

2017 Spring Final Exam Study Guide

Date _____ Period _____

Simplify.

1) $\frac{-1+6i}{3i}$

A) $\frac{i+6}{3}$

B) $\frac{-1+6i}{4}$

C) $-i$

D) $-\frac{5i}{3}$

2) $-5(-i)(-2+i)$

A) $5+10i$

B) $5-10i$

C) $-5+10i$

D) $-5-10i$

3) $8 - (-6 - 4i) + 7$

A) $21 + 4i$

B) $5 + 4i$

C) $19 + 4i$

D) $21 - 4i$

4) $\frac{4}{7+5i}$

A) $\frac{7-5i}{74}$

B) $\frac{14-10i}{37}$

C) $\frac{8-4i}{25}$

D) $\frac{35-25i}{74}$

Solve each equation by factoring.

5) $x^2 + 16 = 8x$

A) $\{-1, 7\}$

B) $\{3\}$

C) $\{-7, -5\}$

D) $\{4\}$

6) $196a^2 - 196a + 48 = 0$

A) $\left\{\frac{5}{7}, -2\right\}$

B) $\left\{-\frac{4}{7}, -\frac{3}{7}\right\}$

C) $\left\{\frac{4}{7}, \frac{3}{7}\right\}$

D) $\left\{\frac{2}{5}, 6\right\}$

Solve each equation with the quadratic formula.

7) $6m^2 + 11m = 72$

A) $\left\{ \frac{-11 + \sqrt{265}}{18}, \frac{-11 - \sqrt{265}}{18} \right\}$

B) $\left\{ \frac{11 + \sqrt{265}}{18}, \frac{11 - \sqrt{265}}{18} \right\}$

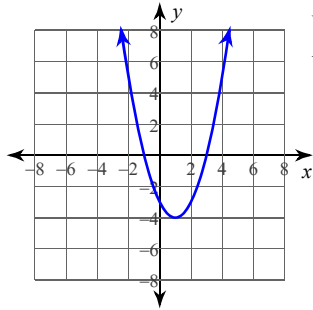
C) $\left\{ \frac{8}{3}, -\frac{9}{2} \right\}$

D) $\left\{ \frac{-11 + \sqrt{157}}{18}, \frac{-11 - \sqrt{157}}{18} \right\}$

Identify the vertex and axis of symmetry of each. Then sketch the graph.

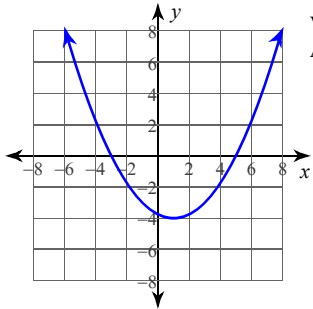
8) $y = \frac{1}{4}x^2 - \frac{1}{2}x - \frac{15}{4}$

A)



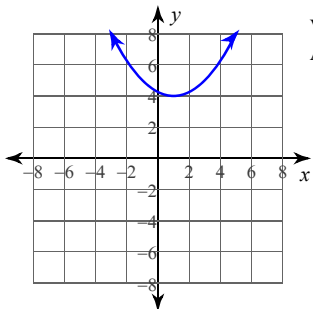
Vertex: (1, -4)
Axis of Sym.: $x = 1$

B)



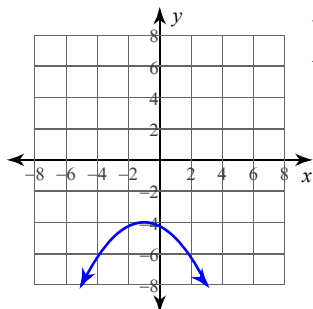
Vertex: (1, -4)
Axis of Sym.: $x = 1$

C)



Vertex: (1, 4)
Axis of Sym.: $x = 1$

D)

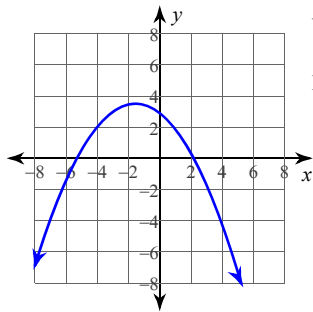


Vertex: (-1, -4)
Axis of Sym.: $x = -1$

Identify the vertex and focus of each. Then sketch the graph.

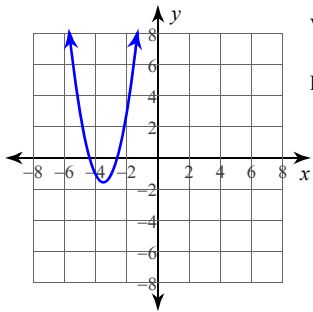
9) $y = \frac{1}{4}(x + 6)(x + 1)$

A)



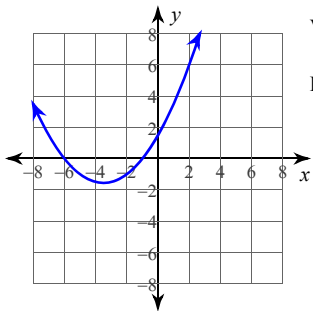
Vertex: $\left(-\frac{25}{16}, \frac{7}{2}\right)$
 Focus: $\left(-\frac{25}{16}, \frac{5}{2}\right)$

B)



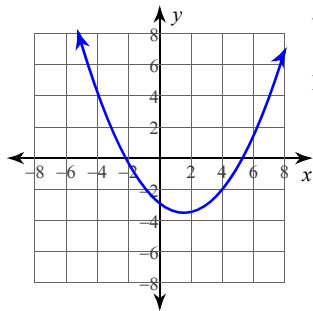
Vertex: $\left(-\frac{7}{2}, -\frac{25}{16}\right)$
 Focus: $\left(-\frac{7}{2}, -\frac{23}{16}\right)$

C)



Vertex: $\left(-\frac{7}{2}, -\frac{25}{16}\right)$
 Focus: $\left(-\frac{7}{2}, -\frac{9}{16}\right)$

D)



Vertex: $\left(\frac{25}{16}, -\frac{7}{2}\right)$
 Focus: $\left(\frac{25}{16}, -\frac{5}{2}\right)$

Identify the min/max value, y-intercept, and x-intercepts of each.

