Directions: Answer each EOC question AND provide the page number the topic was found using the review (1-14).

Submit answers to nevolamathclass.weebly.com

1. Which expression is equivalent to

    Page:

    $\dfrac{2x+6}{x^2+2x-24} \cdot \dfrac{x^2+2x-24}{x^2-7x+12}$?

    A $\dfrac{2}{x-4}$

    B $\dfrac{2(x+3)}{x-3}$

    C $\dfrac{2(x+3)}{(x-4)(x-3)}$

    D $\dfrac{2(x+3)}{(x+4)(x-3)}$

2. Which equation describes the circle with center $(5, \text{-}1)$ and radius 7?

    Page:

    A $(x-5)^2 + (y+1)^2 = 7$

    B $(x-5)^2 + (y+1)^2 = 49$

    C $(x+5)^2 + (y-1)^2 = 7$

    D $(x+5)^2 + (y-1)^2 = 49$

3. What are the zeros of the polynomial $p(x) = x^3 - 2x^2 - 23x + 60$?

    Page:

    A $\{\text{-}15, \text{-}2, 2\}$

    B $\{\text{-}5, 3, 4\}$

    C $\{2, 3, 10\}$

    D $\{1, 2, 30\}$

4. In 1950, a U.S. population model was $y = 151 \cdot (1.013)^{t-1950}$ million people, where t is the year. What did the model predict the U.S. population would be in the year 2000?

    Page:

    A 247 million

    B 255 million

    C 263 million

    D 288 million

5. Page:

    If $h(x) = 2x$ and $g(x) = 3x^2 + 1$, what is $h(g(x))$?

    A $6x^2 + 1$

    B $6x^2 + 2$

    C $12x^2 + 1$

    D $12x^2 + 2$

6. Divide: Page:

    $(6x^3 - 11x^2 - 47x - 20) \div (2x + 1)$

    A $3x^2 - 7x - 20$

    B $3x^2 + 7x - 20$

    C $3x^2 - 4x - 20$

    D $3x^2 + 4x - 20$

7. Page:

    Which expression is equivalent to

    $\dfrac{x+3}{6x-3} \div \dfrac{x^2+2x-3}{2x-1}$?

    A $3(x-1)$

    B $\dfrac{x-1}{3}$

    C $\dfrac{3}{x-1}$

    D $\dfrac{1}{3(x-1)}$

8. Copper production increased at a rate of about 4.9% per year between 1988 and 1993. In 1993, copper production was approximately 1.801 billion kilograms. If this trend continued, which equation **best** models the copper production (*P*), in billions of kilograms, since 1993? (Let $t = 0$ for 1993.)

    Page:

    A $P = 1.801(4.900)^t$

    B $P = 1.801(1.490)^t$

    C $P = 1.801(1.049)^t$

    D $P = 1.801(0.049)^t$

9. The profit (P), in dollars, for a company is modeled by the function $P(x) = {}^-750x^2 + 15{,}000x$, where x is the number of items produced. For which values of x will the company lose money?

  A $x < 2$

  B $2 < x \le 10$

  C $10 \le x < 20$

  D $x > 20$

10. In the function $f(x) = a(x - 4)^2$, where $a > 0$, what happens to the graph of f as the value of a increases?

  A   The graph narrows.

  B   The graph widens.

  C   The graph shifts up.

  D   The graph shifts right.

11. Which circle has the smallest area?

  A $x^2 + y^2 = 12$

  B $(x - 2)^2 + y^2 = 8$

  C $(x + 1)^2 + (y + 3)^2 = 6$

  D $(x + 8)^2 + (y - 9)^2 = 3$

12. In which direction is the graph of $f(x) = \dfrac{5}{x + b}$ translated when b increases?

  A   left

  B   right

  C   up

  D   down

13. Solve for x: $\quad \dfrac{^-1}{2}\left|2x + 6\right| + 2 = 0$

  A $x = 5$ or $x = 1$

  B $x = 5$

  C $x = {}^-5$ or $x = {}^-1$

  D $x = {}^-1$

14. Which is the inverse of the function $f(x) = x - 9$?

  A $f^{-1}(x) = \dfrac{1}{x + 9}$

  B $f^{-1}(x) = x + 9$

  C $f^{-1}(x) = 9 - x$

  D $f^{-1}(x) = \dfrac{1}{x - 9}$

15. When interest is compounded n times a year, the accumulated amount (A) after t years is given by the formula

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

where P is the initial principal and r is the annual rate of interest. **Approximately** how long will it take \$2,000 to double at an annual interest rate of 5.25% compounded monthly?

