

## 1st Semester--More Exam Practice

### Multiple Choice

$g(-1) = 2(-1) - 6 = -2 - 6 = -8$   
 $f(-8) = 3(-8) - 7 = -24 - 7 = -31$

A 1 Let  $f(x) = 3x - 7$  and  $g(x) = 2x - 6$ . Find  $(f \circ g)(-1)$ .

- a) -31      b) -8      c) -26      d) -10

A 2 Subtract if possible.

$2\sqrt{2a} - 4\sqrt{2a} = -2\sqrt{2a}$

- a)  $-2\sqrt{2a}$       c)  $6\sqrt{2a}$   
 b)  $-4\sqrt{2a}$       d) not possible to simplify

B 3 Let  $f(x) = 3x - 6$  and  $g(x) = x - 2$ . Find  $\frac{f}{g}$ .

- a)  $\frac{1}{3}$   
 b) 3  
 c)  $\frac{x-2}{3x-6}$   
 d) -3

$\frac{3x-6}{x-2} = \frac{3(x-2)}{(x-2)} = 3$

A 4 Divide and simplify.

$\frac{\sqrt{60x^{10}}}{\sqrt{3x^4}} = \sqrt{20x^6} = 2x^3\sqrt{5x}$

- a)  $2x^4\sqrt{5x}$       c)  $5x\sqrt{2x^4}$   
 b)  $\sqrt{12x^9}$       d) none of these

C 5 Let  $f(x) = -3x - 7$  and  $g(x) = -4x - 2$ . Find  $f(x) + g(x)$ .

- a)  $-7x - 5$       b)  $x - 9$       c)  $-7x - 9$       d)  $x - 5$

$(-3x - 7) + (-4x - 2) = -7x - 9$

A 6 Simplify.

$(-2 - \sqrt{6})(5 + \sqrt{6}) = -10 - 2\sqrt{6} - 5\sqrt{6} - 6 = -16 - 7\sqrt{6}$

- a)  $-16 - 7\sqrt{6}$       c)  $-4 - 10\sqrt{6}$   
 b)  $-16 - 10\sqrt{6}$       d)  $-3 + 3\sqrt{6}$

B 7 Solve the equation.

$(x-7)^{5/3} = (8)^{5/3}$

- a) 25      b) 39      c) 1      d) 15

$x-7 = (\sqrt[3]{8})^5 = 2^5$   
 $x-7 = 32$   
 $x = 39$

B 8 Simplify the radical expression.

$\sqrt[4]{625x^{28}y^{16}}$

- a)  $25x^{49}y^{16}$       b)  $5x^7y^4$       c)  $5x^8y^{28}$       d)  $25x^{49}y^{16}$

$5x^7y^4$

D 9 Divide and simplify.

$\frac{\sqrt[3]{120}}{\sqrt[3]{3}} = \sqrt[3]{40} = 2\sqrt[3]{5}$

- a)  $5\sqrt[3]{2}$       b)  $2\sqrt{5}$       c)  $\sqrt[3]{120}$       d)  $2\sqrt[3]{5}$

$\sqrt[3]{40} = \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 5} = 2\sqrt[3]{5}$

$$(\sqrt[3]{8})^4$$

$$\sqrt[3]{8^4}$$

C 10 Simplify.

$$8^{\frac{4}{3}}$$

- a)  $\sqrt[3]{8^4}$  *Not simplified*      b) 512

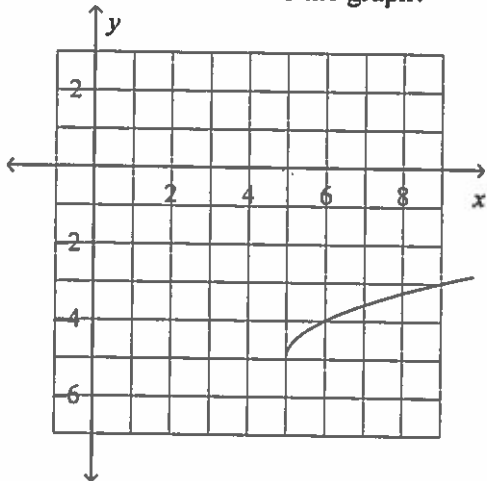
D 11 Find the real-number root.

$$\sqrt[3]{-\frac{125}{343}} = -\frac{5}{7}$$

- a)  $\frac{25}{49}$       b)  $-\frac{125}{343}$

B

12 Which function matches the graph?



a)  $y = \sqrt{x+5} + 5$

b)  $y = \sqrt{x-5} - 5$  *right 5 down 5*

c)  $y = \sqrt{x+5} - 5$

d)  $y = \sqrt{x-5} + 5$

A

13 Write  $(27a^2)^{\frac{2}{3}}$  in simplest form.

a)  $\frac{a^2}{9}$  *27 = 3^3, a^2 = a^2, (3^3)^{\frac{2}{3}} = 3^2 = 9*

b)  $9a^2$

c)  $\frac{1}{9a^2}$

d) none of these

$$\frac{a^2}{9}$$

A

14 Multiply and simplify if possible.

$$\sqrt{33} \cdot \sqrt{3} = \sqrt{99} = \sqrt{9 \cdot 11} = 3\sqrt{11}$$

a)  $3\sqrt{11}$

b)  $\sqrt{99}$

c)  $11\sqrt{3}$

d) not possible

D

15 Add if possible.

$$3\sqrt{7x} + 3\sqrt{5x}$$

a)  $6\sqrt{12x}$

b)  $42\sqrt{7x}$

c)  $42\sqrt{5x}$

d) not possible to simplify

C

16 Simplify the radical expression.

$$\sqrt{36g^6}$$

a)  $36g^3$

b)  $36g^4$

c)  $6g^3$

d)  $6g^4$

A1 17 Find all the real square roots of  $-\frac{9}{16}$ .

