

## Practice Final Exam

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

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

- A)  $3x^3y^2$       B)  $\frac{3y^3}{x^2}$   
 C)  $\frac{9y^5}{x^3}$       D)  $\frac{3y^7}{x^2}$

2)  $\frac{m^3n^4}{4n^2}$

- A)  $\frac{3m^4n^7}{4}$       B)  $\frac{2m^3}{n^4}$   
 C)  $\frac{m^3n^2}{4}$       D)  $\frac{1}{m^3n^3}$

3)  $(u^4v^3)^3$

- A)  $\frac{8}{u^{12}v^6}$       B)  $\frac{1}{4v^8}$   
 C)  $u^{12}v^9$       D)  $\frac{16v^{16}}{u^{12}}$

4)  $(4v^2)^2$

- A)  $16v^4$       B)  $\frac{1}{u^2v^8}$   
 C)  $u^8v^8$       D)  $\frac{1}{4uv^2}$

5)  $(uv^{\frac{5}{3}})^2$

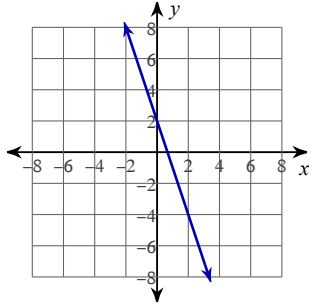
- A)  $\frac{u^{\frac{2}{3}}v^{\frac{1}{3}}}{u^2v^2}$       B)  $u^{\frac{1}{2}}v^{\frac{1}{2}}$   
 C)  $u^2v^{\frac{10}{3}}$       D)  $\frac{u^{\frac{2}{3}}v^{\frac{2}{3}}}{uv}$

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

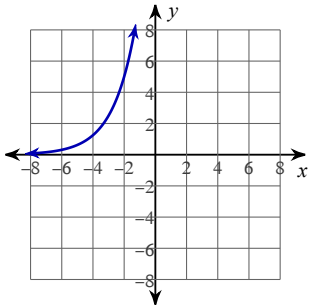
- A)  $\frac{y^{\frac{1}{2}}}{xy}$       B)  $\frac{1}{x^8y^2}$   
 C)  $x^4y^{\frac{10}{3}}$       D)  $y^3x^2$

7) Which of the following represents exponential decay?

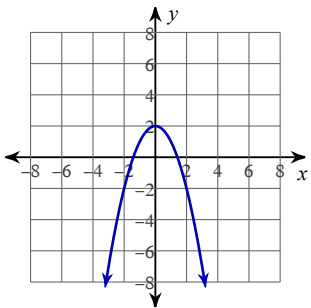
A)



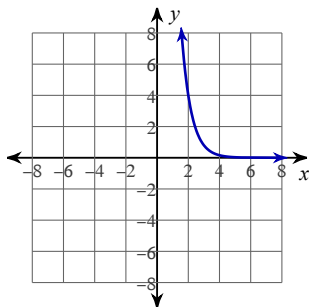
B)



C)

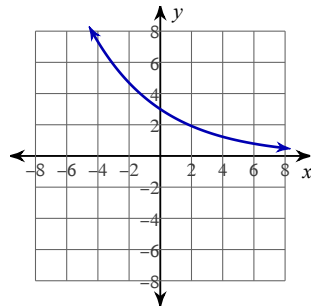


D)

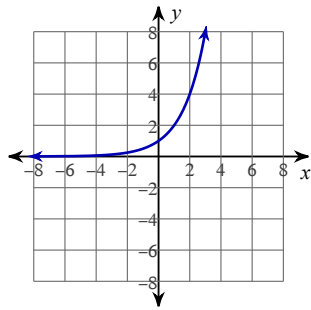


8) Match the function with the graph:  $y = 3x^2$

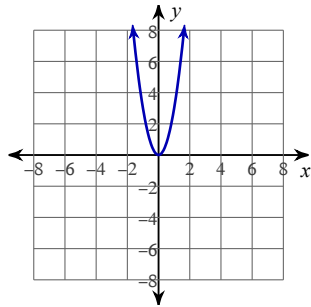
A)



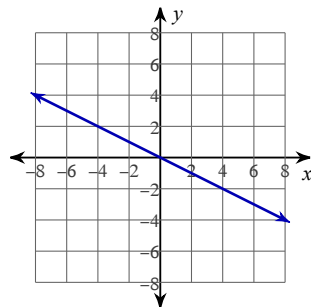
B)



C)



D)



9) Which of the following represents exponential growth?

