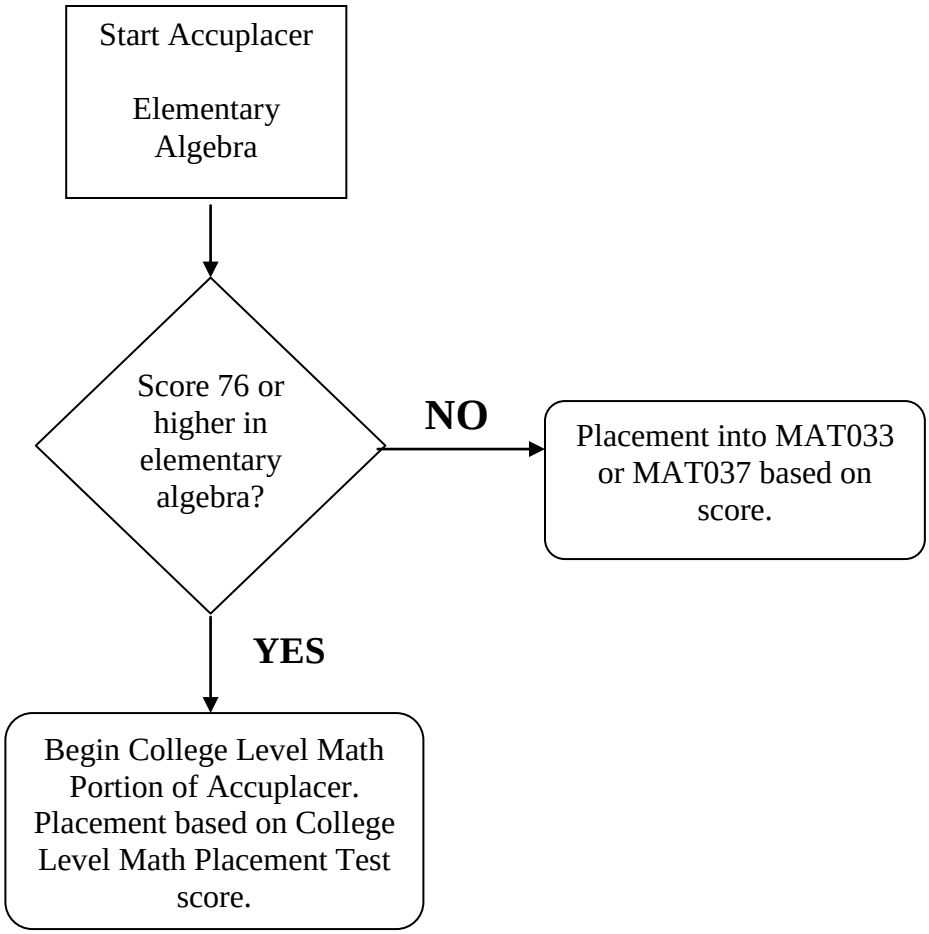
MERCER County Community College

# COLLEGE LEVEL MATHEMATICS PRETEST

This pretest is designed to give you the opportunity to practice the types of problems that appear on the college-level mathematics placement test. An answer key is provided so that you may check your answers. The questions consist of algebra and trigonometry problems.

The Accuplacer Test is an adaptive test. Depending on your answers to each question, you may find that you will be tested on some or all of the material in this packet.

The mathematics placement testing includes elementary algebra to start. If you score a 76 or higher on elementary algebra questions, Accuplacer will automatically continue into college-level mathematics questions. Once you begin answering these questions, your placement is based on your score in this portion of the exam.



1. $-2x(x+3)-(x+1)(x-2)=$
   a. $-x^2-7x-2$.
   b. $-x^2+5x+2$.
   c. $-3x^2-7x+2$.
   d. $-3x^2-5x+2$.
   e. $-3x^2+5x-2$.