a) no real root

b)  $-\frac{3}{4}$

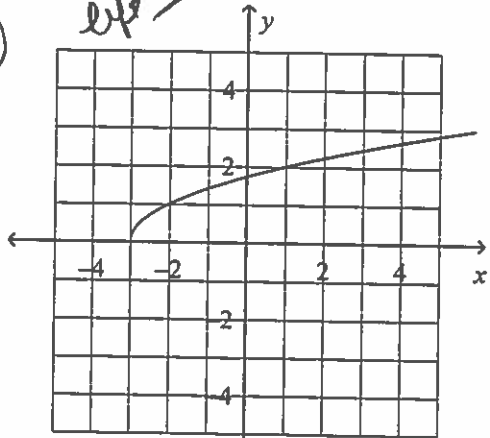
c)  $-\frac{3}{4}$  and  $\frac{3}{4}$

d)  $\frac{81}{256}$

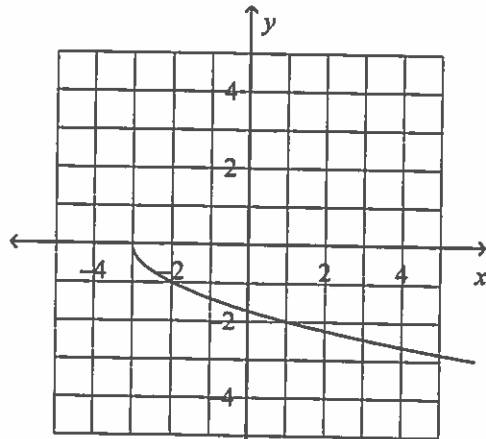
A2 18 Graph the function.

$y = \sqrt{x+3}$  *shift 3*

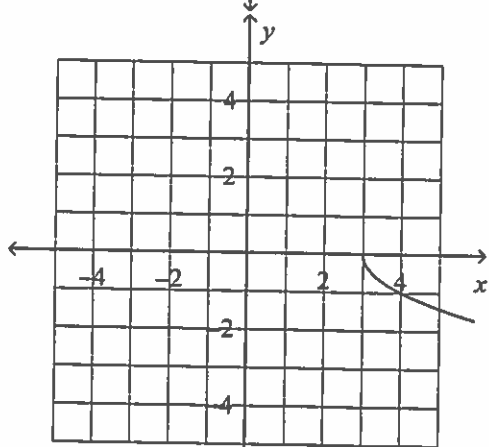
a)



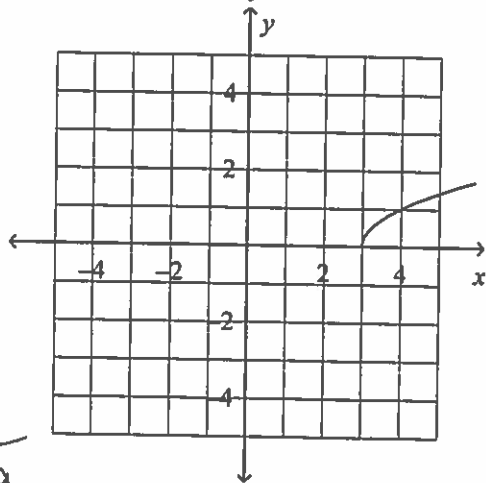
c)



b)



d)



A1 19 Simplify  $\sqrt[3]{54a^{13}b^{15}}$ .

a)  $3a^4b^5\sqrt[3]{2a}$

b)  $2a^4b^5\sqrt[3]{3a}$

c)  $3a^4b^5\sqrt{a}$

d) none of these

$54 = 2 \cdot 27$   
 $27 = 3 \cdot 9$   
 $9 = 3 \cdot 3$   
 $3a^4b^5\sqrt[3]{2a}$

A1 20 Find all the real square roots of 0.0081.

a) 0.09 and -0.09

b) 0.2846 and -0.2846

c) 0.00405 and -0.00405

d) 0.02846 and -0.02846

B1 21 Let  $f(x) = 3x + 2$  and  $g(x) = x - 3$ . Find  $f(x) - g(x)$ .