A)  $y = 2 \cdot 2.5^x$

B)  $y = 4 \cdot 0.5^x$

C)  $y = 100(1 - 0.3)^x$

D)  $y = 0.2^x$

Write each expression in radical form.

10)  $(5n)^{\frac{4}{3}}$

A)  $\sqrt{3n}$

B)  $(\sqrt[5]{n})^7$

C)  $(\sqrt[3]{5n})^4$

D)  $(\sqrt[5]{2n})^6$

11)  $x^{\frac{5}{2}}$

A)  $\sqrt{x}$

B)  $(\sqrt[4]{3x})^5$

C)  $(\sqrt{x})^5$

D)  $(\sqrt[3]{7x})^4$

Simplify.

12)  $(100000m^5)^{\frac{6}{5}}$

A)  $3125m^{15}$

B)  $6m^3$

C)  $1000000m^6$

D)  $5m$

13) Which function represents the following scenario: An item costs \$320, and its price decreases by 3.5% each year.

A)  $y = 320 \cdot 1.035^t$

B)  $y = 320(1 - 0.035)^t$

C)  $y = 1.035 \cdot 3.2^t$

D)  $y = 320(1 + 0.35)^t$

Simplify each sum.

14)  $(6m - 5m^2 + 7) + (5m - 1 - 6m^2)$

A)  $-13m^2 + 11m + 6 - 2m^4$

B)  $-13m^2 + 11m - 1 - 2m^4$

C)  $-11m^2 + 11m + 6 - 2m^4$

D)  $-11m^2 + 11m + 6$

**Simplify each difference.**

15)  $(4n^3 - 4n + 3n^4) - (5n^4 + 5n^3 + 3)$

- A)  $-2n^4 - n^3 - 4n - 5$
- B)  $-2n^4 + 2n^3 - 4n - 5$
- C)  $-8n^4 + 2n^3 - 4n - 5$
- D)  $-2n^4 - n^3 - 4n - 3$

**Find each product.**

16)  $(7x - 5)(8x + 6)$

- A)  $56x^2 + 82x + 30$
- B)  $56x^2 + 2x - 30$
- C)  $3x^2 + 23x - 8$
- D)  $56x^2 - 30$

17)  $(6n + 4)(7n^2 - 4n - 3)$

- A)  $56n^3 + 4n^2 + 9n - 9$
- B)  $42n^3 + 4n^2 - 34n - 12$
- C)  $15n^3 - 16n^2 - 61n - 8$
- D)  $56n^3 + 27n^2 + 17n + 30$

18)  $(x - 1)^2$

- A)  $x^2 - 2x + 1$
- B)  $x^2 + 1$
- C)  $16x^2 + 32x + 16$
- D)  $x^2 - 1$

19)  $(7x + 3)(7x - 3)$

- A)  $49x^2 - 9$
- B)  $36x^2 - 1$
- C)  $49x^2 + 42x + 9$
- D)  $36x^2 - 12x + 1$

**Factor each completely.**

20)  $x^4 + 6x^2 + 5$

- A)  $(x^2 - 5)(x^2 + 1)$
- B) Not factorable
- C)  $(x^2 + 5)(x - 1)(x + 1)$
- D)  $(x^2 + 5)(x^2 + 1)$

21)  $k^2 + 13k + 36$

- A)  $(k + 9)(k - 4)$
- B)  $(k + 9)(k + 4)$
- C)  $(k + 36)(k + 1)$
- D) Not factorable

