

Topic 4 Test Practice

Is the relationship between the variables in the table a direct variation, an inverse variation, or neither? If it is a direct or inverse variation, write a function to model it.

B

1.

x	-9	-7	-2	-1
y	36	28	8	4

direct
 $y = kx$
 $\frac{y}{x} = k$

or

inverse
 $y = \frac{k}{x}$
 $xy = k$

a. inverse variation; $y = \frac{-324}{x}$

b. direct variation; $y = -4x$ $k = \frac{36}{-9} = \frac{28}{-7} = \frac{8}{-2} = \frac{4}{-1}$
 $k = (-4)$ ☺

c. neither

$-9(36) \neq -7(28) \neq -2(8) \neq -1(4)$
 ☹

C

2. Suppose that x and y vary inversely, and $x = 10$ when $y = 8$. Write the function that models the inverse variation.

a. $y = \frac{2}{x}$

$y = \frac{k}{x}$

c. $y = \frac{80}{x}$

b. $y = \frac{18}{x}$

$8 = \frac{k}{10}$

d. $y = 0.8x$

$80 = k$

C

3. A soccer team is collecting money to buy their coach a present. The table represents the cost per person for the gift compared to the number of people contributing. What function models the data, and how much per person will it cost if all 40 players contribute?

Number of Players (n)	5	8	15	20
Cost per Player (c)	\$40	\$25	\$13. $\bar{3}$	\$10

a. $nc = 400$, \$10

c. $nc = 200$, \$5

b. $\frac{n}{c} = 100$, \$5

d. $\frac{n}{c} = 200$, \$20

$C = \frac{k}{n}$

$cn = k$

$40(5) = 25(8) = 13.\bar{3}(15) = 10(20)$

$= 200$

typo

Sketch the asymptotes and graph the function.

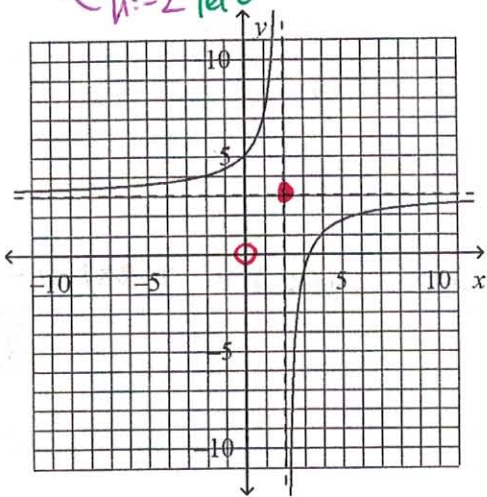
C

4.

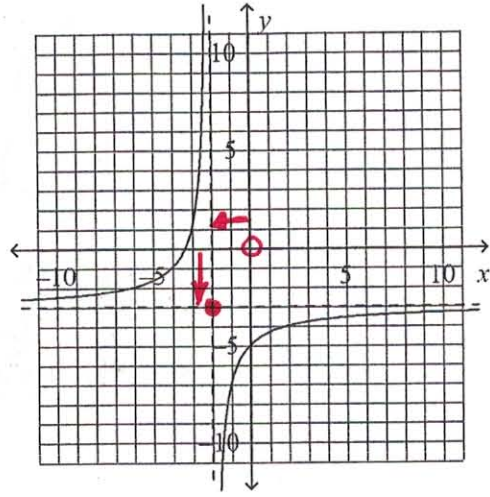
$$y = \frac{-4}{x+2} - 3$$

vert reflection & stretch
 $k: -3$ down
 $h: -2$ left
 $y = \frac{a}{x-h} + k$

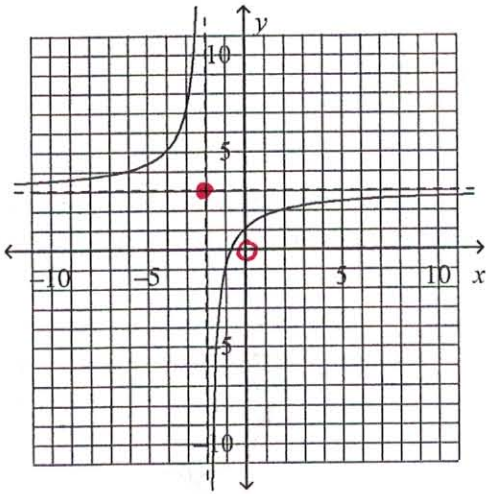
a.