a)  $2x - 5$

b)  $2x + 5$

c)  $4x - 1$

d)  $2x - 1$

$(3x+2) - (x-3)$

$3x+2-x+3$

$2x+5$

$$\sqrt[3]{63x^9} \quad x^3 \sqrt[3]{63}$$

A. 22 Multiply and simplify  $\sqrt[3]{7x^4} \cdot \sqrt[3]{9x^5}$ .

a)  $x^3 \cdot \sqrt[3]{63}$

b)  $\sqrt[3]{63x^9}$

c)  $x^3 \cdot \sqrt[3]{63x^9}$

d) none of these

C. 23 Simplify.

$(\sqrt{7} + \sqrt{2})(\sqrt{7} - \sqrt{2})$

$7 - \sqrt{(4+5)} - 2 = 5$

a) 9

b)  $-5\sqrt{7}$

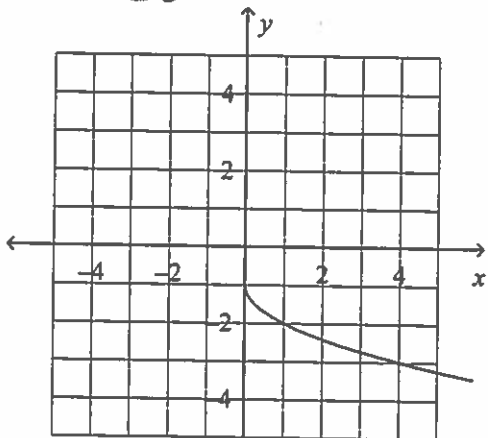
c) 5

d)  $5\sqrt{2}$

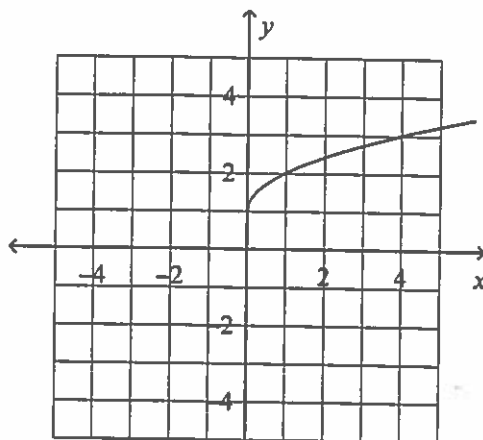
D. 24 Graph the function.

$y = \sqrt{x} - 1$  down

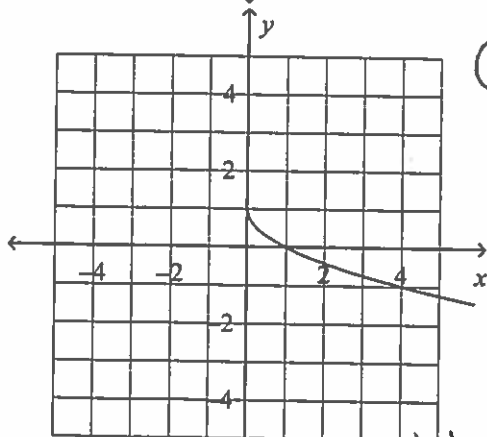
a)



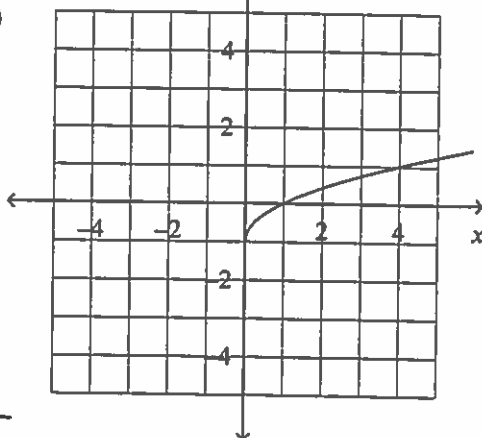
c)



b)



d)



C. 25 Solve the equation.

$\sqrt{x-3} - 2 = 4$

a) 36

b) 33

$x - 3 = 36$

$x = 39$

c) 39

d) 9

A. 26 Write the equation in logarithmic form.

$7^4 = 2,401$

a)  $\log_7 2,401 = 4$

b)  $\log 2,401 = 4$

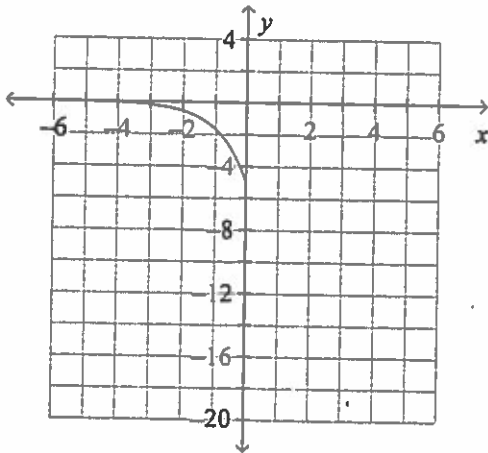
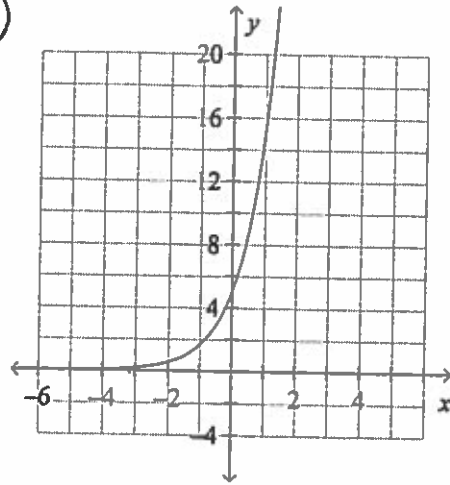
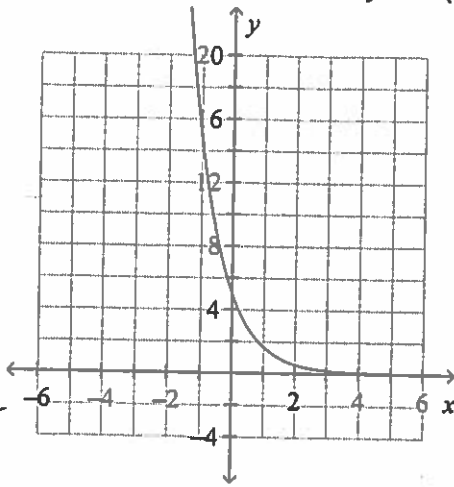
c)  $\log_4 2,401 = 7$

