

SAMPLE Fall Semester Final

© 2014 Kuta Software LLC. All rights reserved.

DO NOT WRITE on this TEST _____

Simplify each expression.

1) $(7x^2 + x + 3x^3) + (1 + 3x + 4x^3)$

- A) $12x^3 + x^2 + 4x + 1$
- B) $7x^3 + 7x^2 + 4x + 1$
- C) $12x^3 + 8x^2 + 4x + 1$
- D) $12x^3 + 7x^2 + 4x + 1$

2) $(4a^3 + a^4 + 2) - (6a^3 + 7a^4 - 6a^2)$

- A) $-6a^4 - 2a^3 + 7a^2 - 10$
- B) $-6a^4 + 6a^3 + 7a^2 - 10$
- C) $-6a^4 - 2a^3 + 6a^2 - 10$
- D) $-6a^4 - 2a^3 + 6a^2 - 5$
- E) $-6a^4 - 2a^3 + 6a^2 + 2$

Find each product or quotient.

3) $(2k - 8)(3k - 2)$

- A) $6k^2 + 16$
- B) $6k^2 - 28k + 16$
- C) $6k^2 + 20k - 16$
- D) $6k^2 - 20k - 16$
- E) $18k^2 + 42k + 12$

4) $(1 + 6m)(1 - 6m)$

- A) $1 - 8m + 16m^2$
- B) $1 - 16m^2$
- C) $25 - 9m^2$
- D) $1 + 12m + 36m^2$
- E) $1 - 36m^2$

5) $\frac{40v^3 + v^2 + 24v}{8v^2}$

- A) $3v^2 + \frac{v}{2} + \frac{5}{6}$
- B) $5v + 1 + \frac{1}{3v}$
- C) $5v + \frac{1}{8} + \frac{3}{v}$
- D) $5 + \frac{4}{v} + \frac{4}{v^2}$
- E) $\frac{v}{2} + 5 + \frac{4}{v}$

6) $\frac{7k^3 + 15k^2 - 12k + 18}{k + 3}$

- A) $7k^2 - 6k + 4 - \frac{1}{k + 3}$
- B) $7k^2 - 6k + 3 + \frac{5}{k + 3}$
- C) $7k^2 - 6k + 6$
- D) $7k^2 - 6k + 4 - \frac{4}{k + 3}$
- E) $7k^2 - 6k + 7 - \frac{1}{k + 3}$

Evaluate each using the values given.

7) $(k + h)^3$; use $h = \frac{4}{5}$, and $k = 2$

A) $\frac{2744}{125}$

B) $\frac{3144}{125}$

C) $\frac{2794}{125}$

D) $\frac{11601}{500}$

E) $\frac{8732}{375}$

Simplify.

8) $(-3\sqrt{2} - 5)(\sqrt{2} + 5)$

A) $3\sqrt{3} + 4$

B) -31

C) $-31 - 20\sqrt{2}$

D) $5\sqrt{30} + 3$

E) $10\sqrt{3} + 4$

9) $3\sqrt{5} - 2\sqrt{5} - 5\sqrt{3}$

A) $-4\sqrt{5}$

B) $-\sqrt{5} - 3\sqrt{3}$

C) $\sqrt{5} - 5\sqrt{3}$

D) $-2\sqrt{5}$

E) $-6\sqrt{5} - 3\sqrt{3}$

Write each expression with a rational exponent.

10) $\sqrt[4]{10a}$

A) $(4a)^{\frac{2}{3}}$

B) $(10a)^{\frac{1}{4}}$

C) $a^{\frac{4}{5}}$

D) $a^{\frac{5}{6}}$

E) $(4a)^{\frac{5}{3}}$

11) $\sqrt{3x}$

A) $(6x)^{\frac{4}{3}}$

B) $(2x^3)^{\frac{1}{6}}$

C) $(3x)^{\frac{1}{2}}$

D) $(3x)^{\frac{3}{5}}$

E) $(7x)^{\frac{5}{2}}$

Write each expression in radical form.