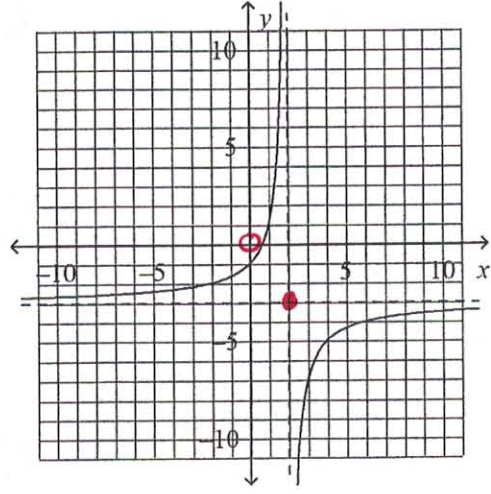
c.



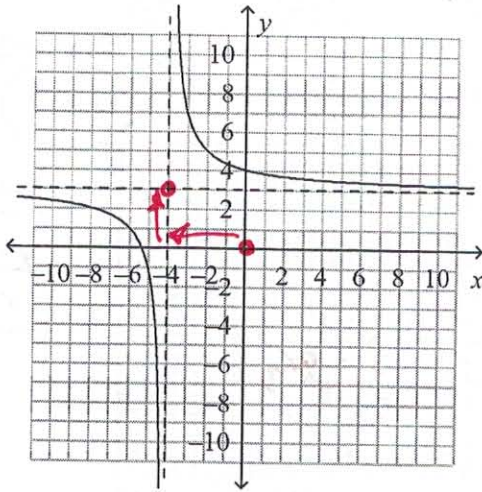
b.



d.



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



• 4 left : $h = -4$
 • 3 up : $k = 3$

$\frac{4}{x - (-4)} + 3$

- a. $y = \frac{4}{x+3} + 4$
 b. $y = \frac{4}{x+3} - 4$
 c. $y = \frac{4}{x+4} - 3$
d. $y = \frac{4}{x+4} + 3$

- C 6. Write an equation for the translation of $y = \frac{4}{x}$ that has the asymptotes $x = 7$ and $y = 6$.

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

$h = 7$ $k = 6$
 $\frac{4}{x-h} + k$

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

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

VA
 $x+1=0 \quad | \quad x+4=0$
 $x=-1 \quad | \quad x=-4$

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

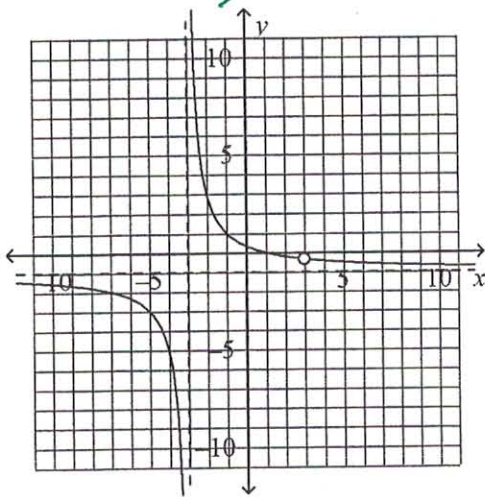
degree of $P(x) >$ degree of $Q(x)$
 \therefore

What is the graph of the rational function?