  A   13.98 years

  B   13.71 years

  C   13.23 years

  D   13.08 years

16. A function is graphed on the set of axes below.
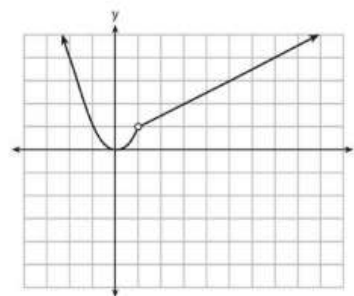
  A $f(x) = \begin{cases} x^2, & x < 1 \\ x - 2, & x > 1 \end{cases}$

  B $f(x) = \begin{cases} x^2, & x < 1 \\ \frac{1}{2}x + \frac{1}{2}, & x > 1 \end{cases}$

  C $f(x) = \begin{cases} x^2, & x < 1 \\ 2x - 7, & x > 1 \end{cases}$

  D $f(x) = \begin{cases} x^2, & x < 1 \\ \frac{3}{2}x - \frac{9}{2}, & x > 1 \end{cases}$

17. What is the **approximate** value of the greatest zero of $f(x) = x^3 - 6x^2 - x + 3?$ Page:

A ⁻0.75

B 2.84

C 6.08

D 6.31

18. What is the domain of $f(x) = \sqrt{-x + 2}?$

A $\{x : x \geq {}^-2\}$

B $\{x : x \leq 2\}$

C $\{x : {}^-2 < x < 2\}$

D $\{x : 0 < x < 2\}$
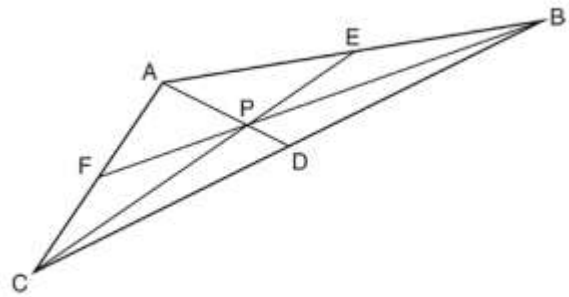
Page:

19. Page:

The graph of $f(x) = x^2 + 3$ is translated to produce the graph of $g(x) = (x + 2)^2 + 3$. In which direction was the graph of f translated?

A up

B down

C left

D right

20. Page:

What are the zeros of $y = \dfrac{x^2 - 2x - 3}{x^2 + 5x - 14}?$

A 3 and ⁻1

B 1 and ⁻3

C 7 and ⁻2

D 2 and ⁻7

21. Page:

The height, h (in feet), of a ball t seconds after it is thrown upward is given by the equation $h = {}^-16t^2 + 60t + 5$. What does the constant term 5 in the equation represent?

A time required for the ball to hit the ground

B time required for the ball to reach the highest point

C height after 5 seconds

D height when first thrown

22. In the diagram below of $\triangle ABC$, $\overline{AE} \cong \overline{BE}$, $\overline{AF} \cong \overline{CF}$, and $\overline{CD} \cong \overline{BD}$.

Point P must be the Page:

A centroid

B circumcenter

C Incenter

D orthocenter

23. Page:

Which is the inverse of $f(x) = 1.5^x + 4?$

A $f^{-1}(x) = \dfrac{x - 4}{1.5}$

B $f^{-1}(x) = \dfrac{\log(x) - 4}{1.5}$

C $f^{-1}(x) = \dfrac{\log(x - 4)}{\log(1.5)}$

D $f^{-1}(x) = \dfrac{4 - \log(x)}{\log(1.5)}$

24. Page:

Which equation is equivalent to $3 \log x + \log 2 = \log 3x - \log 2?$

A $\log x^3 + 2 = \log(3x - 2)$

B $\log(3x + 2) = \log(3x - 2)$

C $\log 6x = \log\left(\dfrac{3x}{2}\right)$

D $\log(2x^3) = \log\left(\dfrac{3x}{2}\right)$

25.

What is the **approximate** solution to the equation $3^{x-1} = 4^{2x+5}$?

A   3.875

B   1.262

C   ⁻2.354

D   ⁻4.797

26.

Approximately what is the smallest real zero of $f(x) = x^3 - 5x^2 + 2x + 6$?

A   ⁻4.18

B   ⁻1.68

C   ⁻0.86

D   ⁻0.46

27.

