2} \cdot \frac{h^5}{10g^2}$

a.  $\frac{3g^3h^3}{100}, g \neq 0, h \neq 0$

b.  $\frac{100}{3g^3h^3}, g \neq 0, h \neq 0$

c.  $\frac{3g^7}{100h^7}, g \neq 0, h \neq 0$

d.  $\frac{3}{100}g^7h^7, g \neq 0, h \neq 0$

**What is the quotient in simplified form? State any restrictions on the variable.**

\_\_\_\_\_ 15.  $\frac{a + 2}{a - 5} \div \frac{a + 1}{a^2 - 8a + 15}$

a.  $\frac{(a + 2)(a - 3)}{a + 1}, a \neq 5, -1, 3$

b.  $\frac{(a + 2)(a + 1)}{(a - 5)^2(a - 3)}, a \neq 5, 3, -1$

c.  $\frac{(a + 2)(a - 3)}{a + 1}, a \neq 3, -1$

d.  $\frac{(a + 2)(a + 1)}{(a - 5)^2(a - 3)}, a \neq 5, 3$

**Simplify the sum.**

\_\_\_\_\_ 16.  $\frac{4}{m+9} + \frac{5}{m^2-81}$

a.  $\frac{9}{(m-9)(m+9)}$

b.  $\frac{4m-31}{(m-9)(m+9)}$

c.  $\frac{9}{m^2+m-72}$

d.  $\frac{4m+41}{(m-9)(m+9)}$

**Simplify the difference.**

\_\_\_\_\_ 17.  $\frac{n^2-10n+24}{n^2-13n+42} - \frac{9}{n-7}$

a.  $\frac{n-13}{n-7}$

b.  $\frac{n-4}{n-7}$

c.  $n-13$

d.  $\frac{n^2-10n+15}{n^2-13n+42}$

**Solve the equation. Check the solution.**

\_\_\_\_\_ 18.  $\frac{4}{a} + \frac{5}{3a} = 3$

a.  $\frac{17}{9}$

b.  $\frac{17}{3}$

c.  $\frac{19}{9}$

d.  $\frac{3}{4}$

\_\_\_\_\_ 19.  $\frac{-4}{x+1} = \frac{-1}{x+5}$

a.  $-\frac{19}{4}$

b.  $\frac{1}{3}$

c.  $-\frac{19}{3}$

d. 2

\_\_\_\_\_ 20. The sum of the reciprocals of two consecutive even integers is  $\frac{7}{24}$ . Write an equation that can be used to find the two integers. Find the two integers.

a.  $q + (q + 2) = \frac{7}{24}$ ; 4 and 6

b.  $q + (q + 2) = \frac{7}{24}$ ; 6 and 8

c.  $\frac{1}{q} + \frac{1}{q+2} = \frac{7}{24}$ ; 6 and 8

d.  $\frac{1}{q} + \frac{1}{q+2} = \frac{7}{24}$ ; 4 and 6

## Topic 4 Test Practice

### Answer Section

1. ANS: B                      PTS: 1                      DIF: L2  
 REF: 4-1 Inverse Variation and the Reciprocal Function  
 OBJ: 4-1.1 Use inverse variation to write and graph the reciprocal function.  
 NAT: HSA.CED.A.2| HSA.CED.A.4              TOP: 4-1 Example 1 Identify Inverse Variation  
 KEY: inverse variation
2. ANS: C                      PTS: 1                      DIF: L2  
 REF: 4-1 Inverse Variation and the Reciprocal Function  
 OBJ: 4-1.1 Use inverse variation to write and graph the reciprocal function.  
 NAT: HSA.CED.A.2| HSA.CED.A.4              TOP: 4-1 Example 2 Use Inverse Variation  
 KEY: inverse variation
3. ANS: C                      PTS: 1                      DIF: L3  
 REF: 4-1 Inverse Variation and the Reciprocal Function  
 OBJ: 4-1.1 Use inverse variation to write and graph the reciprocal function.  
 NAT: HSA.CED.A.2| HSA.CED.A.4              TOP: 4-1 Example 3 Use an Inverse Variation Model  
 KEY: inverse variation
4. ANS: C                      PTS: 1                      DIF: L3  
 REF: 4-1 Inverse Variation and the Reciprocal Function  
 OBJ: 4-1.2 Identify the effect of transformations on the graph of the reciprocal function and define the effects of  $h$  and  $k$  on the function  $f(x) = 1 / x - h + k$ .  
 NAT: HSA.CED.A.2| HSF.BF.A.1| HSF.BF.B.3  
 TOP: 4-1 Example 5 Graph Translations of the Reciprocal Function  
 KEY: reciprocal function
5. ANS: D                      PTS: 1                      DIF: L3  
 REF: 4-1 Inverse Variation and the Reciprocal Function  
 OBJ: 4-1.2 Identify the effect of transformations on the graph of the reciprocal function and define the effects of  $h$  and  $k$  on the function  $f(x) = 1 / x - h + k$ .  
 NAT: HSA.CED.A.2| HSF.BF.A.1| HSF.BF.B.3  
 TOP: 4-1 Example 5 Graph Translations of the Reciprocal Function  
 KEY: reciprocal function
6. ANS: C                      PTS: 1                      DIF: L2  
 REF: 4-1 Inverse Variation and the Reciprocal Function  
 OBJ: 4-1.2 Identify the effect of transformations on the graph of the reciprocal function and define the effects of  $h$  and  $k$  on the function  $f(x) = 1 / x - h + k$ .  
 NAT: HSA.CED.A.2| HSF.BF.A.1| HSF.BF.B.3  
 TOP: 4-1 Example 5 Graph Translations of the Reciprocal Function  
 KEY: reciprocal function
7. ANS: B                      PTS: 1                      DIF: L2                      REF: 4-2 Graphing Rational Functions  
 OBJ: 4-2.1 Graph rational functions by identifying asymptotes and end behavior.  
 NAT: HSA.CED.A.2| HSF.IF.C.7| HSF.BF.A.1| HSF.BF.A.1.b  
 TOP: 4-2 Example 2 Find Asymptotes of a Rational Function  
 KEY: rational function | point of discontinuity | removable discontinuity | non-removable points of discontinuity