2. $\frac{x}{x+2}-\frac{7}{x-2}=$
   a. $\frac{x-7}{x+2}$.
   b. $\frac{x+7}{x+2}$.
   c. $\frac{x^2-9x-14}{x^2-4}$.
   d. $\frac{x^2-9x+14}{x^2-4}$.
   e. $\frac{x-7}{4}$.

3. $\sqrt[3]{x^2}=$
   a. $x^{\frac{2}{3}}$. b. $x^{-3}$. c. $x^{\frac{3}{2}}$. d. $x^{-6}$. e. $x^6$.

4. $\frac{5^{-2}x^{-1}}{x^4y^2}=$
   a. $\frac{1}{25x^3y^2}$.
   b. $\frac{1}{10x^5y^2}$.
   c. $\frac{25x^5}{y^2}$.
   d. $\frac{10}{x^3y^2}$.
   e. $\frac{1}{25x^5y^2}$.

5. $(64)^{-\frac{1}{2}} =$

a. 8. b. $-4$. c. $-\frac{1}{8}$. d. $\frac{1}{8}$. e. $\frac{1}{4}$.

6. If $\sqrt[3]{x}+a=b$, then $x=$

a. $(b-a)^3$.
b. $(a-b)^3$.
c. $b^3-a^3$.
d. $a^3-b^3$.
e. $\sqrt[3]{b-a}$.

7. $\dfrac{\frac{1}{x}-\frac{1}{y}}{y^2-x^2} =$

a. $xy(x+y)$.
b. $\dfrac{1}{xy(x+y)}$.
c. $\dfrac{1}{-(x^3+y^3)}$.
d. $y-x$.
e. $\dfrac{1}{x+y}$.

8. $|2x+7| \le 1$ is equivalent to which of the following?

a. $x \le -3$
b. $x \le 3$
c. $3 \le x \le 4$
d. $-4 \le x \le -3$
e. $0 \le x \le 3$

9. $a^{\frac{2}{3}} \cdot a^{\frac{1}{4}} =$

a. $a^{\frac{1}{6}}$. b. $a^{\frac{2}{7}}$. c. $a^{\frac{11}{12}}$. d. $a^{\frac{1}{4}}$. e. $a^{\frac{3}{7}}$.

10. In the figure below, if the length of AB is 10, find the length of AD.

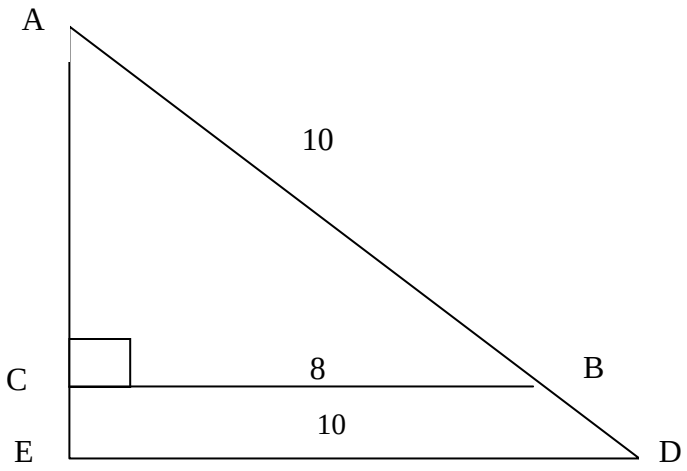
a. $11\frac{3}{8}$

b. $11\frac{3}{4}$

c. 12

d. $12\frac{1}{4}$

e. $12\frac{1}{2}$




11. One solution of the equation $x^2 + 7x - 2 = 0$ is

a. $\frac{7+\sqrt{41}}{2}$.

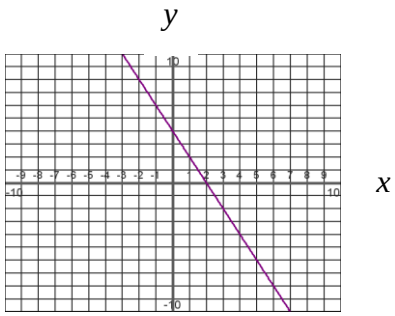
b. $\frac{7-\sqrt{41}}{2}$.

c. $\frac{7+\sqrt{57}}{2}$.

d. $\frac{-7+\sqrt{41}}{2}$.

e. $\frac{-7-\sqrt{57}}{2}$.

