

2016 Fall Final Exam Study Guide

Date _____ Period _____

Simplify.

1) $\frac{7}{-2i}$

- A) $\frac{7i}{2}$ B) $2i$
 C) $4i$ D) $\frac{9i}{2}$

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

- A) $6i$ B) $4i$
 C) $5i$ D) $\frac{11i}{2}$

3) $\frac{8}{9+4\sqrt{5}}$

- A) $\frac{56-32\sqrt{2}}{17}$ B) $72-32\sqrt{5}$
 C) $\frac{55-20\sqrt{5}}{41}$ D) $63-28\sqrt{5}$

4) $-5(-i)(-2+i)$

- A) $5+10i$ B) $5-10i$
 C) $-5+10i$ D) $-5-10i$

5) $(4+4i)-(2+6i)$

- A) $-6-10i$ B) $2-2i$
 C) $2-10i$ D) $6+10i$

6) $(-7i)(-1-4i)-2 \cdot (i)$

- A) $-34+7i$ B) $-28+11i$
 C) $-28-9i$ D) $-28+5i$

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

- A) $21+4i$ B) $5+4i$
 C) $19+4i$ D) $21-4i$

8) $\frac{5i}{-6+6i}$

- A) $\frac{-5i+5}{12}$ B) $\frac{-5i+5}{8}$
 C) $\frac{-7-7i}{12}$ D) $\frac{-1-i}{2}$

9) $\frac{3i}{5+8i}$

- A) $\frac{15-24i}{89}$ B) $\frac{15i+24}{89}$
 C) $\frac{i}{4}$ D) $\frac{30-48i}{89}$

Solve each equation by factoring.

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

- A) $\{-1, 7\}$ B) $\{3\}$
C) $\{-7, -5\}$ D) $\{4\}$

11) $196a^2 - 196a + 48 = 0$

- 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 by taking square roots.

12) $5x^2 - 9 = -77$

- A) $\left\{\frac{i\sqrt{430}}{5}, -\frac{i\sqrt{430}}{5}\right\}$
B) $\left\{\frac{2i\sqrt{85}}{5}, -\frac{2i\sqrt{85}}{5}\right\}$
C) $\{2, -2\}$
D) $\left\{-\frac{68}{5}, \frac{68}{5}\right\}$

Solve each equation with the quadratic formula.

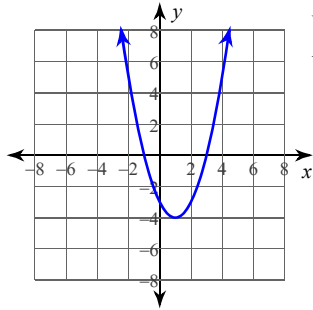
13) $6m^2 + 11m = 72$

- 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.

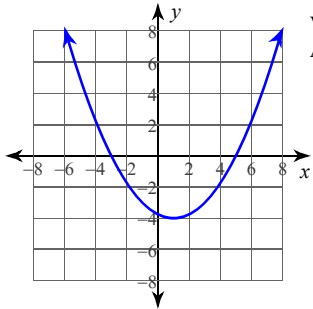
14) $y = \frac{1}{4}x^2 - \frac{1}{2}x - \frac{15}{4}$

A)



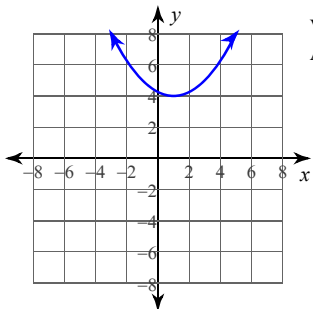
Vertex: (1, -4)
Axis of Sym.: $x = 1$

B)



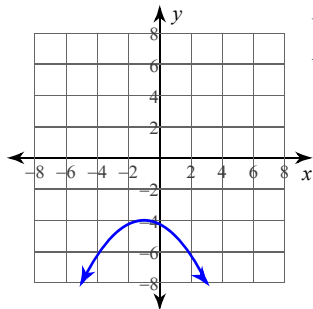
Vertex: (1, -4)
Axis of Sym.: $x = 1$

C)



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

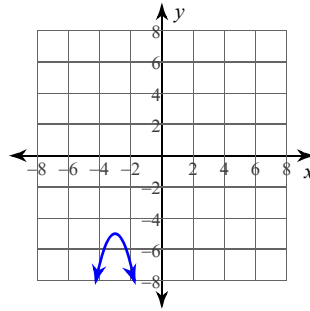
D)



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

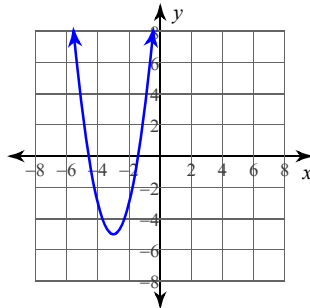
15) $f(x) = -2x^2 - 12x - 23$

A)