d)  $\log 2,401 = 4 \cdot 7$

$\log_7 2401 = 4$

27 Graph the exponential function.  $y = 5(3)^x$

x	y
0.6	
1	1.6
0	5
1	15
2	45



28 Evaluate  $e^{0.3}$  to four decimal places.

- a) 0.7408    **b) 1.3499**    c) 0.8155    d) 2.7183

29 Expand the logarithmic expression.

$\log_5 10p^5$

a)  $\log_5 10 - 5 \log_5 p$

b)  $10 \log_5 p^5$

30 Evaluate the logarithm.

$\log_5 \frac{1}{25} = x$

a) 5

31 Evaluate the logarithm.

$\log_6 216 = x$

a) -3

32 Solve  $10^{5x} = 43$

a) 1.01

$\log_5 10 + 5 \log_5 p$

$5^x = \frac{1}{25}$      $5^x = 5^{-2}$      $x = -2$

$6^x = 216$

**b) -2**    c) 2    d) -1

**c) 3**    d) 2

c) 8.17    **d) 0.33**

$5^x \log 10 = \log 43$

$5^x = 1.6335$     5

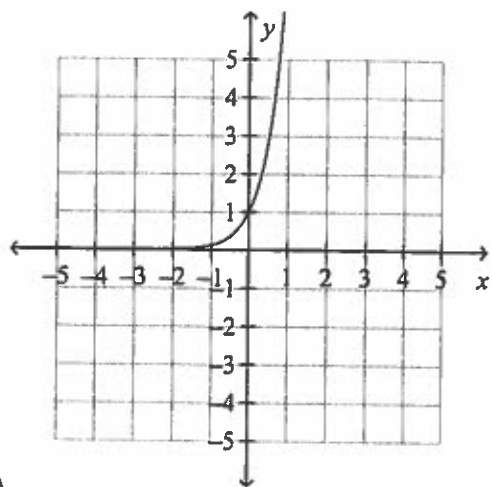
$x = 0.3267$

33 Graph the logarithmic equation.  $y = \log_8 x$ . Use  $y = \{-2, -1, 0, 1, 2\}$ .

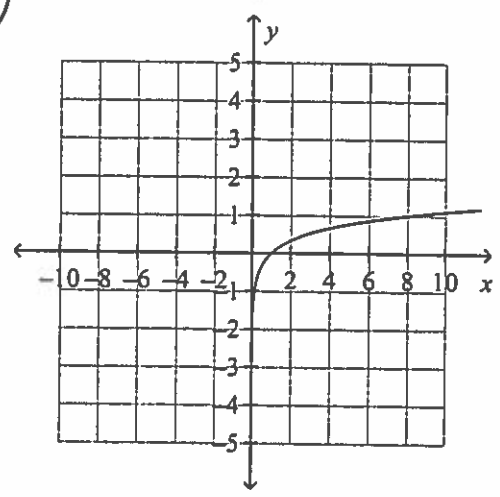
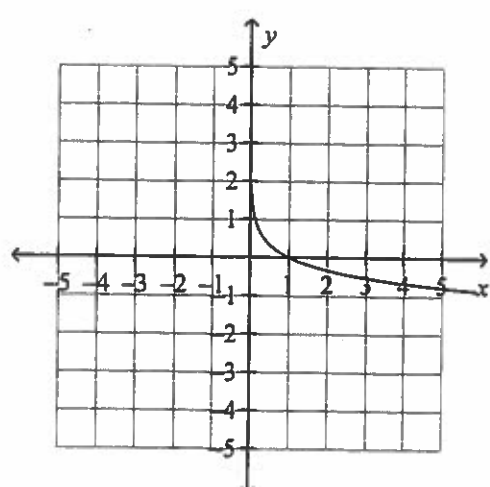
$8^y = x$

x	y
1/64	-2
1/8	-1
1	0
8	1
64	2

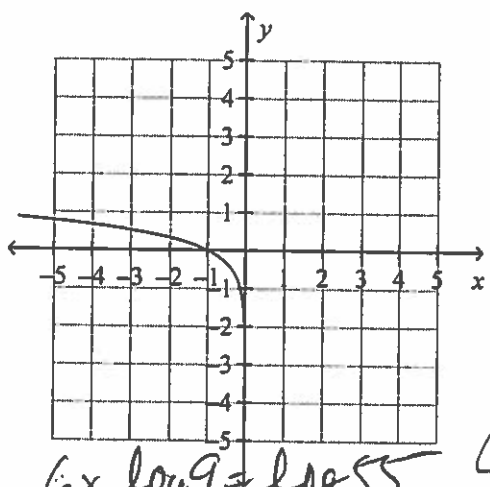
a)



c)



d)



34 Solve  $9^{6x} = 55$ . Round to the nearest ten-thousandth.

- a) 10.8607    b) 0.3040    c) 10.9429    d) 1.0179

$6x \log 9 = \log 55$      $6x = 1.8237$   
 $x = 0.3040$

35 An initial population of 880 quail increases at an annual rate of 18%. Write an exponential function to model the quail population.