10) $y = -x^2 - 11x - 24$

A) Min value = $\frac{25}{4}$

y-int: $\frac{267}{4}$

x-int: None

B) Min value = $-\frac{25}{4}$

y-int: 24

x-int: -8 and -3

C) Max value = $\frac{25}{4}$

y-int: -24

x-int: -8 and -3

D) Max value = $-\frac{11}{2}$

y-int: $-\frac{713}{16}$

x-int: None

11) $y = \frac{2}{3}(x + 9)^2 + 2$

A) Min value = 2

y-int: 56

x-int: None

B) Min value = 9

y-int: $\frac{35}{3}$

x-int: None

C) Min value = 2

y-int: 164

x-int: None

D) Max value = -2

y-int: -56

x-int: None

12) $y = -3(x - 9)(x + 5)$

A) Min value = 147

y-int: 159

x-int: None

B) Min value = -3

y-int: 63072

x-int: -144 and -146

C) Max value = 147

y-int: 135

x-int: 9 and -5

D) Max value = -2

y-int: -64829

x-int: None

Factor each completely by grouping.

13) $6a^3 - 4a^2 + 15a - 10$

A) $(2a^2 + 5)(3a - 2)$

B) $2(3a + 5)(a^2 + 1)$

C) $2(2a^2 - 5)(a - 1)(a + 1)$

D) $2(a - 1)(a + 1)(3a + 5)$

Factor out a monomial.

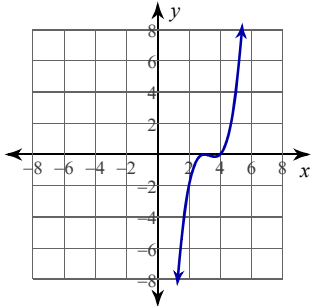
14) $y = x^3 - 16x$

- A) $y = x(x + 5)(x + 4)$
- B) $y = x(x + 2)(x + 3)$
- C) $y = x(x - 4)(x + 3)$
- D) $y = x(x - 4)(x + 4)$

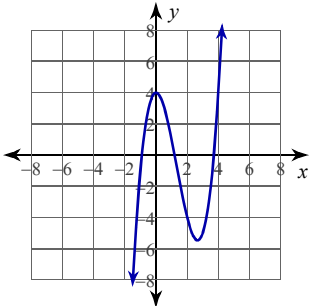
Sketch the graph of each function.

15) $f(x) = x^3 - 10x^2 + 33x - 36$

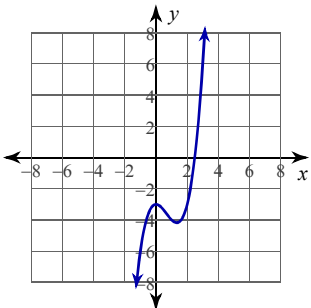
A)



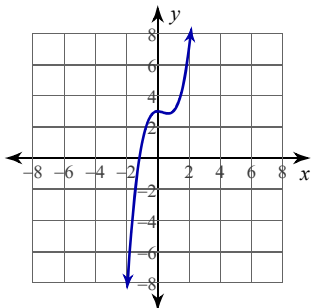
B)



C)

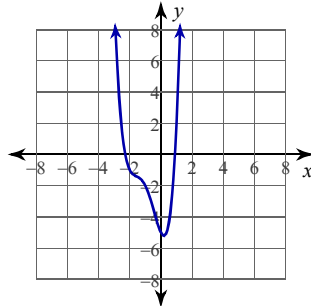


D)

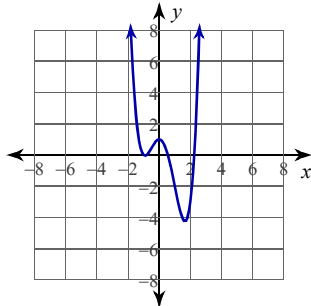


16) $f(x) = x^4 - x^3 - 3x^2 + 1$

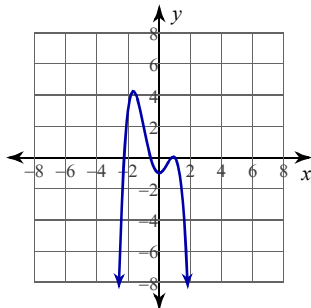
A)



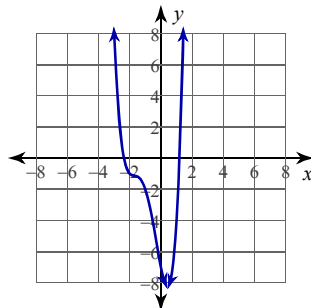
B)



C)



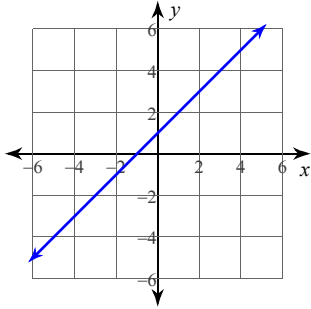
D)



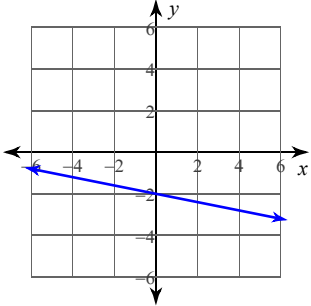
Sketch the graph of each line.