22)  $5m^2 - 17m + 14$

- A)  $(5m - 7)(m - 2)$
- B)  $(7m + 2)(m - 1)$
- C)  $(m - 7)(5m - 2)$
- D)  $5(m - 7)(m + 2)$

23)  $b^2 - 16$

- A)  $(b + 4)(b - 4)$
- B)  $(b + 16)^2$
- C)  $(b + 5)(b - 5)$
- D) Not factorable

24)  $25n^2 - 10n + 1$

- A) Not factorable
- B)  $(5n - 1)^2$
- C)  $(4n + 3)^2$
- D)  $(5n + 1)(5n - 1)$

25)  $2x^4 + 16x^2 + 14$

- A)  $2(x^2 - 7)(x^2 + 1)$
- B)  $2(x^2 + 1)(x^2 + 7)$
- C) Not factorable
- D)  $2(x^2 - 8)(x^2 + 16)$

**Solve the factored equation.**

26)  $(5k + 2)(3k + 1) = 0$

- A)  $\left\{\frac{1}{4}, -2\right\}$
- B)  $\left\{-\frac{2}{5}, -\frac{1}{3}\right\}$
- C)  $\left\{\frac{2}{5}, \frac{7}{8}\right\}$
- D)  $\{-4, -7\}$

**Solve each equation by factoring.**

27)  $x^2 + 5x - 6 = 0$

- A)  $\{1, -6\}$
- B)  $\{1, -3\}$
- C)  $\{-6, -4\}$
- D)  $\{-1, -7\}$

28)  $r^2 + 13r + 42 = 0$

- A)  $\{-6, -7\}$
- B)  $\{4, 2\}$
- C)  $\{-7, 3\}$
- D)  $\{-6, 1\}$

$$29) n^2 - 2n - 48 = 0$$

$$A) \{5, 6\}$$

$$B) \{8, -6\}$$

$$C) \{-1, 2\}$$

$$D) \{2, -8\}$$

$$30) x^2 - 7x + 10 = 0$$

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

$$B) \{1, 4\}$$

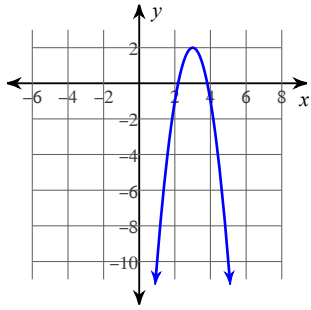
$$C) \{-2, -4\}$$

$$D) \{2, 5\}$$

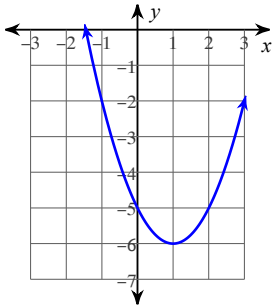
Sketch the graph of the function.

31)  $y = \frac{1}{2}x^2 + 4x + 6$

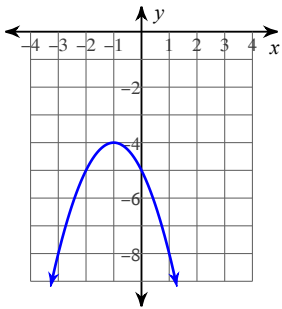
A)



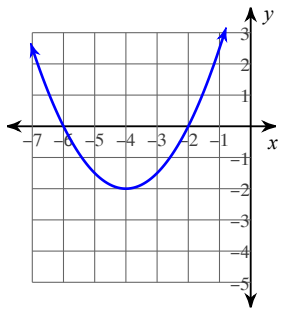
B)



C)



D)