12) $(v^2)^{\frac{3}{2}}$

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

B) $(\sqrt{v})^3$

C) $\sqrt[4]{v^3}$

D) v^3

E) $(\sqrt[4]{5v})^5$

Simplify.

13) $\sqrt[5]{128x^6}$

A) $3x\sqrt[5]{3x^2}$

B) $2\sqrt[5]{7x^4}$

C) $2\sqrt[5]{6x^4}$

D) $4\sqrt[5]{4x^4}$

E) $2x\sqrt[5]{4x}$

14) $\sqrt{128x^4y^3}$

A) $2x\sqrt{3y}$

B) $8y^2x\sqrt{3}$

C) $12xy\sqrt{2y}$

D) $8x^2y\sqrt{2y}$

E) $6y^2\sqrt{7x}$

Simplify. Your answer should contain only positive exponents.

15) $2v^2 \cdot 3u^{-1}v^{-4}$

A) $12v^4$

B) $\frac{6}{uv^2}$

C) $\frac{4u^3}{v^3}$

D) $8uv^4$

Factor each completely.

16) $27m^3 + 8$

A) $(3m + 2)(9m^2 - 6m + 4)$

B) $(3m + 2)^3$

C) $(3m - 2)(3m + 2)^2$

D) $(3m - 2)(9m^2 + 6m + 4)$

E) $(3m + 2)(3m - 2)^2$

17) $n^2 + 7n - 18$

A) $(n + 2)(n - 9)$

B) $(n + 2)(n + 9)$

C) $(n - 2)(n + 9)$

D) $(n - 2)(n - 9)$

E) $(n + 3)(n - 6)$

Evaluate each function.

18) $p(x) = -4x - 2$; Find $p(-1)$

A) 34

B) -18

C) 14

D) 2

E) -38

Perform the indicated operation.

19) $h(x) = -2x - 4$

$g(x) = x^3 - 4x$

Find $(h - g)(x)$

A) $x^3 - 2x + 4$

B) $-2x + 5$

C) $-x^3 + 2x - 4$

D) $x^3 - 2x - 4$

E) $-x - 9$

20) $f(n) = n^2 + 5$

$g(n) = -3n + 3$

Find $(f \cdot g)(n)$

A) $-3n^3 + 3n^2 - 15n + 15$

B) $3n^3 + 3n^2 + 15n + 15$

C) $3n^2 + 2n - 1$

D) $n^4 - 2n^3 + n^2$

E) $-3n^3 - 4n^2 + 15n + 20$

Solve each equation.

21) $\left| \frac{29}{10}b \right| = \frac{87}{20}$

A) $\left\{ \frac{1}{28}, -\frac{7}{4} \right\}$

B) $\left\{ \frac{3}{2} \right\}$

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

D) $\left\{ 2, -\frac{17}{2} \right\}$

E) $\left\{ \frac{9}{4}, 2 \right\}$

Solve each equation. Remember to check for extraneous solutions.

22) $-3 + \sqrt{7x + 81} = x$

A) $\{9\}$

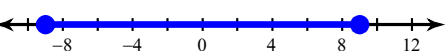
B) $\{10, 9\}$

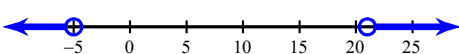
C) $\{10, -3\}$

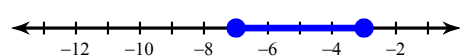
D) $\{9, -3\}$

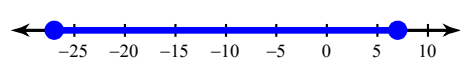
Solve each inequality and graph its solution.