8. ANS: D                   PTS: 1                   DIF: L3                   REF: 4-2 Graphing Rational Functions  
OBJ: 4-2.1 Graph rational functions by identifying asymptotes and end behavior.  
NAT: HSA.CED.A.2| HSF.IF.C.7| HSF.BF.A.1| HSF.BF.A.1.b  
TOP: 4-2 Example 2 Find Asymptotes of a Rational Function           KEY: rational function
9. ANS: C                   PTS: 1                   DIF: L3                   REF: 4-2 Graphing Rational Functions  
OBJ: 4-2.1 Graph rational functions by identifying asymptotes and end behavior.  
NAT: HSA.CED.A.2| HSF.IF.C.7| HSF.BF.A.1| HSF.BF.A.1.b  
TOP: 4-2 Example 5 Graph a Rational Function                           KEY: rational function
10. ANS: B                   PTS: 1                   DIF: L2                   REF: 4-2 Graphing Rational Functions  
OBJ: 4-2.1 Graph rational functions by identifying asymptotes and end behavior.  
NAT: HSA.CED.A.2| HSF.IF.C.7| HSF.BF.A.1| HSF.BF.A.1.b  
TOP: 4-2 Example 3 Graph a Function of the Form  $(ax + b)/(cx + d)$   
KEY: rational function
11. ANS: D                   PTS: 1                   DIF: L3  
REF: 4-3 Multiplying and Dividing Rational Expressions  
OBJ: 4-3.1 Use the structure of rational expressions to rewrite simple rational expressions in different forms.  
NAT: HSA.SSE.A.1| HSA.SSE.A.1.a| HSA.SSE.A.1.b| HSA.SSE.A.2  
TOP: 4-3 Example 2 Simplify a Rational Expression                   KEY: rational expression | simplest form
12. ANS: B                   PTS: 1                   DIF: L2  
REF: 4-3 Multiplying and Dividing Rational Expressions  
OBJ: 4-3.1 Use the structure of rational expressions to rewrite simple rational expressions in different forms.  
NAT: HSA.SSE.A.1| HSA.SSE.A.1.a| HSA.SSE.A.1.b| HSA.SSE.A.2  
TOP: 4-3 Example 2 Simplify a Rational Expression                   KEY: rational expression | simplest form
13. ANS: B                   PTS: 1                   DIF: L3  
REF: 4-3 Multiplying and Dividing Rational Expressions  
OBJ: 4-3.2 Understand that rational expressions form a system analogous to the system of rational numbers and use that understanding to multiply and divide rational expressions.  
NAT: HSA.SSE.A.1| HSA.SSE.A.1.a| HSA.SSE.A.1.b| HSA.SSE.A.2  
TOP: 4-3 Example 3 Multiply Rational Expressions                   KEY: rational expression | simplest form
14. ANS: A                   PTS: 1                   DIF: L2  
REF: 4-3 Multiplying and Dividing Rational Expressions  
OBJ: 4-3.2 Understand that rational expressions form a system analogous to the system of rational numbers and use that understanding to multiply and divide rational expressions.  
NAT: HSA.SSE.A.1| HSA.SSE.A.1.a| HSA.SSE.A.1.b| HSA.SSE.A.2  
TOP: 4-3 Example 3 Multiply Rational Expressions                   KEY: rational expression | simplest form
15. ANS: A                   PTS: 1                   DIF: L3  
REF: 4-3 Multiplying and Dividing Rational Expressions  
OBJ: 4-3.2 Understand that rational expressions form a system analogous to the system of rational numbers and use that understanding to multiply and divide rational expressions.  
NAT: HSA.SSE.A.1| HSA.SSE.A.1.a| HSA.SSE.A.1.b| HSA.SSE.A.2  
TOP: 4-3 Example 5 Divide Rational Expressions                   KEY: rational expression | simplest form
16. ANS: B                   PTS: 1                   DIF: L2  
REF: 4-4 Adding and Subtracting Rational Expressions  
OBJ: 4-4.1 Understand that rational expressions form a system analogous to the system of rational numbers and use that understanding to add and subtract rational expressions.  
NAT: HSA.APR.D.7  
TOP: 4-4 Example 3 Add Rational Expressions With Unlike Denominators