- a)  $f(x) = 880(1.18)^x$     b)  $f(x) = 880(18)^x$     c)  $f(x) = (880 \cdot 0.18)^x$     d)  $f(x) = 880(0.18)^x$

$y = 880(1 + 0.18)^t$   
 $y = 880(1.18)^t$

36 Write the equation  $\log_{32} 8 = \frac{3}{5}$  in exponential form.

- a)  $8^{\frac{3}{5}} = 32$     b)  $(\frac{3}{5})^{32} = 8$     c)  $8^{\frac{3}{5}} = 32$     d)  $32^{\frac{3}{5}} = 8$

$32^{\frac{3}{5}} = 8$   
 $\log_3 \frac{50}{5} = \log_3 10$

37 Write the expression as a single logarithm.  $\log_3 50 - \log_3 5$

- a)  $\log_3 45$     b)  $\log 10$     c)  $\log_3 10$     d)  $\log 45$

38 Suppose you invest \$800 at an annual interest rate of 3.4% compounded continuously. How much will you have in the account after 30 years?

- a) \$24,830.03    b) \$2,218.56    c) \$9753.29    d) \$33,718.74

$y = Ae^{rt}$   
 $y = 800e^{(0.034)(30)}$   
 2218.56

$$10^2 = 4x$$

$$100 = 4x$$

$$x = 25$$

C1 39 Solve  $\log_4 x = 2$ .

a)  $\frac{1}{2}$

b) 8

c) 25

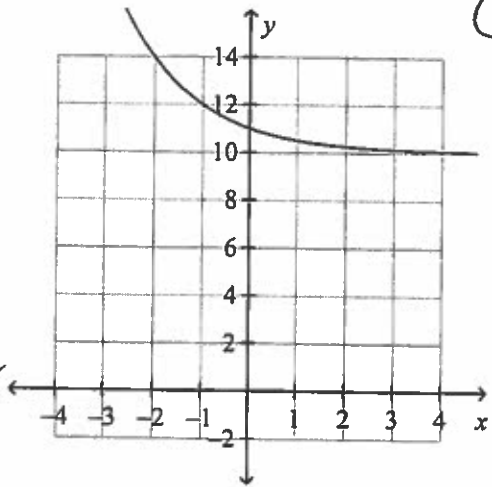
d) 1.85

C1 40 Graph the function.

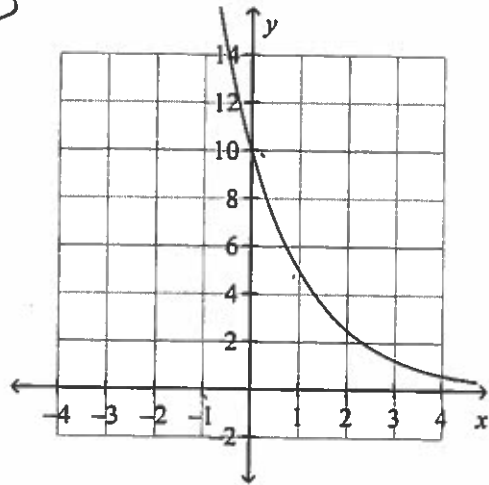
$$y = 10\left(\frac{1}{2}\right)^x$$

x	y
-2	40
-1	20
0	10
1	5
2	2.5

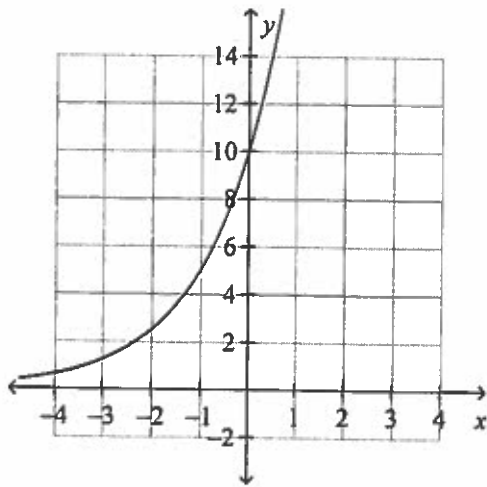
a)



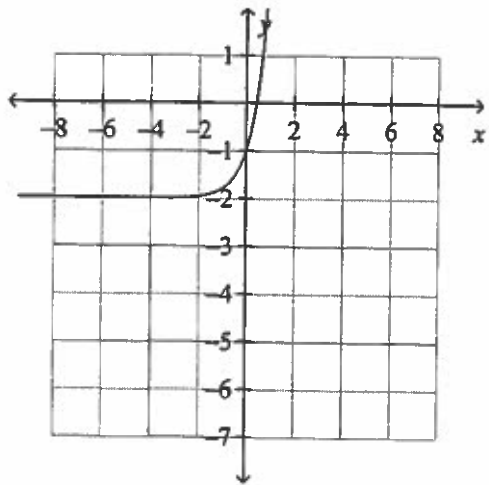
c)



b)



d)



A 41 Multiply or divide.