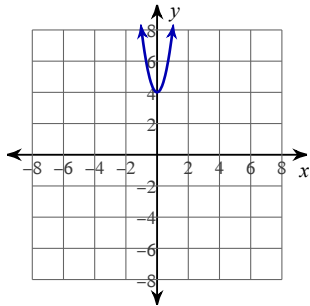


- 32) A firework is launched into the air from a height of 4 feet with an upward velocity of 130 ft per second. Its height,  $h$ , (in feet) after  $t$  seconds is given by the function  $h(t) = -16t^2 + 130t + 4$ . How high is the firework at 6 seconds?
- A) 268.06 *ft*      B) 4 *ft*      C) 520 *ft*      D) 208 *ft*
- 33) A firework is launched into the air from a height of 4 feet with an upward velocity of 130 ft per second. Its height,  $h$ , (in feet) after  $t$  seconds is given by the function  $h(t) = -16t^2 + 130t + 4$ . After how many seconds does the ball reach its maximum height? What is the maximum height?
- A) 5.06 sec; 270 ft      B) 4.06 sec; 268.06 ft  
C) 4 sec; 130 ft      D) 2.578 sec; 167.28 ft
- 34) State the domain and range of the function  $f(x) = 2^x + 2$
- A) Domain: All real numbers; Range:  $y \leq 0$   
B) Domain: All real numbers; Range:  $y \geq 2$   
C) Domain: All real numbers; Range:  $y < 0$   
D) Domain: All real numbers; Range:  $y > 2$

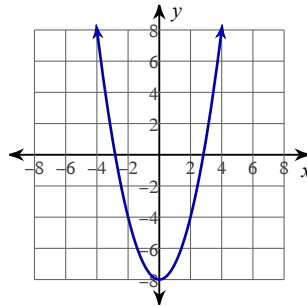


35) Which graph below is the graph of the function  $y = 4x^2 - 4$ ? What are the solutions (zeros) of the function  $y = 4x^2 - 4$ ?

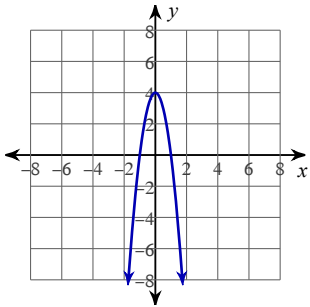
A) There are no real solutions.



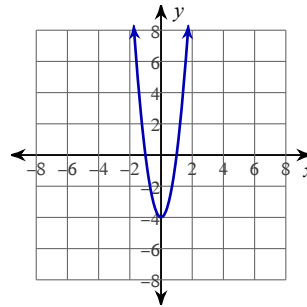
B) There are two solutions: 3 and -3



C) There are two solutions: 1 and -1



D) There are two solutions: 1 and -1



36) Compare the graph of  $g(x) = 3x^2 + 1$  to the graph of  $f(x) = x^2$

- A)  $g(x)$  is wider than  $f(x)$ , translated down 1 unit.
- B)  $g(x)$  is wider than  $f(x)$ , translated up 1 unit.
- C)  $g(x)$  is narrower than  $f(x)$ , translated up 1 unit.
- D)  $g(x)$  is narrower than  $f(x)$ , translated down 1 unit.

37) How can the graph of  $g(x) = x^2 + 2$  be obtained from the graph of  $f(x) = x^2$

- A) by translating  $f(x)$  down 2 units
- B) by translating  $f(x)$  up 2 units
- C) by translating  $f(x)$  right 2 units
- D) by translating  $f(x)$  left 2 units

38) Does  $f(x) = -5x^2 + 12x - 3$  have a maximum or a minimum? Find the value?

- A) Maximum; 1.2      B) Minimum; -1.6  
C) Minimum; -0.6      D) Maximum; 1.6

39) Which quadratic function has a vertex  $(-3, -9)$ ?

- A)  $x^2 + 6x + 15$       B)  $x^2 + 6x$   
C)  $x^2 - 3x - 9$       D)  $x^2 - 9x + 9$

40) Which quadratic function has zeros of  $-3$  and  $7$ ?

- A)  $x^2 - 3x + 7$       B)  $x^2 + 3x - 7$   
C)  $x^2 - 4x - 21$       D)  $x^2 + 10x - 21$

## Answers to Practice Final Exam

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

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

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

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