12. What is the slope of the line shown? You may assume that each tick mark represents one unit.




a. –2 b. $-\frac{1}{2}$ c. 1 d. 2 e. $\frac{1}{2}$

13. If $f(x)=4x-2$, then $f(x-1)=$

a. $4x^2-6x+2$.
b. $4x^2+2x+2$.
c. $4x+2$.
d. $4x-6$.
e. $4x-1$.

14. The graph of which of the following equations is a line parallel to the graph of $x-5y=8$?

a. $x+5y=8$
b. $5x-y=8$
c. $2x+10y=8$
d. $2x-10y=8$
e. $10x-2y=8$

15. If $z=\dfrac{x-8}{2x}$, then $x=$

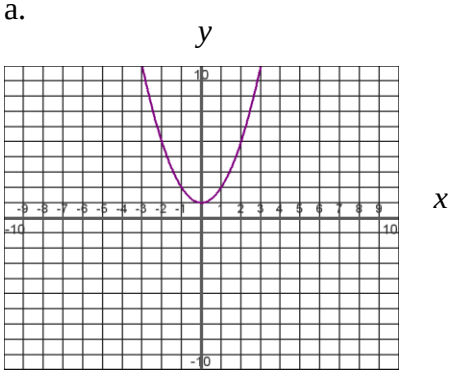
a. $\dfrac{8}{1-2z}$.
b. $\dfrac{8}{2z-1}$.
c. $\dfrac{z-8}{2}$.
d. $\dfrac{z+8}{2}$.
e. $2z-1$.

16. If $\sqrt{x+b}=a$, then $x=$

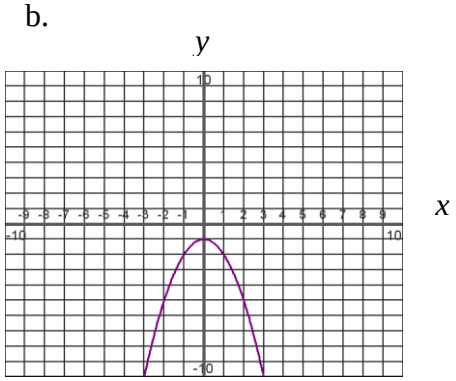
a. $a-b^2$.
b. $a-\sqrt{b}$.
c. $a^2-b$.
d. $a^2+b$.
e. $a+\sqrt{b}$.

17. Which of the following could represent the graph of $y = -x^2 - 1$? You may assume that each tick mark represents one unit.

a.




b.

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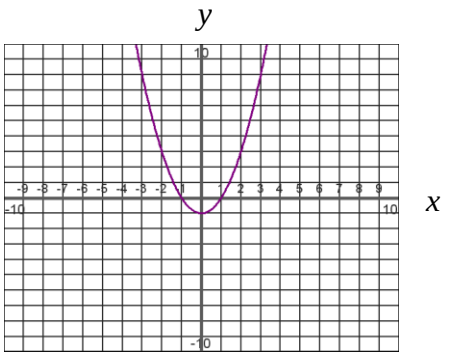
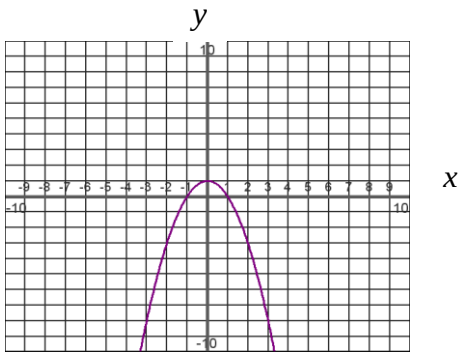
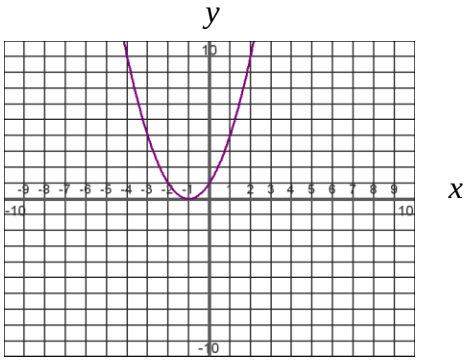



d.




e.