$$\frac{7c^4}{5d^6} \cdot \frac{9d^4}{8c^6} = \frac{63c^4d^4}{40c^2d^2} = \frac{63}{40c^2d^2}$$

a)  $\frac{63}{40c^2d^2}$

c)  $\frac{40c^2d^2}{63}$

b)  $\frac{63c^{10}}{40d^{10}}$

d)  $\frac{63}{40}c^{10}d^{10}$

A 42 Multiply or divide.

$$\frac{g^2}{g+3} \cdot \frac{g^2+g-6}{g^2-6g}$$

$$\frac{g^2}{\cancel{g+3}} \cdot \frac{\cancel{g+3}(g-2)}{g(g-6)} = \frac{g(g-2)}{g(g-6)} = \frac{g^2-2g}{g-6}$$

$$\frac{g(g-2)}{g-6} = \frac{g^2-2g}{g-6}$$

a)  $\frac{g^2-2g}{g-6}$

~~c)  $\frac{g^2-2g}{g-6}$~~

b)  $\frac{g-2}{g-6}$

~~d)  $\frac{g-2}{g-6}$~~

B 43 Multiply or divide.

$$\frac{p+2}{p-5} \div \frac{p+4}{p^2-10p+25}$$

$$\frac{(p+2)}{\cancel{p-5}} \cdot \frac{\cancel{p-5}(p-5)}{(p+4)} = \frac{(p+2)(p-5)}{(p+4)}$$

$$= \frac{(p+2)(p-5)}{(p+4)}$$

a)  $\frac{(p+2)(p+4)}{(p-5)^2(p-5)}$

~~c)  $\frac{(p+2)(p+4)}{(p-5)^2(p-5)}$~~

b)  $\frac{(p+2)(p-5)}{p+4}$

~~d)  $\frac{(p+2)(p-5)}{p+4}$~~

B 44 Add or subtract. Simplify if possible.

$$\frac{3}{b+2} + \frac{1}{b^2-4}$$

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

$$= \frac{3b-6+1}{(b+2)(b-2)}$$

a)  $\frac{3b+7}{(b-2)(b+2)}$

c)  $\frac{4}{b^2+b-2}$

b)  $\frac{3b-5}{(b-2)(b+2)}$

d)  $\frac{4}{(b-2)(b+2)}$

$$\frac{3b-5}{(b+2)(b-2)}$$



$$\frac{n^2 + 9n + 14 - 2n - 4}{(n-6)(n+2)}$$

$$\frac{n^2 + 7n + 10}{(n-6)(n+2)}$$

$$\frac{n^2 + 7n + 10}{(n-6)(n+2)}$$

$$\frac{(n+5)(n+2)}{(n-6)(n+2)}$$

$$\frac{(n+5)(n+2)}{(n-6)(n+2)}$$

$$\frac{(n+5)(n+2)}{(n-6)(n+2)}$$

A

45 Add or subtract. Factor and cancel at the end, if possible.

$$\frac{n^2 + 9n + 14}{(n-6)(n+2)} - \frac{2}{(n-6)} = \frac{n^2 + 9n + 14}{(n-6)(n+2)} + \frac{-2(n+2)}{(n-6)(n+2)}$$

a)  $\frac{n+5}{n-6}$

c)  $\frac{n^2 + 9n + 12}{n^2 - 4n - 12}$

b)  $\frac{n+7}{n-6}$

d)  $n+5$

A

46 Solve the equation.

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

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

$$-2x + 8 = -4x - 16$$

$$+4x \quad +4x$$

$$2x = -24$$

$$x = -12$$

B

47 Solve the equation.

$$\frac{5}{6x} + \frac{1}{5x} = -\frac{1}{1}$$

b)  $12$

c)  $-6$

d)  $-8$

$$\frac{25}{30x} + \frac{6}{30x} = \frac{-30x}{30x}$$

$$31 = -30x$$

$$x = -\frac{31}{30}$$

A

48 Solve the equation.

$$\frac{a}{a^2 - 36} + \frac{2}{(a-6)(a+6)} = \frac{1}{(a+6)}$$

$$\frac{a}{(a+6)(a-6)} + \frac{2(a+6)}{(a+6)(a-6)} = \frac{a-6}{(a+6)(a-6)}$$

$$a + 2a + 12 = a - 6$$

a)  $-9$

b)  $-6$

c)  $-9$  and  $-6$

d)  $6$

C

49 The distance a spring will stretch varies directly with how much weight is attached to the spring. If a spring stretches 9 inches with 100 pounds attached, how far will it stretch with 90 pounds attached? Round to the nearest tenth of an inch.

a) 8.9 in.

b) 10 in.

c) 8.1 in.

d) 9.1 in.

$$\frac{9}{100} = \frac{x}{90}$$

$$100x = 810$$

$$x = 8.1$$

$$2a + 12 = -b$$

$$-22 \quad -12$$

The pair of points is on the graph of a direct variation. Find the missing value.

