# MA 152: College Algebra for Liberal Arts
# Common Core Final Exam Practice Problems

1. Evaluate: $\left(-\frac{125}{27}\right)^{-2/3}$

   a. 9/25 b. -25/9 c. -9/25 d. -25/9

   **ANS: a**

2. Perform the following operation and express the final answer using positive exponents only: $\frac{-3x^{-2}y^{-4}}{27x^{-4}y^{-5}}$.

   a. $-\frac{1}{9x^2y}$ b. $\frac{1}{9x^2y}$ c. $9x^2y$ d. $-\frac{1}{9}x^2y$

   ANS: d

3. Perform the following: $3(2x-1)-2(3x+2)+5(2x+1)$,

   a. –10x + 2 b. 10x - 2 c. 10x + 2 d. –10x - 2

   **ANS: b**

4. Factor the following polynomial completely: $(2x+y)^2-81$,

   a. (2x - y - 9)( 2x - y + 9) b. (2x + y - 9)( 2x + y + 9)
   c. (-2x + y + 9)( 2x + y + 9) d. (2x - y + 9)( 2x + y + 9)

   **ANS: b**

5. Perform the following operation involving rational expressions. Express your final answers in simplest form: $\frac{x^2-x}{x+4} * \frac{x^2+5x+4}{x^4-x^2}$,

   a. 1/x b. -1/x c. x d. –x

   **ANS: a**

6. Express in simplest radical form. All variables represent positive real numbers: $\sqrt[4]{64x^9y^{17}z^6}$,

   a. $2x^2y^4z\ \sqrt[4]{4xyz^2}$, b. $-2x^2y^4z\ \sqrt[4]{4xyz^2}$,

   c. $2xyz\ \sqrt[4]{4xyz^2}$, d. $2x^2y^2z\ \sqrt[4]{4xyz^2}$,

   **ANS: a**

7. Express in simplest radical form: $\frac{2\sqrt{3}}{2\sqrt{3}-\sqrt{2}}$.

   a. $\frac{6+2\sqrt{6}}{5}$ b. $\frac{6-2\sqrt{6}}{5}$ c. $\frac{6-\sqrt{6}}{5}$ d. $\frac{6+\sqrt{6}}{5}$

   **ANS: d**

**8.** Perform the following operation and express the resulting complex number in standard form: (2 - 6i) - (3 + 4i) + (6 - 7i),

   a. 5-9i b. 5+9i c. 5-17i d. 5+17i

   **Ans.: c**

**9.** Perform the following operation and express the resulting complex number in standard form: $\frac{2 - 6i}{3 + 4i}$,

a. $\frac{18}{25} + \frac{26}{25}i$ b. $\frac{18}{25} - \frac{26}{25}i$ c. $-\frac{18}{25} + \frac{26}{25}i$ d. $-\frac{18}{25} - \frac{26}{25}i$

**ANS: d**

10. Solve the equation: $\frac{2n-5}{5} - 4 = \frac{n-3}{6}$

a. –248/11 b. 96/7 c. 135/7 d. –359/2

**ANS: c**

11. Solve the equation: $(2z-3)(z-3) - 2z(z+5) = 9$

a. 0 b. 1 c. 2 d. -3

**ANS: a**

12. Find three consecutive even integers such that if the largest integer is subtracted from two times the smallest, the result is 6 more than four times the middle integer.

a. -5, -3 and –1 b. -6, -4 and –2
c. -5, -4 and –3 d. -10, -8 and –6

**ANS: b**

13. The sum of two numbers is 104. If the larger is divided by the smaller, the quotient is 5 and the remainder is 2. Find the numbers.
    a. The larger number is 87, the smaller number is 17.
    b. The larger number is 78, the smaller number is 27.
    c. The larger number is 79, the smaller number is 26.
    d. The larger number is 86, the smaller number is 18.