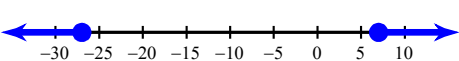
23) $|a + 10| \leq 17$

A) $-9 \leq a \leq 9$: 

B) $a > 21$ or $a < -5$: 

C) $-7 \leq a \leq -3$: 

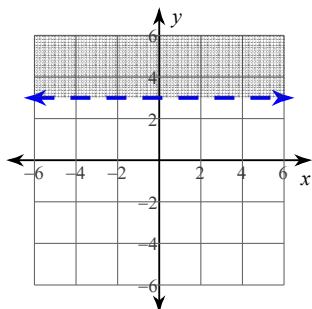
D) $-27 \leq a \leq 7$: 

E) $a \geq 7$ or $a \leq -27$: 

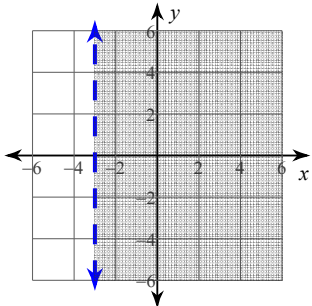
Sketch the graph of each linear inequality or systems of inequalities.

24) $x < 3$

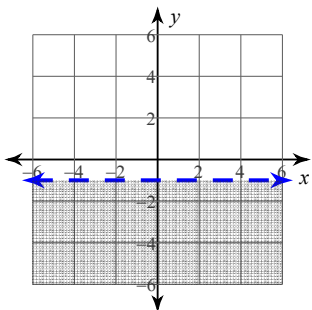
A)



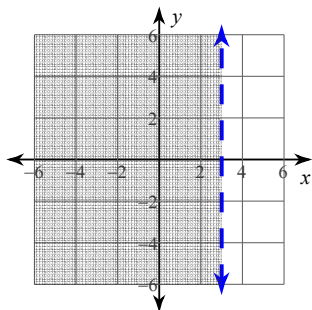
B)



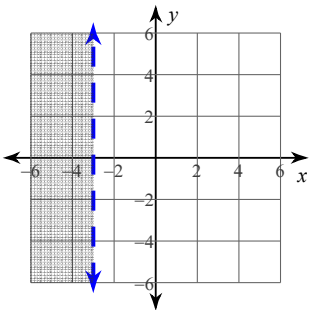
C)



D)



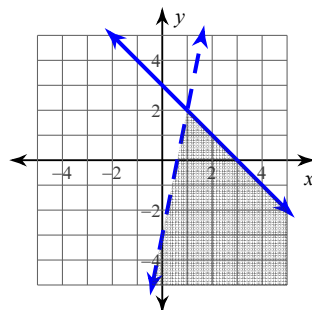
E)



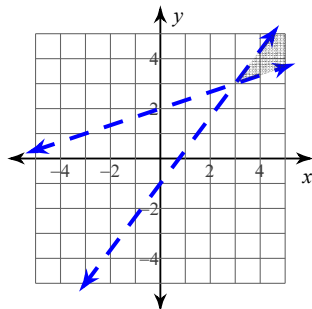
25) $y \leq -x + 3$

$y < 5x - 3$

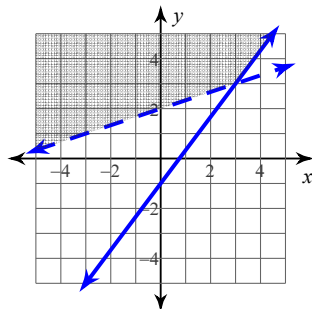
A)



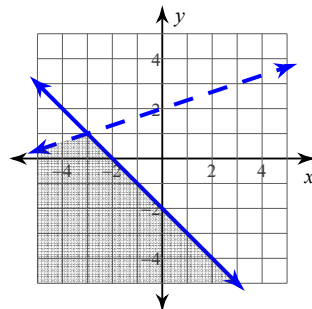
B)



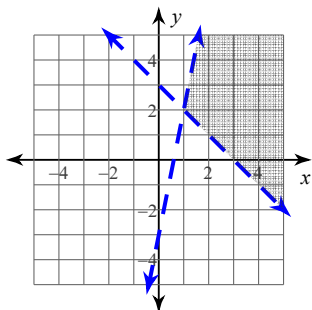
C)



D)



E)



Simplify.