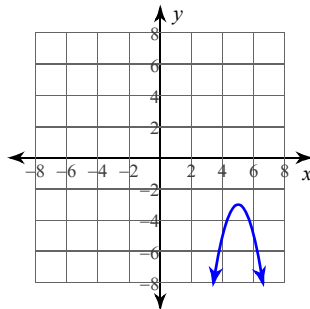
Vertex: (-3, -5)
Axis of Sym.: $x = -3$

B)



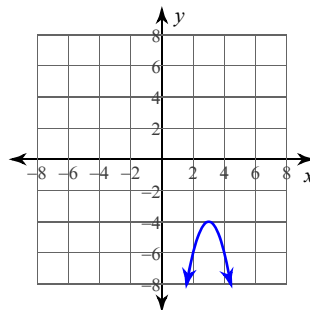
Vertex: (-3, -5)
Axis of Sym.: $x = -3$

C)



Vertex: (5, -3)
Axis of Sym.: $x = 5$

D)

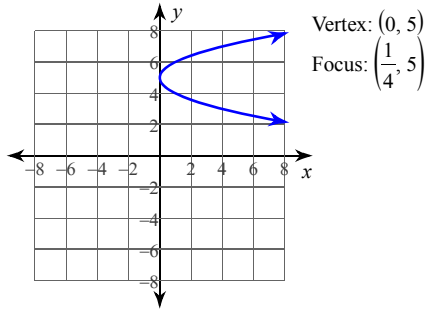


Vertex: (3, -4)
Axis of Sym.: $x = 3$

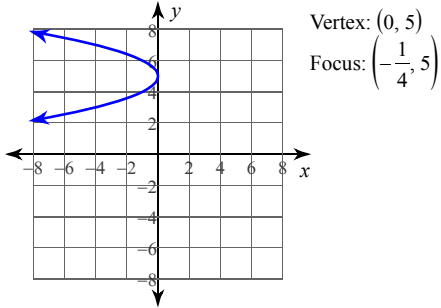
Identify the vertex and focus of each. Then sketch the graph.

16) $x = -y^2 + 10y - 25$

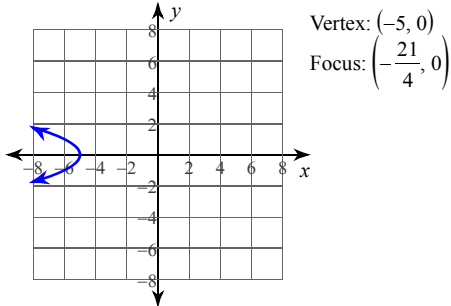
A)



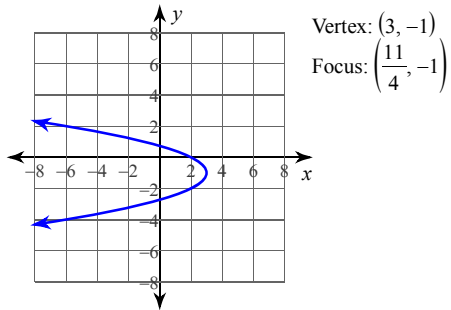
B)



C)

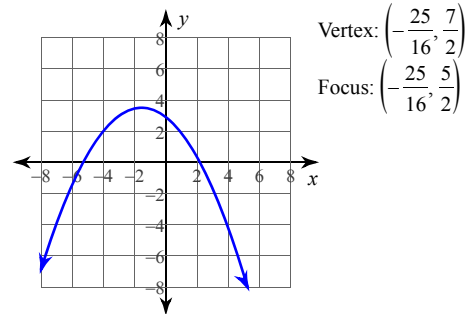


D)

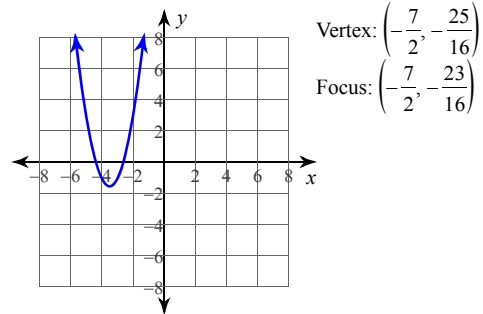


17) $y = \frac{1}{4}(x + 6)(x + 1)$

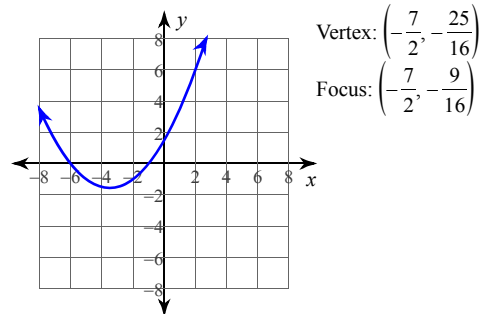
A)