**ANS: a**

14. Solve an equation $\frac{3}{a-18} - \frac{1}{a-6} = \frac{1}{2a-36}$

a. –2 b. 34 c. –26 d. –22

**ANS: a**

15. Solve the following quadratic equation by using the method that seems most appropriate to you: $2t^2 - 3t + 6 = 0$

a. $\frac{-3 \pm i\sqrt{39}}{4}$ b. $\frac{39 \pm i\sqrt{3}}{4}$ c. $\frac{-39 \pm i\sqrt{3}}{4}$ d. $\frac{3 \pm i\sqrt{39}}{4}$

**ANS: d**

16. Find two consecutive even whole numbers whose product is 624.

a. 24 and 26 b. 26 and 28
c. 32 and 34 d. 20 and 22 e. 18 and 20

**ANS: a**

17. Use the quadratic formula to solve the equation: $x^2 + 6x - 3 = 0$

a. $6 \pm 2\sqrt{3}$ b. $-3 \pm 2\sqrt{3}$ c. $3 \pm 2\sqrt{3}$ d. $-6 \pm 2\sqrt{3}$

**ANS: b**

18. How many liters of a 40% acid solution must be added to 6 liters of a 20% acid solution to produce 25% acid solution?

a. 13 liters b. 2 liters c. 3 liters d. 20 liters

**ANS: b**

19. Solve the equation: $\sqrt{5a-9}-\sqrt{a-1}=0$

a. 0 b. 5 c. no solution d. 2 e. 1

**ANS: d**

20. Solve the conjunction by using compact form and express the solution set in interval notation: $-7 \le 3y+8<17$

a. (-7, 1) b. [-7, 1] c. (-5, 3] d. [-5, 3)

**ANS: d**

21. Solve the inequality and express the solution set in interval notation: $49t^2-84t+36>0$

a. $(-\infty,\infty)$ b. $(-\infty,6/7)\cup(6/7,\infty)$

c. $(-\infty,-6/7)\cup(6/7,\infty)$ d. $(-\infty,6)\cup(7,\infty)$

**ANS: b**

22. Solve the equation: $|2a-7|=-1$

a. 4, -3 b. 4, 3 c. –4, -3 d. no solution e. -4, 3

ANS: d

23. Find the coordinate of the point two-thirds of the distance from 3 to -9.

a. -5 b. -1 c. 11 d. -6

**ANS: a**

24. Given points A(-2,-1), B(7,11). Find AB.

a. $\sqrt{63}$ b. $13\frac{1}{2}$ c. 15 d. $5\sqrt{5}$

**ANS: c**

25. Which of the following is an equation of a line with a slope of $\frac{1}{5}$ and a y-intercept of 3?

a. $y=-\frac{1}{5}x+3$ b. $y=\frac{1}{5}x-3$ c. $y=-\frac{1}{5}x-3$ d. $y=\frac{1}{5}x+3$

**ANS: d**

26. Which of the following equations has a graph that is a horizontal line through the point (-5,2)?

a. $y=-5$ b. $x=-5$ c. $y=2$ d. $x=2$

ANS: c

27. Which of the following inequalities has a graph that contains the origin?

a. $y<-x-1$ b. $2x+3y<6$ c. $y<3x-2$ d. $x+2y>4$

**ANS: b**

28. Find the slope of the line determined by the pair of points (1, 4) and (10, 12).

a. $-\frac{9}{8}$ b. $-\frac{8}{9}$ c. $\frac{9}{8}$ d. $\frac{8}{9}$

**ANS: d**

29. Which of the following is an equation of a line with a slope of $\frac{3}{5}$ and containing the point (-1,4).

a. $3x-5y=-23$ b. $3x-5y=17$ c. $5x-3y=-17$ d. $5x+3y=-8$

**ANS: a**

30. Determine the point that is symmetric to the point $(-3,5)$ with respect to the x-axis.

a. $(3,5)$ b. $(3,-5)$ c. $(-3,-5)$ d. $(-3,5)$

**ANS: c**

31. Determine the type of symmetry possessed by the graph of the equation $x^2 + 4y^2 = 4$.

a. x-axis only. b. x-axis, y-axis, and origin.
c. Origin only d. y-axis only

**ANS: b**

32. Determine the domain of the function $f(x) = \sqrt{11x - 1}$

a. D = {x | x is any real number} b. D = {x | x ≥ 0}
c. D = {x | x ≥ -1/11} d. D = {x | x ≥ 1/11}