17) $x = -10 + 5y$

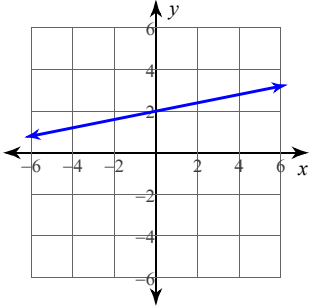
A)



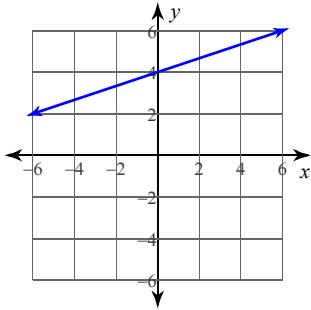
B)



C)



D)



Find each product.

18) $(8k + 8)(7k^2 - k - 3)$

A) $2k^3 + 5k^2 - 37k + 30$

B) $56k^3 + 48k^2 - 32k - 24$

C) $64k^3 + 112k^2 + 17k - 28$

D) $7k^3 - 21k^2 + 16k - 4$

Simplify each sum.

19) $(5x^2 - 7x^4 - 4x) + (7x^4 + 3x - 2)$

A) $5x^2 + 5x - 2$

B) $5x^2 - x - 2$

C) $9x^2 + 5x - 2$

D) $5x^2 + 3x - 2$

Simplify each difference.

20) $(4k^2 + 8k + 4k^4) - (4k^2 + 6k^3 - 8k)$

A) $4k^4 - 6k^3 + 20k$

B) $4k^4 - 5k^3 + 20k$

C) $4k^4 - 6k^3 + 16k$

D) $4k^4 - 6k^3 + 14k$

Write each expression in exponential form.

21) $(\sqrt[4]{2b})^5$

A) $(3b)^{\frac{1}{3}}$

B) $(2b)^{\frac{5}{4}}$

C) $(7b)^{\frac{5}{3}}$

D) $(4b)^{\frac{2}{3}}$

Write each expression in radical form.

22) $(2n)^{\frac{3}{2}}$

A) $\sqrt[4]{3n}$

B) $\frac{1}{(\sqrt[4]{3n})^3}$

C) $(\sqrt[3]{6n})^4$

D) $(\sqrt{2n})^3$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

23) $xy \cdot x^2y^{-\frac{3}{2}} \cdot 4x^{-2}y^{-1}$

A) $\frac{4xy^{\frac{1}{2}}}{y^2}$

B) $4y^3x^{\frac{1}{6}}$

C) $12xy$

D) $y^{\frac{7}{12}}$

24) $\left(x^{-\frac{1}{3}}y^2\right)^2$

A) $y^{\frac{1}{2}}x^{\frac{1}{3}}$

B) $\frac{x^{\frac{3}{4}}y^{\frac{7}{12}}}{xy}$

C) $\frac{y^4x^{\frac{1}{3}}}{x}$

D) $\frac{x^{\frac{3}{8}}y^{\frac{1}{4}}}{x^3y}$

25) $\frac{3x^{\frac{3}{2}}y^{-\frac{3}{4}}}{2y^{-2}}$

A) $\frac{2x^{\frac{4}{3}}y^{\frac{2}{3}}}{y^2}$

B) $\frac{2y^{\frac{1}{4}}}{x^2}$

C) $\frac{y^{\frac{5}{3}}}{2x^2}$

D) $\frac{3y^{\frac{5}{4}}x^{\frac{3}{2}}}{2}$

Simplify.

26) $(x^4)^{\frac{1}{2}}$

A) $81x^{12}$

B) $512x^9$

C) x^6

D) x^2

Find all roots.

27) $(x^2 + 3)(2x^2 - 3)(2x^2 + 3) = 0$

A) $\left\{2i, -2i, \frac{\sqrt{6}}{2}, -\frac{\sqrt{6}}{2}, \frac{i\sqrt{6}}{2}, -\frac{i\sqrt{6}}{2}\right\}$

B) $\left\{i\sqrt{3}, -i\sqrt{3}, \frac{\sqrt{6}}{2}, -\frac{\sqrt{6}}{2}, \frac{i\sqrt{6}}{2}, -\frac{i\sqrt{6}}{2}\right\}$

C) $\left\{i\sqrt{3} \text{ mult. } 2, -i\sqrt{3} \text{ mult. } 2, \frac{\sqrt{6}}{2}, -\frac{\sqrt{6}}{2}\right\}$

D) $\left\{i\sqrt{3}, -i\sqrt{3}, \frac{\sqrt{6}}{2}, -\frac{\sqrt{6}}{2}, i, -i\right\}$

Simplify.

28) $\frac{2 - 10i}{-2i}$

A) $-3i$

B) $i + 5$

C) $\frac{-i + 10}{2}$

D) $\frac{-2 + 10i}{5}$

29) $\frac{-10 - 7i}{-9 - 4i}$

A) $\frac{10 + 7i}{12}$

B) $\frac{136 + 15i}{97}$

C) $\frac{118 + 23i}{97}$

D) $\frac{10 + 7i}{15}$

Simplify each expression.

30) $-6 - 4x + 1 + 5x$

A) $11x$

B) $6x$

C) $-5 + 5x$

D) $-5 + x$

Divide.

31) $(m^3 + 10m^2 + 17m - 38) \div (m + 4)$

A) $m^2 + 6m - 7 - \frac{10}{m + 4}$

B) $m^2 + 8m - 5 - \frac{12}{m + 4}$

C) $m^2 + 8m - 10 - \frac{12}{m + 4}$

D) $m^2 + 8m - 6 - \frac{12}{m + 4}$

Simplify.