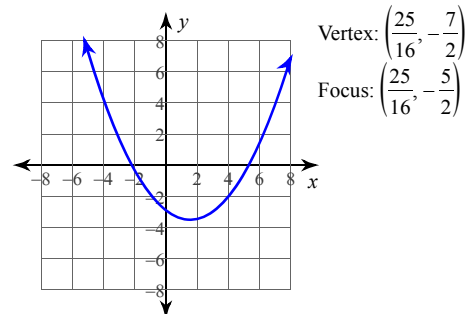
B)



C)



D)



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

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

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

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

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

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

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.

21) $16v^3 - 12v^2 + 12v - 9$

A) $(4v^2 + 3)(4v - 3)$

B) $(4v^2 - 3)(4v - 3)$

C) $(4v^2 + 3)^2$

D) $(4v^2 - 3)(4v + 3)$

22) $25x^3 + 20x^2 + 20x + 16$

A) $(5x^2 + 4)(5x - 4)$

B) $(5x + 4)(5x^2 - 4)$

C) $(5x^2 + 4)(5x + 4)$

D) $(5x^2 - 4)(5x - 4)$

Factor out a monomial.

23) $y = x^3 - 2x^2 - 15x$

- A) $y = x(x + 6)(x + 3)$
- B) $y = 3x(x + 7)(x + 1)$
- C) $y = x(x + 3)^2$
- D) $y = x(x - 5)(x + 3)$

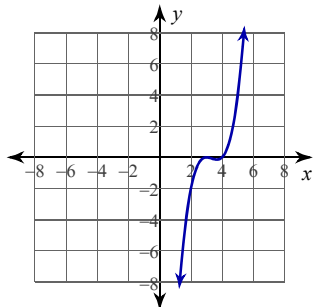
24) $y = x^3 - 6x^2 + 5x$

- A) $y = 2x(x - 1)(3x - 5)$
- B) $y = x(x - 1)(x + 4)$
- C) $y = x(2x - 1)(x - 5)$
- D) $y = x(x - 1)(x - 5)$

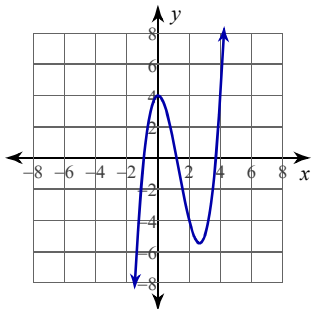
Sketch the graph of each function.

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

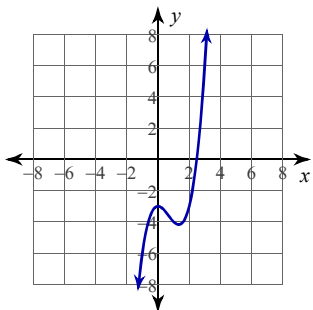
A)



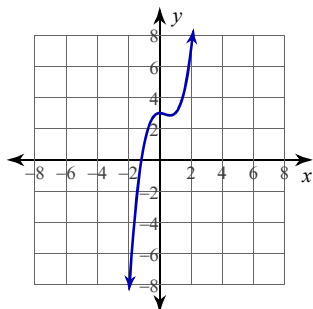
B)



C)

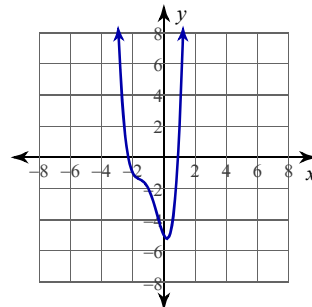


D)

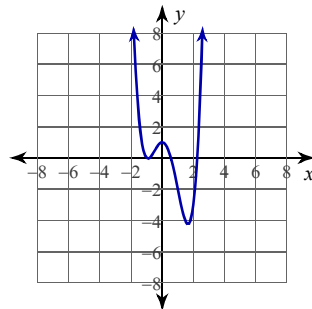


26) $f(x) = x^4 - x^3 - 3x^2 + 1$

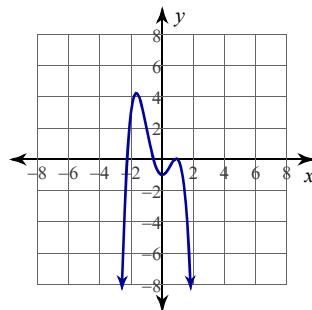
A)