26) $\frac{7}{10 + 9\sqrt{3}}$

A) $\frac{-56 + 63\sqrt{3}}{179}$

B) $\frac{-2 + 2\sqrt{3}}{5}$

C) $\frac{-70 + 63\sqrt{3}}{143}$

D) $\frac{-1 + \sqrt{3}}{3}$

E) $\frac{-7 + 7\sqrt{3}}{20}$

Solve each system algebraically.

27) $8x + 3y = -18$
 $-10x + y = -6$

A) $(-3, 6)$

B) $(0, -6)$

C) $(-3, -6)$

D) $(-6, -3)$

E) $(-1, -3)$

28) $x - y = 0$
 $2x - 2y = 0$

A) $(1, -1)$

B) $(5, -5)$

C) No solution

D) Infinite number of solutions

E) $(1, -5)$

29) Sarina has four times as many dimes as nickels, and five more quarters than nickels. If the value of her coins is \$7.55, how many coins does she have?

A) 33 coins

B) 38 coins

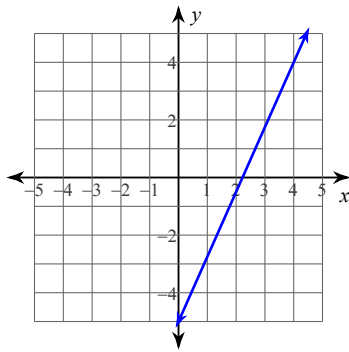
C) 44 coins

D) 45 coins

E) 59 coins

Match the correct function with the given graph.

30)



- A) $y = \frac{9}{4}x - 5$ B) $y = -x + 5$
 C) $y = -x - 5$ D) $y = 5x - 1$
 E) $y = -5x - 1$

Simplify.

31) $\frac{4i}{1+2i}$

- A) $\frac{3-6i}{5}$ B) $\frac{12-8i}{13}$
 C) $\frac{4i+2}{5}$ D) $\frac{2i}{3}$
 E) $\frac{4i+8}{5}$

32) $(1-2i)(-8+7i)$

- A) $4+27i$ B) $-22+9i$
 C) $6+23i$ D) $7+21i$
 E) $-6+23i$

33) $(3i) - (6+5i) + 7$

- A) $-13-8i$ B) $-20+3i$
 C) $13-2i$ D) $1-2i$
 E) $9+3i$

34) The y-values or output values of a function are known as the:

- A) range
 B) domain
 C) relations
 D) dependent variables
 E) umm, whatzicallsit

Simplify.

35) $x^3y^2 \cdot (x^3y^4)^4$

- A) $16x^{24}y^{24}$ B) $8yx^9$
 C) $x^{15}y^{18}$ D) $4x^2y^{12}$
 E) $32x^{12}y^8$

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

- A) $\frac{2y^3}{3x^6}$ B) $3x^6y^9$
 C) $\frac{y^4}{2x^7}$ D) $4x^9y^3$

Identify the vertex and axis of symmetry of each.

37) $y = -3x^2 + 18x - 23$

- A) Vertex: $(-6, 1)$
Axis of Sym.: $y = 1$
- B) Vertex: $(3, 4)$
Axis of Sym.: $y = 4$
- C) Vertex: $(3, 4)$
Axis of Sym.: $x = 3$
- D) Vertex: $(3, -4)$
Axis of Sym.: $y = -4$
- E) Vertex: $(-4, -3)$
Axis of Sym.: $y = -3$

Simplify. Write "undefined" for expressions that are undefined.