C

50 (2.4, 3) and (5, y)

a) 1.44

b) 1

c) 6.25

d) 0.69

$$\frac{3}{2.4} = \frac{y}{5}$$

C

51 (7, 1) and (x, 5)

a)  $7 \frac{1}{7} = \frac{5}{x}$

b)  $\frac{5}{7}$

c) 35

d) 7

$$2.4y = 15$$

$$y = 6.25$$

B

52 The time  $t$  required to drive a certain distance varies inversely with the speed  $r$ . If it takes 2 hours to drive the distance at 30 miles per hour, how long will it take to drive the same distance at 50 miles per hour?

a) 60 hours

c) 750 hours

b) 1.2 hours

d) about 3.33 hours

$$(2)(30) = 30x$$

$$60 = 30x$$

$$x = \frac{60}{30}$$

$$x = 2$$

$$(9.4)(11) = 11y$$

$$103.4 = 11y$$

A

53 The values (9.4, 11) and (11, y) are from an inverse variation. Find the missing value and round to the nearest hundredth

- a) 9.4      ~~(.6)~~ ~~49~~      c) 103.4      d) 1137.4

A

54 A drama club is planning a bus trip to New York City to see a Broadway play. The cost per person for the bus rental varies inversely as the number of people going on the trip. It will cost \$30 per person if 44 people go on the trip. How much will it cost per person if 60 people go on the trip? Round your answer to the nearest cent, if necessary.

- a) \$22.00      b) \$40.91      c) \$1,320.00      d) \$21.29

Graph the function.

$$(30)(44) = 60x$$

$$1320 = 60x$$

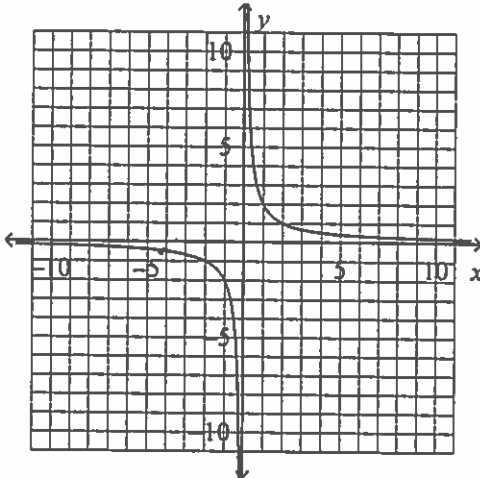
$$x = 22$$

B

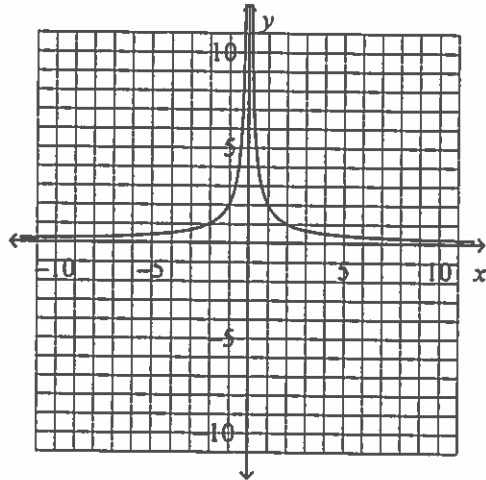
55  $y = \frac{-2}{x}$

x	y
-4	1/2
-3	2/3
-2	1
-1	2
0	und
1	-2
2	-1
3	-2/3
4	-1/2

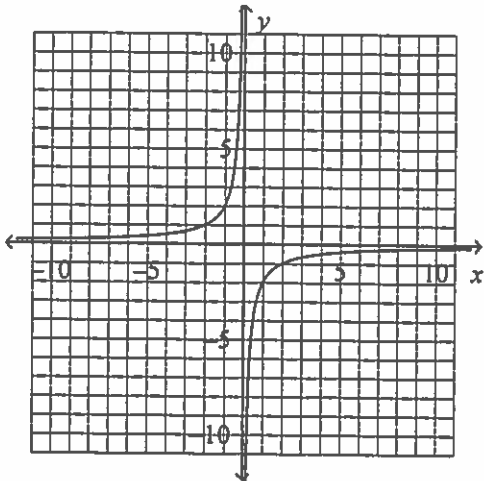
a)



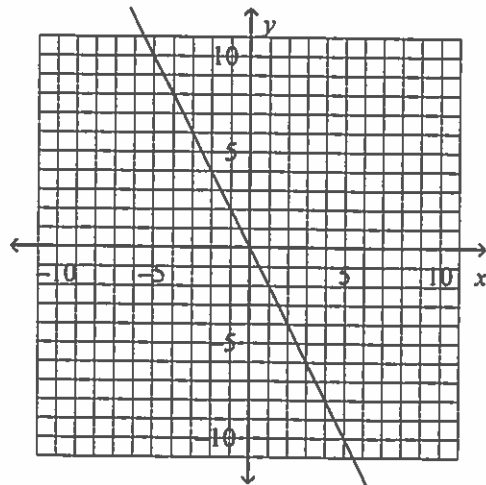
c)



b)

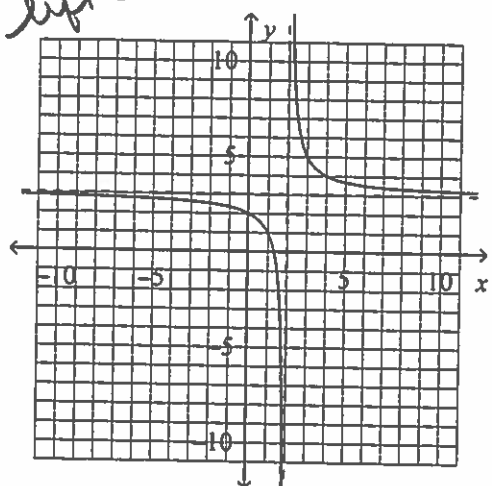


d)