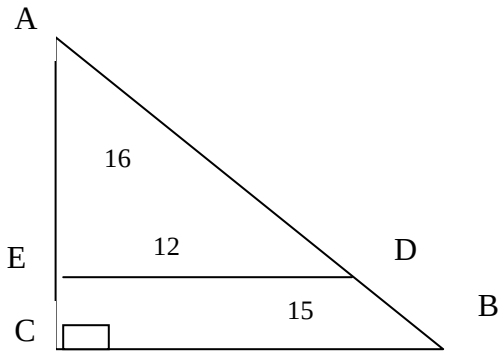


18. If $\frac{1}{r+s}=\frac{1}{t}$, then $s=$

a. $t-r$.
b. $r-t$.
c. $\frac{rt}{t-r}$.
d. $\frac{rt}{r-t}$.
e. $\frac{1}{t-r}$.

19. In the figure below, if the length of $AE=16$, find the length of $EC$.

a. 21
b. $5\frac{2}{3}$
c. 5
d. $4\frac{1}{2}$
e. 4




20. The graph of $\frac{(x-2)^2}{16}-\frac{(y-1)^2}{25}=1$ is which of the following?

a. circle
b. ellipse
c. hyperbola
d. parabola
e. two intersecting lines

21. A parent rewards a child with 50 cents for each correctly solved mathematics problem and fines the child 30 cents for each incorrectly solved problem. If the child nets $22.00 after 100 problems. How many problems were solved correctly?

a. 30 b. 35 c. 45 d. 53 e. 65

22. If $3^{x+5}=\frac{1}{27}$, then $x=$

a. $-10$. b. $-8$. c. $-6$. d. $-2$. e. 1.

23. If $x \geq 0$, then $\sqrt{x^4 - 6x^2 + 9} =$

a. $x^2 - \sqrt{6x} + 3$.
b. $x^2 + \sqrt{6x} + 3$.
c. $\left|x^2 - 3\right|$.
d. $\left(x^2 + 3\right)\sqrt{-6x^2}$.
e. $x^2\sqrt{6x + 9}$.

24. If $\log_3 81 = x$, then $x =$

a. 2.
b. 4.
c. 6.
d. 12.
e. 27.

25. If $\log_2\left(\frac{1}{128}\right) = x$, then $x =$

a. $-7$.
b. $\frac{1}{7}$.
c. $-\frac{1}{7}$.
d. 7.
e. 64.

26. If $\log 5 = 0.6990$ and $\log 3 = 0.4771$, then $\log 45 =$

a. 0.93755.
b. 0.58881.
c. 2.3524.
d. 2.1303.
e. 1.6532.

27. If $\log x = 3\log a + \log b$, then $x =$

a. $(ab)^3$.
b. $3a + b$.
c. $3ab$.
d. $a^3b$.
e. $\frac{a^3}{b}$.

28. If $2^{1.5894} = 3$, then $2^{4.5894} =$

a. 18. b. 24. c. 28. d. 30. e. 31.

29. Given that $\log_b\left(N^4\right) = 8$, then $\log_b\left(\frac{1}{N}\right) =$

a. $-2$.
b. $\frac{1}{2}$.
c. $\sqrt[4]{8}$.
d. $\frac{1}{\sqrt[4]{8}}$.
e. $-\frac{1}{2}$.