38) $\begin{bmatrix} -3 & 5 \\ -4 & -3 \\ 2 & -6 \end{bmatrix} - \begin{bmatrix} 1 & 2 \\ 2 & -4 \\ 2 & 1 \end{bmatrix}$

- A) $\begin{bmatrix} -4 & 4 \\ -9 & 1 \\ 0 & -7 \end{bmatrix}$
- B) $\begin{bmatrix} 0 & 7 \\ -3 & -7 \\ 2 & -5 \end{bmatrix}$
- C) $\begin{bmatrix} -4 & 3 \\ -6 & 1 \\ 0 & -9 \end{bmatrix}$
- D) $\begin{bmatrix} -4 & 3 \\ -6 & 1 \\ 0 & -7 \end{bmatrix}$

39) $3 \begin{bmatrix} 3 \\ -2 \end{bmatrix}$

- A) $\begin{bmatrix} -9 \\ 6 \end{bmatrix}$
- B) $\begin{bmatrix} 9 \\ -6 \end{bmatrix}$
- C) $\begin{bmatrix} 9 \\ 6 \end{bmatrix}$
- D) $\begin{bmatrix} -9 \\ -6 \end{bmatrix}$

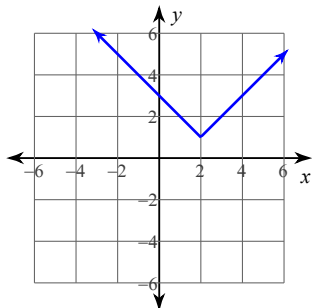
40) $\begin{bmatrix} -5 & -1 \\ 6 & -2 \\ 6 & -2 \end{bmatrix} \cdot \begin{bmatrix} -6 & -5 \\ 0 & 4 \\ -1 & -1 \end{bmatrix}$

- A) $\begin{bmatrix} -6 & -1 \\ 0 & -1 \\ 4 & -12 \end{bmatrix}$
- B) $\begin{bmatrix} -2 & 0 \\ 0 & 4 \\ -8 & -5 \end{bmatrix}$
- C) $\begin{bmatrix} -6 & -1 \\ -5 & 13 \\ 0 & -1 \end{bmatrix}$
- D) Undefined

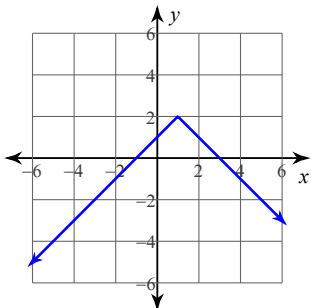
Graph each equation.

41) $y = |x - 2| + 1$

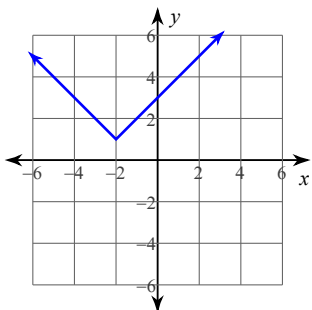
A)



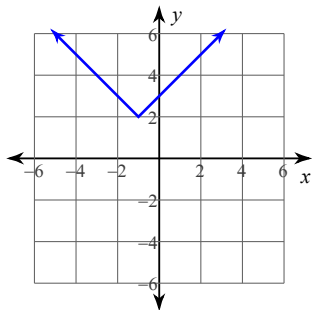
B)



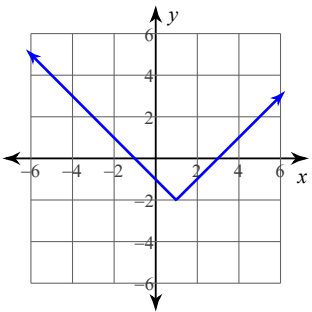
C)



D)



E)



Answers to SAMPLE Fall Semester Final (ID: 1)

- | | | | |
|-------|-------|-------|-------|
| 1) B | 2) E | 3) B | 4) E |
| 5) C | 6) C | 7) A | 8) C |
| 9) C | 10) B | 11) C | 12) D |
| 13) E | 14) D | 15) B | 16) A |
| 17) C | 18) D | 19) C | 20) A |
| 21) C | 22) A | 23) D | 24) D |
| 25) A | 26) C | 27) B | 28) D |
| 29) E | 30) A | 31) E | 32) C |
| 33) D | 34) A | 35) C | 36) A |
| 37) C | 38) D | 39) B | 40) D |
| 41) A | | | |