32) $\frac{\sqrt{15}}{2\sqrt{5}}$

A) $\frac{2\sqrt{3}}{3}$

B) $\frac{\sqrt{3}}{2}$

C) $\frac{\sqrt{3}}{12}$

D) 2

Simplify each expression.

$$33) \frac{2n + 18}{7n} \div \frac{2n + 18}{8}$$

- A) $4n^2$ B) $\frac{8}{7n}$
C) $n - 2$ D) 6

Simplify.

$$34) \frac{9i}{5 - 10i}$$

- A) $-\frac{9i}{8}$ B) $\frac{21 + 35i}{68}$
C) $\frac{11 + 22i}{25}$ D) $\frac{9i - 18}{25}$

Solve each equation.

$$35) 4^{3x} = 64$$

- A) No solution. B) $\{2\}$
C) $\{-2\}$ D) $\{1\}$

Solve each equation. Round your answers to the nearest ten-thousandth.

$$36) 7 \cdot 10^{a+8} = 59.5$$

- A) -5.8729 B) -7.0706
C) -5.8495 D) -5.8599

Solve each equation.

$$37) \log_8 (2n + 2) = \log_8 (-3n + 2)$$

- A) $\{0\}$ B) $\{-2\}$
C) $\{-13\}$ D) $\{5\}$

$$38) \log_4 2x^2 - \log_4 2 = 4$$

- A) $\{2\}$ B) $\{2, -2\}$
C) $\{1, -1\}$ D) $\{16, -16\}$

$$39) -7(1 - 7p) - 4p = -322$$

- A) $\{-7\}$ B) $\{15\}$
C) No solution. D) $\{9\}$

Solve each equation by factoring.

40) $n^2 = 11n - 30$

- A) $\{-5, -6\}$ B) $\{5, 0\}$
C) $\{5, 6\}$ D) $\{5\}$

Solve each equation by taking square roots.

41) $9p^2 + 2 = 794$

- A) $\{2\sqrt{22}, -2\sqrt{22}\}$
B) $\left\{\frac{439}{5}, -\frac{439}{5}\right\}$
C) $\left\{\frac{2\sqrt{199}}{3}, -\frac{2\sqrt{199}}{3}\right\}$
D) $\left\{\frac{796}{9}, -\frac{796}{9}\right\}$

Solve each equation with the quadratic formula.

42) $9x^2 = 15$

- A) $\left\{\frac{\sqrt{15}}{3}, -\frac{\sqrt{15}}{3}\right\}$
B) $\{-1 + \sqrt{19}, -1 - \sqrt{19}\}$
C) $\left\{\frac{1 + \sqrt{91}}{5}, \frac{1 - \sqrt{91}}{5}\right\}$
D) $\left\{\frac{2 + \sqrt{94}}{10}, \frac{2 - \sqrt{94}}{10}\right\}$

43) $12r^2 + r = 9$

- A) $\left\{\frac{-1 + \sqrt{433}}{24}, \frac{-1 - \sqrt{433}}{24}\right\}$
B) $\left\{\frac{6 + \sqrt{6}}{2}, \frac{6 - \sqrt{6}}{2}\right\}$
C) $\left\{\frac{-7 + 7\sqrt{3}}{2}, \frac{-7 - 7\sqrt{3}}{2}\right\}$
D) $\{7, -14\}$

Solve each equation. Remember to check for extraneous solutions.

44) $\sqrt{\frac{n}{3}} = 0$

- A) $\{4\}$ B) $\{5\}$
C) $\{-1\}$ D) $\{0\}$

45) $\sqrt{n - 10} = \sqrt{2n - 28}$

- A) $\{18, 1\}$ B) $\{18\}$
C) $\{9, -10\}$ D) No solution.

46) $\frac{x+4}{x^2} - \frac{x-4}{x^2} = \frac{1}{x}$

- A) $\{-2\}$ B) $\{-8\}$
C) $\{2\}$ D) $\{8\}$

$$47) \frac{1}{3x} + \frac{x+3}{6x^2} = \frac{1}{6x}$$

A) $\left\{\frac{1}{3}\right\}$ B) $\left\{-\frac{3}{2}\right\}$

C) $\left\{-\frac{1}{3}\right\}$ D) $\{-1\}$

Solve each equation.

$$48) 343 = (m - 14)^{\frac{3}{2}}$$

A) $\{63\}$ B) $\{63, -3\}$

C) $\{-63, 63\}$ D) $\{-63, -3\}$

$$49) (3p)^{\frac{3}{2}} = 27$$

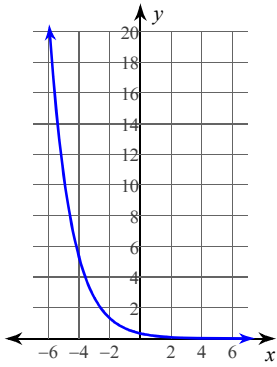
A) $\{-8, 63\}$ B) $\{-8, -63\}$

C) $\{-8, 24\}$ D) $\{3\}$

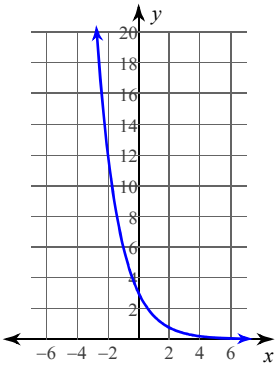
Sketch the graph of each function.