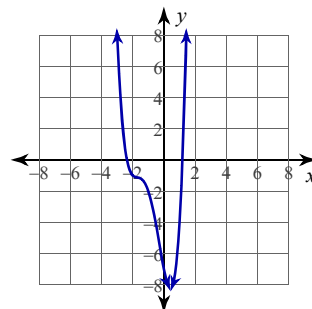
B)



C)



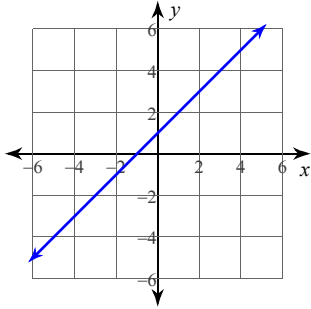
D)



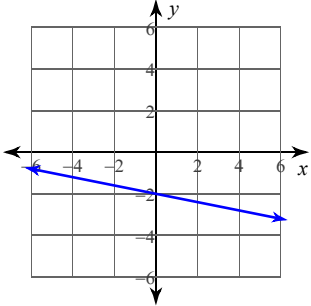
Sketch the graph of each line.

27) $x = -10 + 5y$

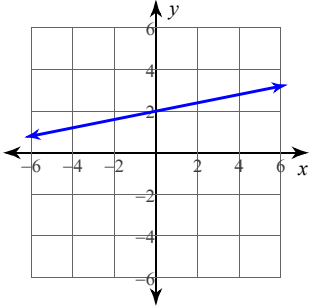
A)



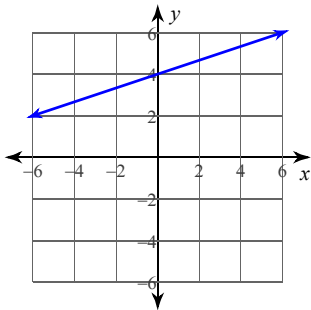
B)



C)



D)



Find each product.

28) $(8k + 8)(7k^2 - k - 3)$

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.

29) $(5x^2 - 7x^4 - 4x) + (7x^4 + 3x - 2)$

- A) $5x^2 + 5x - 2$
- B) $5x^2 - x - 2$
- C) $9x^2 + 5x - 2$
- D) $5x^2 + 3x - 2$

Simplify each difference.

30) $(4k^2 + 8k + 4k^4) - (4k^2 + 6k^3 - 8k)$

- 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.

31) $(\sqrt{5x})^3$

- A) $x^{-\frac{5}{3}}$
- B) $(5x)^{\frac{3}{2}}$
- C) $(6x)^{\frac{3}{2}}$
- D) $x^{-\frac{3}{2}}$

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

- A) $(2a)^{-\frac{5}{2}}$
- B) $a^{\frac{5}{6}}$
- C) $(7a)^{\frac{5}{2}}$
- D) $(10a)^{-\frac{5}{3}}$

Write each expression in radical form.

33) $(2k)^{\frac{1}{6}}$

- A) $\sqrt[6]{2k}$
- B) $\sqrt[3]{7k}$
- C) $(\sqrt[6]{k})^5$
- D) $\sqrt[5]{3k}$

34) $k^{\frac{1}{6}}$

- A) $\sqrt[6]{k}$
- B) $\frac{1}{\sqrt[3]{3k}}$
- C) $\sqrt[3]{3k}$
- D) $(\sqrt[4]{3k})^3$

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

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

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

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

C) $12xy$

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

36) $\left(\frac{1}{a^2}\right)^2$

A) a

B) $\frac{a^{\frac{3}{8}}b^{\frac{5}{4}}}{a}$

C) $\frac{b^5a^{\frac{1}{2}}}{a^3}$

D) $\frac{a^{\frac{7}{8}}b^{\frac{3}{2}}}{a^2}$

37) $\left(x^2y^{-\frac{7}{4}}\right)^{\frac{2}{3}}$

A) x^2

B) $\frac{x^{\frac{4}{9}}y^{\frac{2}{3}}}{y^2}$

C) $\frac{yx^{\frac{7}{9}}}{x^3}$

D) $\frac{y^{\frac{5}{6}}x^{\frac{4}{3}}}{y^2}$

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

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.

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

A) $81x^{12}$

B) $512x^9$

C) x^6

D) x^2

Find all roots.

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

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

Answers to 2016 Fall Final Exam Study Guide (ID: 1)

1) A
5) B
9) B
13) C
17) C
21) A
25) A
29) B
33) A
37) D

2) C
6) D
10) D
14) B
18) C
22) C
26) B
30) C
34) A
38) D

3) B
7) A
11) C
15) A
19) A
23) D
27) C
31) B
35) A
39) D

4) D
8) A
12) B
16) B
20) C
24) D
28) B
32) A
36) A
40) B