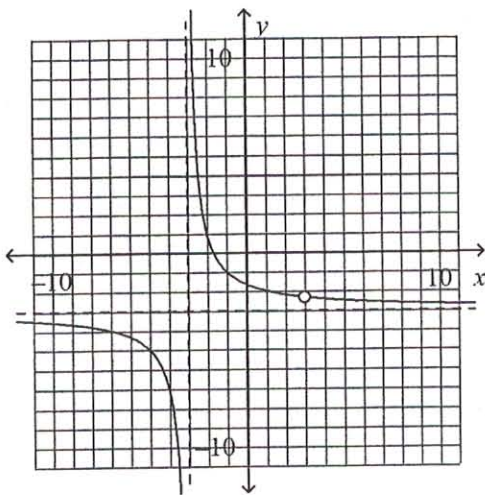
C 9. $y = \frac{x^2 - 4x + 3}{x^2 - 9}$

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

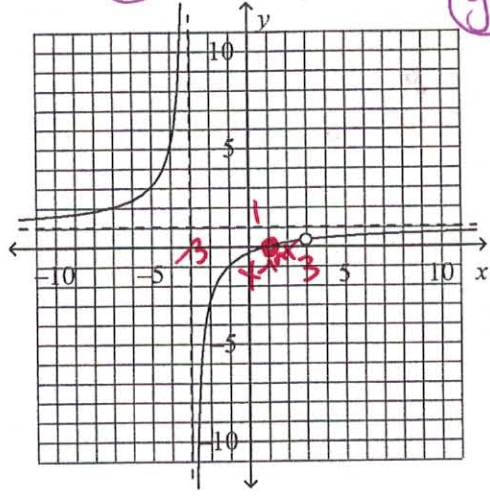
a.



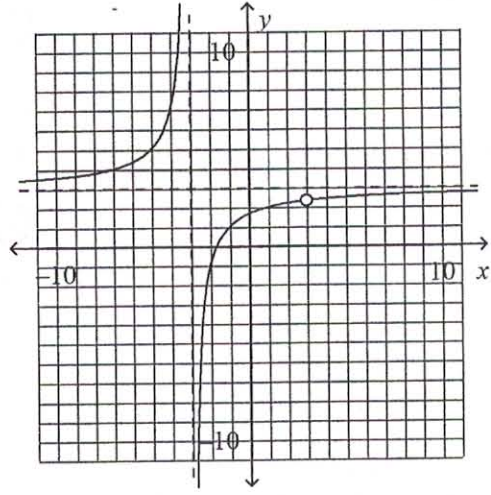
b.



c.



d.

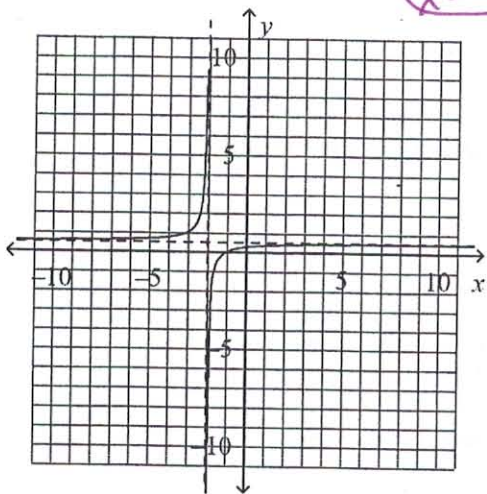


$\frac{VA}{x+3=0}$
 $x = -3$
 $\frac{Hole}{x-3=0}$
 $x = 3$
 $\frac{HA}{deg P(x) = deg Q(x)}$
 $\therefore y = \frac{1}{1}$

$x\text{-int}$
 $x-1=0$
 $x=1$

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

a.