50) $y = \frac{1}{3} \cdot \left(\frac{1}{2}\right)^x$

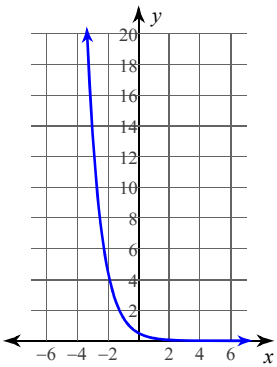
A)



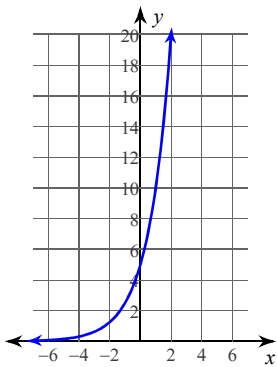
B)



C)

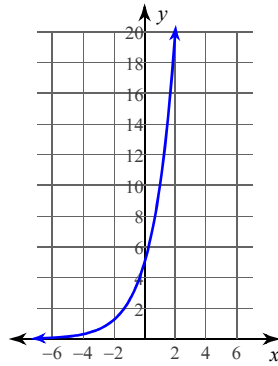


D)

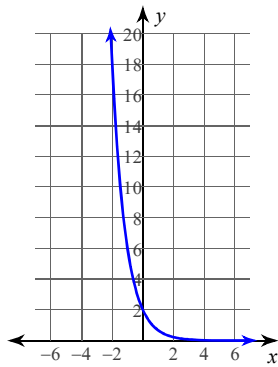


51) $y = 5 \cdot 2^x$

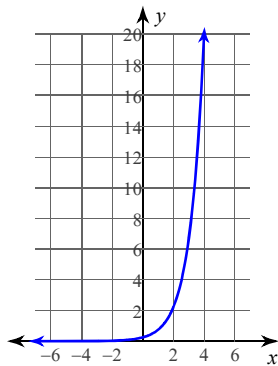
A)



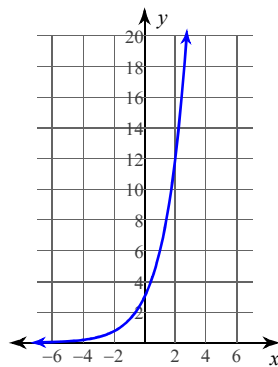
B)



C)



D)



Find the inverse of each function.

52) $y = \frac{-7 \cdot 3^x + 1}{3^x}$

A) $y = \log_3 (x + 8)$

B) $y = \log_{\frac{1}{3}} (x + 7)$

C) $y = \log_6 4x$

D) $y = \log_3 x^4$

Simplify. Your answer should contain only positive exponents.

53) $2x^{-4}y^3 \cdot 3yx^{-4}$

A) $4x^2y^4$ B) $4x^4y^3$

C) $2y^5$ D) $\frac{6y^4}{x^8}$

Factor each completely.

54) $36k^3 + 6k^2 - 6k - 1$

A) $(6k^2 - 1)(6k^2 + 1)$

B) $(6k^2 + 1)(6k + 1)$

C) $(6k^2 - 1)(6k + 1)$

D) $(6k^2 + 1)^2$

Factor each.

55) $x^8 - 10x^4 + 9 = 0$

A) $(x - 1)(x + 1)(x^2 + 1)(x^2 + 5)(x^2 + 3) = 0$

B) $(x - 1)(x + 1)(x^2 + 1)(x^2 - 3)(x^2 + 3) = 0$

C) $(3x - 1)(x + 1)(x^2 + 1)^2(x^2 - 3) = 0$

D) $(x - 1)(x + 1)(x^2 + 1)(2x^2 - 3)(x^2 + 3) = 0$

Factor each completely.

56) $r^2 + r - 42$

A) $(r + 7)(r - 6)$

B) $(r - 7)(r + 6)$

C) $(r + 7)(r + 6)$

D) $4r(r - 1)$

57) $3u^4 - 33u^2 + 90$

A) $(u^2 + 2)(u^2 + 15)$

B) $3(u^2 - 15)(u^2 - 2)$

C) $(u^2 + 30)(u^2 + 1)$

D) $3(u^2 - 6)(u^2 - 5)$

58) $n^2 - 16$

- A) $(n + 16)^2$
- B) $(n + 4)(n - 4)$
- C) $(n - 4)^2$
- D) $(4n + 1)(4n - 1)$

Find all roots.

59) $(3x^2 - 2)(3x^2 + 2)(x - 2)(x + 2)(x^2 + 4) = 0$

- A) $\left\{0, \frac{\sqrt{6}}{3}, -\frac{\sqrt{6}}{3}, \frac{2i\sqrt{3}}{3}, -\frac{2i\sqrt{3}}{3}, 2, 2i, -2i\right\}$
- B) $\left\{\frac{\sqrt{6}}{3}, -\frac{\sqrt{6}}{3}, \frac{i\sqrt{6}}{3}, -\frac{i\sqrt{6}}{3}, 2, -2, 2i, -2i\right\}$
- C) $\left\{0, \frac{\sqrt{6}}{3}, -\frac{\sqrt{6}}{3}, \frac{i\sqrt{6}}{3}, -\frac{i\sqrt{6}}{3}, -2, 2i, -2i\right\}$
- D) $\left\{\frac{\sqrt{6}}{3}, -\frac{\sqrt{6}}{3}, \frac{i\sqrt{6}}{3}, -\frac{i\sqrt{6}}{3}, 2, -\frac{2}{3}, 2i, -2i\right\}$

Evaluate each function.

60) $g(n) = n^2 - 3$; Find $g(3)$

- A) 6
- B) 33
- C) 46
- D) 61

61) $g(x) = -4x + 2$; Find $g(10)$

- A) 30
- B) 14
- C) 42
- D) -38

Find the inverse of each function.

62) $g(x) = \sqrt[3]{x} - 2$

- A) $g^{-1}(x) = (x + 1)^3 - 3$
- B) $g^{-1}(x) = x^5$
- C) $g^{-1}(x) = \sqrt[3]{x} - 1$
- D) $g^{-1}(x) = (x + 2)^3$

Perform the indicated operation.