30. Given that a circle has $2\pi$ radians, how many degrees are equal to $\frac{\pi}{12}$ radians?

a. $6^\circ$
b. $12^\circ$
c. $15^\circ$
d. $20^\circ$
e. $30^\circ$

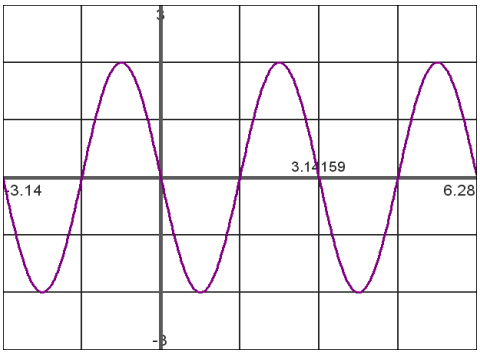
31. If $\cos 60^\circ = \frac{1}{2}$, then $\cos 300^\circ =$

a. $\frac{\sqrt{3}}{2}$.
b. $-\frac{1}{2}$.
c. $\frac{\sqrt{2}}{2}$.
d. $-\frac{\sqrt{3}}{2}$.
e. $\frac{1}{2}$.

32. If $\tan\theta = \frac{5}{12}$, $0^\circ \le \theta \le 90^\circ$, then $\cos\theta =$

a. $\frac{5}{13}$. b. $\frac{12}{13}$. c. $\frac{13}{5}$. d. $\frac{13}{12}$. e. $\frac{12}{5}$.

33. The figure below shows a portion of the graph of which of the following functions? Note that the *x*-axis is labeled in radians. Each tick mark on the *y*-axis is one unit.




a. $y = 2\sin\left(\frac{x}{2}\right)$

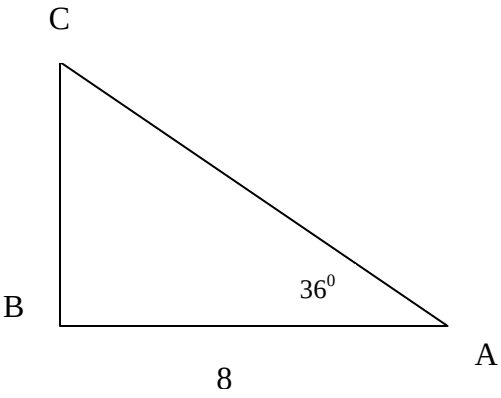
b. $y = -2\cos(2x)$

c. $y = 2\cos\left(\frac{x}{2}\right)$

d. $y = -2\sin(2x)$

e. $y = 2\cos(2x)$

34. In the figure below, the length of BC is




a. $8\sin 36^\circ$.

b. $8\cos 36^\circ$.

c. $8\tan 36^\circ$.

d. 6.

e. 10.

35. Given $0^\circ \le x \le 360^\circ$ and $4\sin x - 1 = -5$, then $x =$

a. $0^\circ$.

b. $90^\circ$.

c. $180^\circ$.

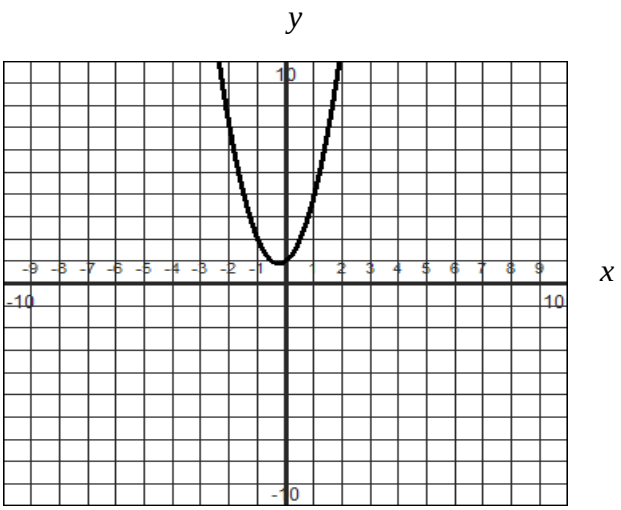
d. $270^\circ$.

e. $360^\circ$.