**ANS: d**

33. Find $\dfrac{f(a+h) - f(a)}{h}$ for $f(x) = \dfrac{1}{x-5}$

a. $-\dfrac{1}{(a-5)^2}$ b. $-\dfrac{1}{(a+h-5)(a-5)}$

c. $\dfrac{1}{(a-5-h)^2}$ d. $\dfrac{1}{(a-h-5)(a-5)}$

**ANS: b**

34. Find f(4), f(1/2) and f(104) if $f(x) = \sqrt{2x+8}$

a. f(4) = 6, f(1/2) = 0, $f(104) = 7\sqrt{2}$ b. f(4) = 4, f(1/2) = 3, $f(104) = 6\sqrt{6}$
c. f(4) = 1, f(1/2) = 3, $f(104) = 5\sqrt{2}$ d. f(4) = 5, f(1/2) = 3, $f(104) = 5\sqrt{6}$

**ANS: b**

35. Determine whether $f(x)$ is even, odd, or neither even nor odd $f(x) = x^9$

a. The function is odd. b. The function is not defined.
c. The function is even. d. The function is neither even nor odd.

**ANS: a**

36. Find f(2), f(8), f(0), f(-3) if $f(x) = \begin{cases} 7, & for \quad x < 0 \\ x^2 + 1, & for \quad 0 \le x \le 3 \\ -4, & for \quad x > 3 \end{cases}$

**ANS:** 5, –4, 1, 7

37. The linear depreciation method assumes that an item depreciates the same amount each year. Suppose a new piece of machinery costs $36,500 and it depreciates $2,000 every year. Find the value of the machinery after 4 years.

a. $32,600 b. $26,000
c. $24,800 d. $28,500

**ANS: d**

38. Determine an equation of the function whose graph is a line that is parallel to the line $g(x) = -4x - 3$ and passes through the point ( 1, 6 ).

a. f(x) = 4x –10 b. f(x) = -4x +10
c. f(x) = -4x –10 d. f(x) = 4x +10

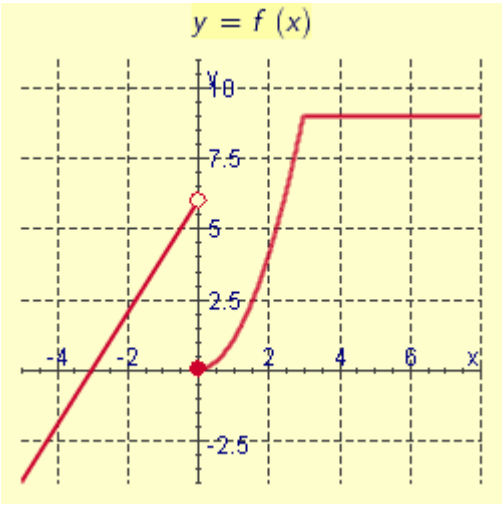
**ANS: b**

39. The Rent-Me Car Rental Company charges $15 per day plus $0.31 per mile to rent a car. Determine an equation for the linear function that can be used to calculate daily car rentals. Then use that function to determine the cost of renting a car for a day and driving 180 miles.
a. $70.80 b. $92.90
c. $60.75 d. $105.05

**ANS: a**

40. The piecewise-defined function is given below. Is the graph below the graph of this function? (True or false)

$$f(x) = \begin{cases} 2x + 6 & \text{if } x \le 0 \\ x^2 & \text{if } 0 < x < 3 \\ 9 & \text{if } x \ge 3 \end{cases}$$




**ANS: F**

41. The height of a projectile fired vertically into the air (neglecting air resistance) at an initial velocity of 160 feet per second is a function of time, *x*, and is given by the equation $f(x) = 160x - 16x^2$

Find the highest point reached by the projective?
a. 459 feet b. 400 feet
c. 329 feet d. 72 feet

**ANS: b**

42. Two hundred and forty meters of fencing is available to enclose a rectangular playground. What should be the dimensions of the playground to maximize the area?
a. 50 meters by 70 meters b. 35 meters by 85 meters
c. 55 meters by 65 meters d. 60 meters by 60 meters