63) $g(n) = 3n - 3$
 $f(n) = 2n + 3$
Find $g(n) + f(n)$

- A) $5n$ B) $-5n$
C) $n + 2$ D) $-3n^3 - 4n - 7$

64) $h(a) = 4a + 1$
 $g(a) = 4a - 2$
Find $h(a) + g(a)$

- A) $a^2 - 3a + 5$ B) $a^3 + 2a - 2$
C) $7a - 3$ D) $8a - 1$

65) $g(n) = -3n + 3$
 $f(n) = -3n^2 - 4n$
Find $g(n) - f(n)$

- A) $-3n^2 - n - 3$
B) $-n^2 + n - 7$
C) $3n^2 + n + 3$
D) $-3n^2 + n - 3$

66) $g(n) = n - 2$
 $h(n) = n^2 + n$
Find $g(n) - h(n)$

- A) $-n^2 + 4n - 9$ B) $n^2 + 2$
C) $3n + 3$ D) $-n^2 - 2$

67) $f(x) = 2x$
 $g(x) = -2x^3 + 5$
Find $f(x) \cdot g(x)$

- A) $x^3 - 9x$
B) $-4x^4 + 10x$
C) $-4x^4 - 10x$
D) $-x^3 + x^2 + 12x$

68) $g(x) = x^2 + 5$
 $f(x) = x + 4$
Find $g(x) \cdot f(x)$

- A) $-4x^3 + 15x^2 + 4x$
B) $-x^3 + 16x$
C) $-x^3 + 4x^2 - 5x + 20$
D) $x^3 + 4x^2 + 5x + 20$

69) $g(a) = 4a + 5$
 $f(a) = a^2 - 3a$
Find $g(a) \div f(a)$

- A) $\frac{4a + 5}{a^2 - 3a}$ B) $\frac{a^2 - 3a}{4a + 5}$
C) $\frac{-a + 2}{a^2 + 2}$ D) $\frac{a^2 + 3a}{-4a + 5}$

70) $g(n) = 4n + 3$
 $h(n) = n^2 - 3n$
Find $g(n) \div h(n)$

- A) $\frac{4n + 3}{n^2 - 3n}$ B) $\frac{n^2 - 3n}{4n + 3}$
C) $\frac{n^2 + 3n}{-4n + 3}$ D) $\frac{4n - 3}{n - 5}$

71) $f(x) = 2x - 1$
 $g(x) = 4x + 4$
Find $f(g(x))$

- A) $8x$ B) $-8x$
C) $8x + 7$ D) $12x + 12$

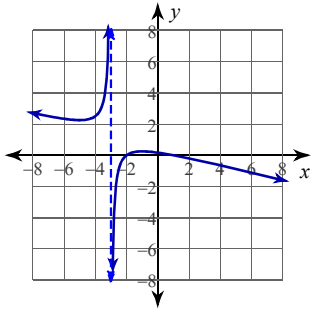
72) $g(n) = n^3 - 5n^2$
 $h(n) = 4n$
Find $g(h(n))$

- A) $64n^3 - 80n^2$
B) $4n^3 - 20n^2$
C) $12n - 2$
D) $-4n^3 - 20n^2$

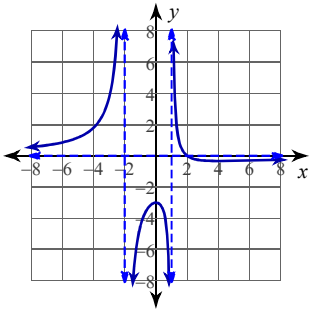
Graph each function.

73) $f(x) = \frac{-3x + 6}{x^2 + x - 2}$

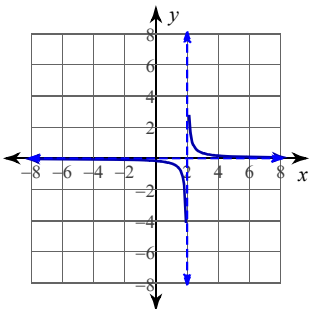
A)



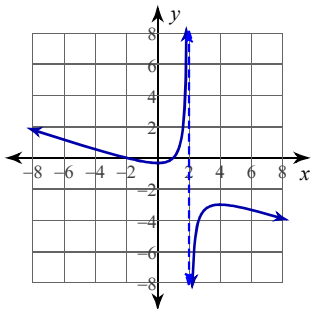
B)



C)

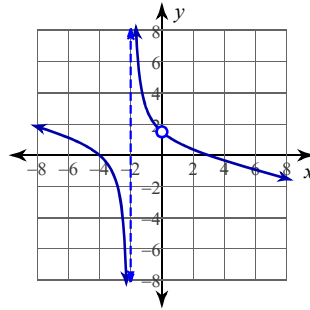


D)

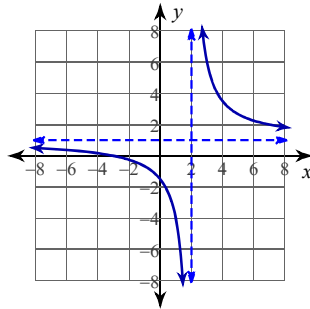


74) $f(x) = \frac{x - 2}{x + 3}$

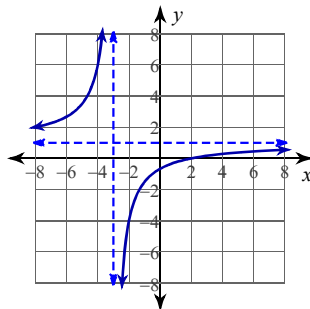
A)



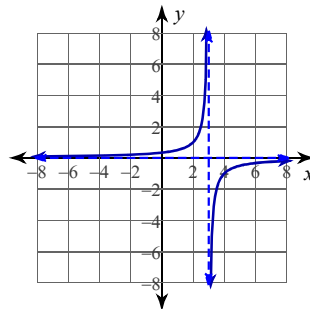
B)



C)



D)



Use a calculator to approximate each to the nearest thousandth.