36. $2\sin x\cos x =$

a. $\sin 2x$.
b. $\cos 2x$.
c. $\sin\left(\frac{x}{2}+1\right)$.
d. $\sqrt{4\sin x\cos x}$.
e. $-2\cos^2 x$.

37. What is **not** true of the graph of $y = f(x)$ below?




a. This is not a one-to-one function.
b. This function has no real roots.
c. The domain of the function is $(-\infty,\infty)$.
d. This is not an odd function.
e. $f(2)$ is negative.

38. Write the equation of an ellipse with foci at $(-6,-3),(0,-3)$ and a major axis of length 10.

a. $\frac{(x-2)^2}{25}+\frac{(y-3)^2}{16}=1$

b. $\frac{(y-4)^2}{25}+\frac{(x+3)^2}{16}=1$

c. $\frac{(x+3)^2}{25}+\frac{(y+3)^2}{16}=1$

d. $\frac{(x+4)^2}{25}+\frac{(y-3)^2}{16}=1$

e. $\frac{(x-3)^2}{25}+\frac{(y-4)^2}{16}=1$

39. $\sin\theta(\csc\theta-\sin\theta)=$

a. $\cos^2\theta$.

b. $\tan\theta-\sin^2\theta$.

c. $\sec\theta-\sin^2\theta$.

d. $\cot\theta-\sin^2\theta$.

e. $\sin^2\theta$.

40. Which expresses *y* as a function of *x*?

a. $x^2+y^2=4$

b. $x=y^2-4$

c. $x=4$

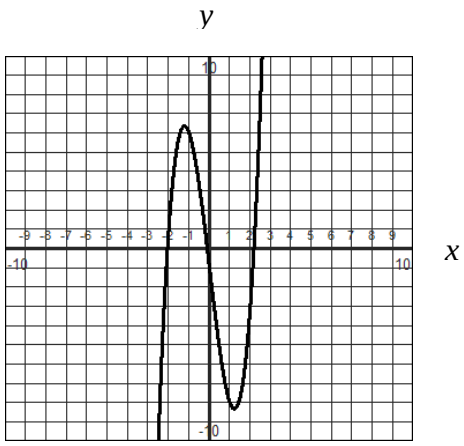
d. $x^2+4y=4$

e. $\sin\left(x^2\right)=\sin\left(y^2\right)$

41. Let $f(x)=x^2-\frac{3}{x}, g(x)=\sqrt{x+7}$. Find $f(g(2))$.

a. 6 b. 12 c. 8 d. $-12$ e. 0

42. Which of the following could represent the graph below?




a. $y = -x^3 + 3x^2 - 4$
b. $y = -2x - 4$
c. $y = x^3$
d. $y = x^2 - 4$
e. $y = 2x^3 - 9x - 1$

43. Solve $\tan^2 x = 1,$ where $0 \le x \le \pi$.

a. $\frac{\pi}{2}$
b. $\frac{\pi}{4}, \frac{3\pi}{4}$
c. $1, -1$
d. $0$
e. $\frac{\pi}{4}$

44. If $f(x) = \frac{1}{x-1}$ and $g(x) = \frac{1}{x}$, what is the domain of $f(g(x))$?

a. $(-\infty, 1)$
b. $(-\infty, 1) \cup (1, \infty)$
c. $(-\infty, 0) \cup (0, 1) \cup (1, \infty)$
d. $(1, \infty)$
e. $(-\infty, \infty)$

45. Evaluate: $\csc(\cos^{-1} x)$.

a. $\frac{\sqrt{1-x^2}}{x}$

b. $\sqrt{1-x^2}$

c. $\frac{x}{\sqrt{1-x^2}}$

d. $\frac{1}{\sqrt{1-x^2}}$

e. $\sqrt{x^2-1}$

46. Solve: $49x^4 - 25x^2 = 0$.

a. $x = \pm\frac{25}{49}$

b. $x = 0, \pm\frac{5}{7}$

c. $x = \pm\frac{49}{25}$

d. $x = 0, \pm\frac{7}{5}$

e. $x = \pm\frac{5}{7}$

47. What is the remainder when $x^3 + 19x^2 + 114x + 218$ is divided by $(x+4)$?

a. 4 b. 9 c. 6 d. 2 e. 0

48. The sum of a number and 6 is 8 more than twice the number. Find the equation that could be used to find this number *x*.