**ANS: d**

43. Suppose that the equation $p(x) = -5x^2 + 600x + 1000$ (where *x* represents the number of items sold), describes the profit function for a certain business. How many items should be sold to maximize the profit?
a. 40 items b. 10 items c. 60 items d. 155 items

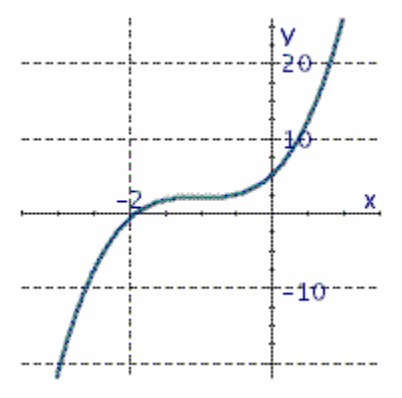
**ANS: c**

44. Find the *x* intercepts and the vertex of this parabola $f(x) = 2x^2 - 28x + 96$
a. (12, 0) and (14, 0); (13, 4) b. (13, 0) and (15, 0); (14, 5)
c. (6, 0) and (8, 0); (7, -2) d. (10, 0) and (12, 0); (11, 2)

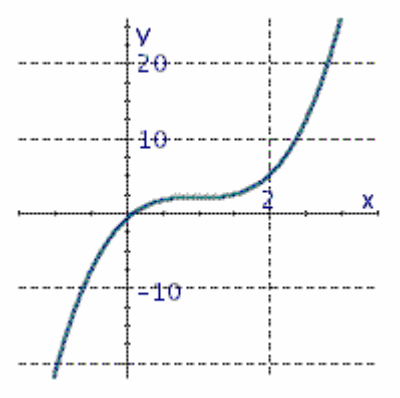
**ANS: c**

45. Which of the following graphs is the graph of the function $f(x) = 3(x-1)^3 - 2$

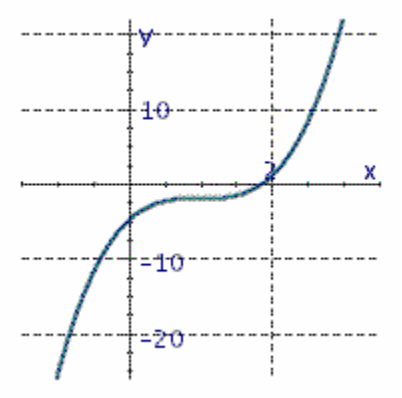
a.



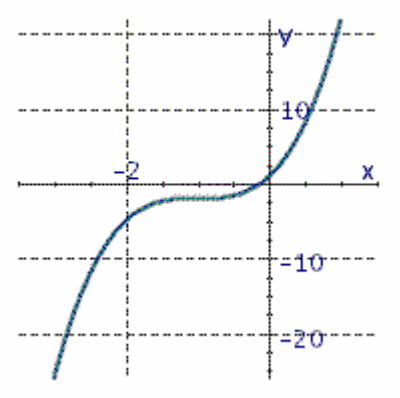

c.




b.




d.




**ANS: b**

46. Find (f o g)(4) and (g o f)(4) if $f(x) = \sqrt{x}$, $g(x) = 4x - 3$

a. $\sqrt{23}$ and 9 b. 25 and 4 4 and 3 d. $\sqrt{13}$ and 5

**ANS: d**

47. Find $f + g$. if $f(x) = 8x - 7$, $g(x) = 4x + 8$.

a. (f + g)(x) = 12x – 1
b. (f + g)(x) = -12x
c. (f + g)(x) = -12x + 8
d. (f + g)(x) = 12x + 1

**ANS: d**

48. Find the inverse of the function $f(x) = x^3 - 6$

a. $g(x) = \dfrac{1}{x^3 - 6}$
b. $g(x) = \sqrt[3]{x + 6}$
c. $g(x) = \sqrt[3]{x} + 6$
d. $g(x) = x^3 + 6$

**ANS: b**