75) $\log_4 31$

- A) 2.364
- B) 2.114
- C) 2.631
- D) 2.477

76) $\log_5 39$

- A) 1.745
- B) 2.622
- C) 1.916
- D) 2.276

Condense each expression to a single logarithm.

$$77) \frac{\log_2 x}{3} + \frac{\log_2 y}{3} + \frac{\log_2 z}{3}$$

- A) $\log_2 \sqrt[3]{zyx}$ B) $\log_2 (yxz^3)$
C) $\log_2 \frac{x^3}{y^3}$ D) $\log_2 (y^9 x^3)$

$$78) \log_4 u + \log_4 v + 5 \log_4 w$$

- A) $\log_4 (vuw^5)$
B) $\log_4 (w\sqrt[3]{vu})$
C) $\log_4 \frac{u^{30}}{v^6}$
D) $\log_4 \sqrt[3]{wvu}$

Evaluate each expression.

$$79) \log_6 \frac{1}{216}$$

- A) $\frac{1}{1296}$ B) -3
C) 3 D) 2

$$80) \log_7 343$$

- A) 4 B) 5
C) 3 D) 49

Expand each logarithm.

$$81) \log_8 \frac{12^3}{11^5}$$

- A) $3 \log_8 12 + 5 \log_8 11$
B) $5 \log_8 12 - 15 \log_8 11$
C) $3 \log_8 5 + \frac{\log_8 12}{3}$
D) $3 \log_8 12 - 5 \log_8 11$

$$82) \log_3 \left(\frac{x^2}{y} \right)^6$$

- A) $6 \log_3 x + 12 \log_3 y$
B) $2 \log_3 x - 6 \log_3 y$
C) $12 \log_3 x - 6 \log_3 y$
D) $2 \log_3 z + \frac{\log_3 x}{3}$

Find the inverse of each function.

$$83) y = \log_6 x - 1$$

- A) $y = 2^{x-3}$ B) $y = 6^{x+1}$
C) $y = 5^x + 2$ D) $y = 4^{x+3}$

$$84) y = \log_6 x - 9$$

- A) $y = 3^{x+9}$ B) $y = 6^{x+9}$
C) $y = 5^{\frac{x}{4}}$ D) $y = 2^x - 5$

Expand each logarithm.

85) $\log_6 \sqrt{2 \cdot 3 \cdot 11}$

A) $4\log_6 2 - 6\log_6 3$

B) $\log_6 11 + \frac{\log_6 2}{2} + \frac{\log_6 3}{2}$

C) $4\log_6 11 + \frac{\log_6 2}{2}$

D) $\frac{\log_6 2}{2} + \frac{\log_6 3}{2} + \frac{\log_6 11}{2}$

86) $\log_8 (6^5 \cdot 7)^6$

A) $6\log_8 6 + 30\log_8 7$

B) $5\log_8 6 - 6\log_8 7$

C) $30\log_8 6 - 6\log_8 7$

D) $30\log_8 6 + 6\log_8 7$

Simplify each expression.

87) $\frac{1}{3v^2} \cdot \frac{9v+27}{9}$

A) $\frac{v+3}{3v^2}$

B) $\frac{v-8}{8v}$

C) 8

D) $\frac{v-3}{v+10}$

88) $\frac{a-1}{5} \cdot \frac{2a^2-20a}{a-10}$

A) $\frac{2a(a-1)}{5}$

B) $\frac{28a}{3}$

C) $\frac{2}{a-6}$

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

89) $\frac{n+3}{2} + \frac{n-2}{n-6}$

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

B) $\frac{n^2+3n-18}{2(n-2)}$

C) $\frac{n^2-3n-18}{2(n-2)}$

D) $\frac{n^2-n-22}{2(n-6)}$

90) $\frac{x+3}{12x+24} + 4$

A) $\frac{x-2}{6x(x-6)}$

B) $\frac{6x-18}{5x(3x-2)}$

C) $\frac{2x-2}{x(x-3)}$

D) $\frac{49x+99}{12(x+2)}$

$$91) \frac{5n}{2} - \frac{3}{3n-12}$$

$$A) \frac{5n^2 - 20n - 2}{2(n-4)}$$

$$B) \frac{5n}{2(n-4)}$$

$$C) \frac{-60n^3 - 48n^2 + 2n - 1}{6n(5n+4)}$$

$$D) \frac{-30n^3 - 24n^2 + 2n - 1}{6n(5n+4)}$$

$$92) \frac{2}{r-1} - \frac{6r}{r+2}$$

$$A) \frac{-2+4r}{3}$$

$$B) \frac{9r+4-4r^2}{(r-1)(r+2)}$$

$$C) \frac{8r+4-6r^2}{(r-1)(r+2)}$$

$$D) \frac{10r+4-5r^2}{(r-1)(r+2)}$$

$$93) \frac{a+1}{a^2-a-2} \div \frac{a+7}{20-8a-a^2}$$

$$A) \frac{a+9}{8}$$

$$B) \frac{5a}{a+5}$$

$$C) \frac{a+8}{8a}$$

$$D) \frac{-10-a}{a+7}$$

$$94) \frac{7x}{2x^2+6x} \div \frac{1}{2x}$$

$$A) x+3$$

$$B) \frac{7x}{x+3}$$

$$C) \frac{8(x+5)}{9}$$

$$D) 7$$

Solve each equation. Remember to check for extraneous solutions.