a. $x + 6 = 2x + 8$

b. $x + 6 = x^2 + 8$

c. $x + 6 = 2(x + 8)$

d. $6x = 2x + 8$

e. $x + 14 = 2x$

49. Given that *f(x)* is one-to-one, find the inverse of the function $f(x)=(x-6)^3+6$.

a. $f^{-1}(x)=\sqrt[3]{x-6}+6$
b. $f^{-1}(x)=\sqrt[3]{x}+6$
c. $f^{-1}(x)=\sqrt[3]{x+6}-6$
d. $f^{-1}(x)=\sqrt[3]{x-6}-6$
e. None of these.

50. Simplify: $\dfrac{e^{3-4x}}{e^{4-2x}}$.

a. $\dfrac{4x-3}{2x-4}$
b. $\dfrac{3-4x}{4-2x}$
c. $e^{1+2x}$
d. $e^{8x^2-22x+12}$
e. $e^{-1-2x}$

51. Write an equation of the line passing through the point $(6,-10)$ with an undefined slope.

a. $x=-10$
b. $x=6$
c. $y=6$
d. $y=-10$
e. It cannot be determined from the given information.

52. Perform the indicated operation and write the result in standard form: $(-3+2i)(-3-7i)$.

a. $-5+27i$
b. $23+15i$
c. $-5+15i$
d. $23-15i$
e. $-5-27i$

53. What is the least common denominator for $\frac{3x}{x^2-16}$ and $\frac{4}{2x-8}$?

a. $2(x+4)(x-4)$
b. $4(x^2-16)+3x(2x-8)$
c. $2(x-4)$
d. $(x^2-16)(2x-8)$
e. $2\left(x^2+4\right)$

54. If $f(x)=\frac{x}{x^2-16}$ and $g(x)=\frac{7}{x^2+5x+4}$, find $f(x)-g(x)$.

a. $\frac{x^2-6x+28}{(x-4)(x+4)}$
b. $\frac{x^2-6}{(x-4)(x+4)}$
c. $\frac{x^2-6x+28}{(x-4)(x+4)(x+1)}$
d. $\frac{x^2+6x+28}{(x-4)(x+4)(x+1)}$
e. $\frac{x^2-6x-28}{\left(x^2-16\right)(x+1)}$

55. The function $f(x)=\frac{(x^2+19)(x-4)}{x^2-81}$ has

a. two vertical asymptotes; one oblique asymptote .
b. one vertical asymptote; one horizontal asymptote.
c. one vertical asymptote; no horizontal asymptote.
d. no vertical asymptotes; one oblique asymptote.
e. only two vertical asymptotes.

## SOLUTIONS

1. d
2. c
3. a
4. e
5. d
6. a
7. b
8. d
9. c
10. e
11. e
12. a
13. d
14. d
15. a
16. c
17. b
18. a
19. e
20. c
21. e
22. b
23. c
24. b
25. a
26. e
27. d
28. b
29. a
30. c
31. e
32. b
33. d
34. c
35. d
36. a
37. e
38. c
39. a
40. d
41. c
42. e
43. b
44. c
45. d
46. b
47. d
48. a
49. a
50. e
51. b
52. b
53. a
54. c
55. a

Websites for Practice:

http://www.testprepreview.com/modules/graphs.htm

http://www.testprepreview.com/modules/mathematics3.htm

http://accuplacer-practice-tests.accuplacer-test.com/

https://secure.noctrl.edu/placement_exams/math/advalg.htm

https://secure.noctrl.edu/placement_exams/math/trgel.htm#top

https://secure.noctrl.edu/placement_exams/math/elemalg.htm#top

http://www.khanacademy.org/