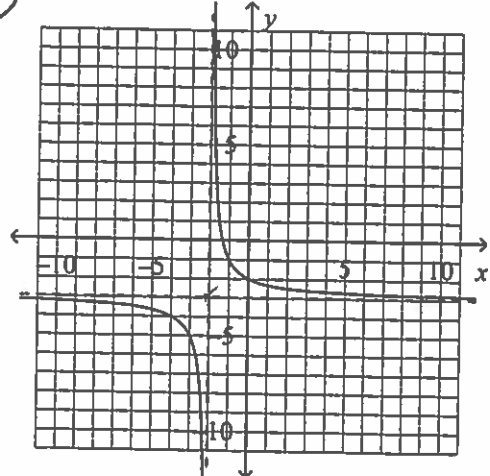


Sketch the asymptotes and graph the function.

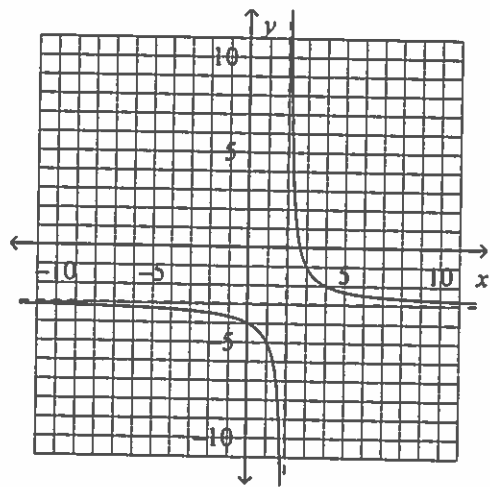
C 56  $y = \frac{2}{x+2} - 3$   
 a) *left 2 down 3*



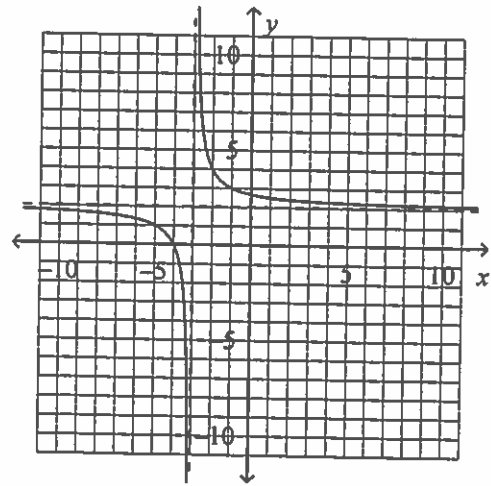
c)



b)



d)



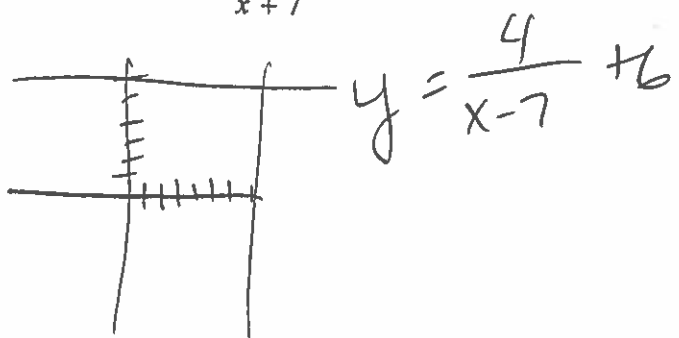
C 57 Write an equation for the translation of  $y = \frac{4}{x}$  that has the asymptotes  $x = 7$  and  $y = 6$ .

a)  $y = \frac{4}{x-6} + 7$

b)  $y = \frac{4}{x+7} + 6$

c)  $y = \frac{4}{x-7} + 6$

d)  $y = \frac{4}{x+6} + 7$



Simplify the complex fraction.

C 58  $\frac{\frac{4}{x+3}}{\frac{1}{x} + \frac{3}{1+3x}} = \frac{4}{x+3} \cdot \frac{x}{(1+3x)} = \frac{4x}{(x+3)(1+3x)}$

- a)  $\frac{12x+4}{x(x+3)}$       c)  $\frac{4x}{(x+3)(1+3x)}$   
 b)  $\frac{4x}{3(x+3)}$       d) not here

A 59 Suppose that  $x$  and  $y$  vary inversely, and  $x = 4$  when  $y = 8$ . Write the function that models the inverse variation.

a)  $y = \frac{32}{x}$        $k = xy$   
 $k = (4)(8)$   
 $k = 32$   
 c)  $y = \frac{4}{x}$        $y = \frac{k}{x}$   
 $y = \frac{32}{x}$   
 d)  $y = \frac{12}{x}$

A 60 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.

x	-7	-4	1	2
y	42	24	-6	-12

- a) direct variation;  $y = -6x$   
 b) inverse variation;  $y = \frac{-294}{x}$   
 c) neither

Direct:  $k = \frac{y}{x}$   
 $k = -6$   
 $y = kx$   
 $y = -6x$

Short Answer

A 61 Determine whether the function  $y = 10(1.6)^x$  represents exponential growth or exponential decay.  
 a. Exponential Growth      b. Exponential Decay

B 62 Determine whether the function  $y = 2\left(\frac{9}{11}\right)^x$  represents exponential growth or exponential decay.  
 a. Exponential Growth      b. Exponential Decay