$$95) \frac{1}{x} + \frac{1}{5} = 1$$

$$A) \left\{ \frac{5}{4} \right\}$$

$$B) \left\{ -\frac{4}{3}, \frac{1}{6} \right\}$$

$$C) \left\{ \frac{4}{3}, \frac{1}{6} \right\}$$

$$D) \left\{ -\frac{4}{3} \right\}$$

$$96) \frac{1}{3v^2} - \frac{5v-20}{3v^2} = \frac{3}{v^2}$$

$$A) \{-2\}$$

$$B) \{-6\}$$

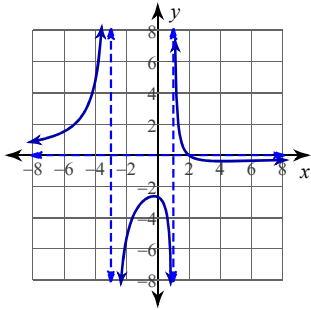
$$C) \left\{ \frac{1}{6} \right\}$$

$$D) \left\{ \frac{12}{5} \right\}$$

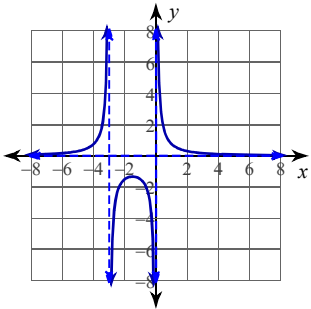
Graph each function.

$$97) f(x) = \frac{3}{x^2 + 3x}$$

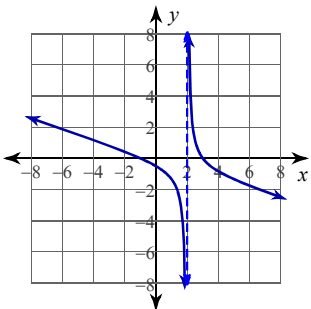
A)



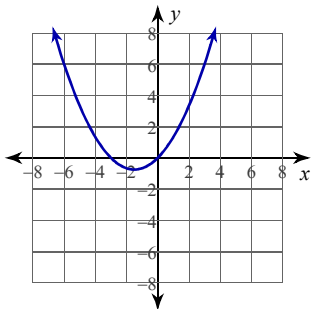
B)



C)

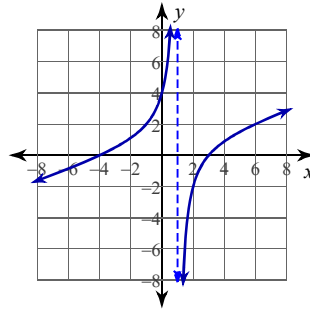


D)

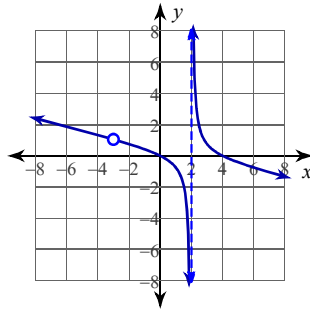


$$98) f(x) = \frac{x^3 - x^2 - 12x}{-4x^2 - 4x + 24}$$

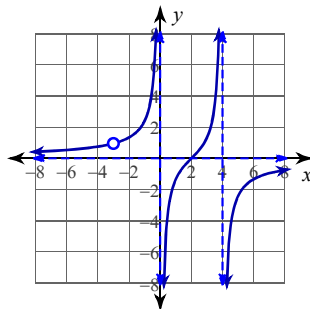
A)



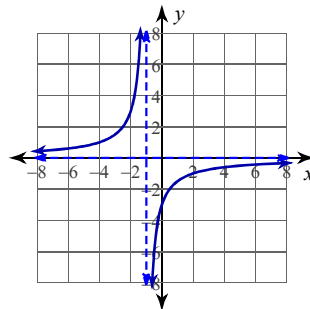
B)



C)



D)



Simplify each and state the excluded values.

99) $\frac{r^2 + r - 72}{r + 9}$

A) $r + 9$; $\{2\}$

B) $r - 8$; $\{-9\}$

C) $\frac{3(r - 3)}{5}$; No excluded values.

D) $\frac{5}{3(r - 3)}$; $\{3\}$

100) $\frac{6n^2 - 30n}{n - 5}$

A) $\frac{1}{8n}$; $\{0, 10\}$

C) $6n$; $\{5\}$

B) $8n$; $\{10\}$

D) $9n$; $\{1\}$

Answers to 2017 Spring Final Exam Study Guide (ID: 1)

- | | | | |
|-------|-------|-------|--------|
| 1) A | 2) D | 3) A | 4) B |
| 5) D | 6) C | 7) C | 8) B |
| 9) C | 10) C | 11) A | 12) C |
| 13) A | 14) D | 15) A | 16) B |
| 17) C | 18) B | 19) B | 20) C |
| 21) B | 22) D | 23) A | 24) C |
| 25) D | 26) D | 27) B | 28) B |
| 29) C | 30) D | 31) A | 32) B |
| 33) B | 34) D | 35) D | 36) B |
| 37) A | 38) D | 39) A | 40) C |
| 41) A | 42) A | 43) A | 44) D |
| 45) B | 46) D | 47) B | 48) A |
| 49) D | 50) A | 51) A | 52) B |
| 53) D | 54) C | 55) B | 56) A |
| 57) D | 58) B | 59) B | 60) A |
| 61) D | 62) D | 63) A | 64) D |
| 65) C | 66) D | 67) B | 68) D |
| 69) A | 70) A | 71) C | 72) A |
| 73) B | 74) C | 75) D | 76) D |
| 77) A | 78) A | 79) B | 80) C |
| 81) D | 82) C | 83) B | 84) B |
| 85) D | 86) D | 87) A | 88) A |
| 89) D | 90) D | 91) A | 92) C |
| 93) D | 94) B | 95) A | 96) D |
| 97) B | 98) B | 99) B | 100) C |