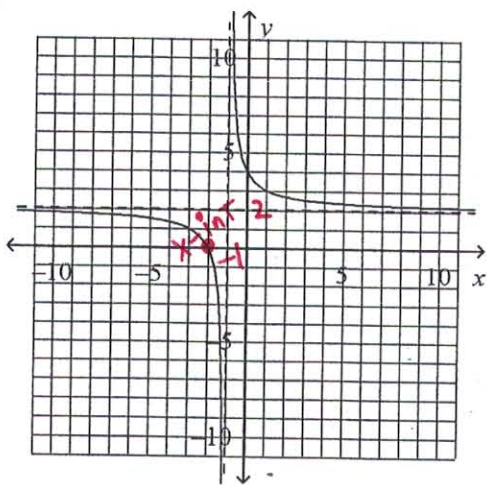
$\frac{2(x+2)}{x+1}$

VA
 $x+1=0$
 $x=-1$

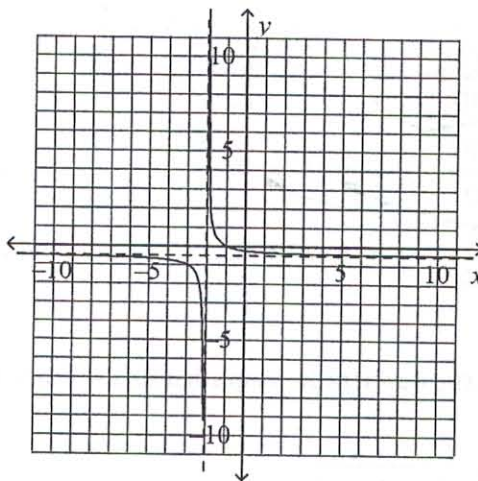
HA
 $\deg P(x) = \deg Q(x)$
 $y = \frac{2}{1}$

X-int
 $2x+4=0$
 $2x=-4$
 $x=-2$

b.



d.



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

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

$\frac{(k-2)(k+1)}{(k-5)(k+1)}$

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

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

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

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

B 12. $\frac{t^2 - 4t - 32}{t - 8}$ $\frac{(t-8)(t+4)}{(t-8)}$

a. $t - 4; t \neq -8$ c. $-t - 4; t \neq 8$
 b. $t + 4; t \neq 8$ d. $-t + 4; t \neq -8$

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

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

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

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

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

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

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

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

$\frac{(a+2)}{(a-5)} \cdot \frac{(a-3)(a-3)}{(a+1)}$

Simplify the sum.

B 16. $\frac{4}{m+9} + \frac{5}{m^2-81}$ $\frac{4}{(m+9)} + \frac{5}{(m+9)(m-9)}$ $\frac{LCD}{(m+9)(m-9)}$

a. $\frac{9}{(m-9)(m+9)}$ $\frac{4m-36+5}{(m-9)(m+9)}$

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

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

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

Simplify the difference.

A 17. $\frac{n^2-10n+24}{n^2-13n+42} - \frac{9}{n-7}$ $\frac{(n-6)(n-4)}{(n-6)(n-7)} - \frac{9}{(n-7)} \rightarrow \frac{n-4-9}{n-7} = \frac{n-13}{n-7}$

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

b. $\frac{n-4}{n-7}$ d. $\frac{n^2-10n+15}{n^2-13n+42}$

Solve the equation. Check the solution.

A 18. $\frac{4}{a} + \frac{5}{3a} = 3$ mult by $\frac{LCD}{3a}$ $\frac{4}{a} \cdot 3a + \frac{5}{3a} \cdot 3a = \frac{3}{1} \cdot 3a \rightarrow 12+5=9a$

a. $\frac{17}{9}$ b. $\frac{17}{3}$ c. $\frac{19}{9}$ d. $\frac{3}{4}$ $17=9a$ $\frac{17}{9}=a$

C 19. $\frac{-4}{(x+1)} = \frac{-1}{(x+5)}$ cross mult. $-4(x+5) = -1(x+1)$

a. $\frac{19}{4}$ b. $\frac{1}{3}$ c. $-\frac{19}{3}$ d. 2

$-4x-20 = -x-1$

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

b. $q + (q+2) = \frac{7}{24}$; 6 and 8 d. $\frac{1}{q} + \frac{1}{q+2} = \frac{7}{24}$; 4 and 6

$q(q+2)24 \cdot \left(\frac{1}{q} + \frac{1}{q+2} = \frac{7}{24}\right) \rightarrow (q+2)24 + q \cdot 24 = 7(q)(q+2)$

$24q+48 + 24q = 7q^2 + 14q$

$\hookrightarrow \hookrightarrow \hookrightarrow 0 = 7q^2 - 34q - 48$

$0 = (7q+8)(q-6)$

$q = \cancel{7} / q = 6$ consec even int 8