Which expression is equivalent to $(x + 3)^3 - 9x(x + 3)$?

A $x^3 + 27$

B $x^3 - 27$

C $x^3 - 9x^2 - 27x + 27$

D $x^3 - 9x^2 + 27x + 27$

28.

Where does the minimum value of the function $y = |x - 5| - 4$ occur?

A   at $y = ⁻5$

B   at $y = 4$

C   at $x = 0$

D   at $x = 5$

29.

Which expression is equivalent to $(4 - 3i)^2 + (6 + i)^2$?
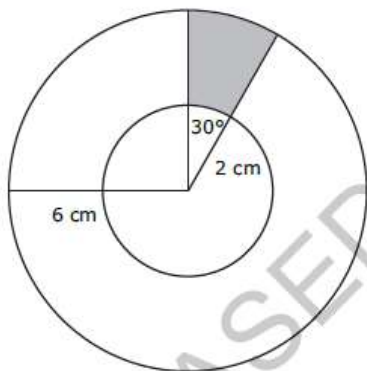
A   30

B $42 - 12i$

C   50

D $62 - 12i$

30.

The volume of a rectangular prism is represented by the expression $(x^3 - 2x^2 - 20x - 24)$. If the length is $(x - 6)$ and the height and width are equal, what is the width of the prism?

A $x + 2$

B $x - 2$

C $x + 4$

D $x - 4$

31.

In the figure below, the larger circle has a radius of 6 cm, and the smaller circle has a radius of 2 cm.

30°

2 cm

6 cm

What is the **approximate** area of the shaded region?

A   2.1 cm²

B   3.4 cm²

C   4.2 cm²

D   8.4 cm²

32.

Solve: $3x - 7\sqrt{x} + 2 = 0$

A $x = \frac{1}{9}, x = 4$

B $x = \frac{1}{3}, x = 4$

C $x = \frac{1}{9}, x = \frac{-1}{3}$

D $x = \frac{1}{3}, x = \frac{1}{9}$

33

A shipping company is designing boxes to meet specific requirements.

- Each box must be a completely closed rectangular prism with no overlapping material.
- The boxes must hold 24 cans in two layers of 12 cans each.
- The cans are 3 inches in diameter and 5 inches in height.

What is the smallest amount of cardboard needed to meet the specifications?

A   1,080 in.^{2}

B   840 in.^{2}

C   636 in.^{2}

D   540 in.^{2}

35

Samantha invested $10,000 in each of two different financial plans in 2013. The predicted value of each plan is modeled below.

- Plan M: a rate of 7.5%, compounded continuously.
- Plan N: The value is determined by the function $y = 5x^3 - 50x^2 + 4x + 10,000$, where x is the number of years after 2013.

Plan N has a greater predicted value than Plan M during which years?

A   from 2014 to 2041

B   from 2028 to 2055

C   from 2042 to 2073

D   Plan N never has a greater value than Plan M.

37.

A function is shown below.

$$f(x) = \begin{cases} {}^-x^2 + 2x & \text{for } x \le {}^-3 \\ 2\left(\frac{1}{3}\right)^{2x} & \text{for } {}^-3 < x < 4 \\ \dfrac{2x - 5}{x - 7} & \text{for } x \ge 4 \end{cases}$$
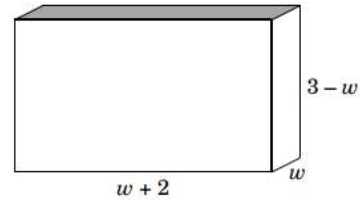
What is the value of the expression $f({}^-3) + 2f({}^-1) - f(4)$?

A $\frac{101}{36}$

B $\frac{32}{9}$

C   4

D   22

34.

The dimensions of this rectangular prism are given algebraically.

What is the *approximate* width (w) that will maximize the volume?

A   1 unit

B $1\frac{1}{2}$ units

C $1\frac{3}{4}$ units

D   2 units

36.

Let $f(x) = 14x^3 + 28x^2 - 46x$ and $g(x) = 2x + 7$.
Which is the solution set to the equation $\frac{1}{12}f(x) = g(x)$?

A $\{{}^-3, 0, 1\}$

B $\{{}^-3, {}^-1, 2\}$

C $\{{}^-2, 1, 3\}$

D $\{1, 5, 11\}$

38.

The diameter of a circle is 8 centimeters. A central angle of the circle intercepts an arc of 12 centimeters. What is the radian measure of the angle?

A $\frac{3}{2}$
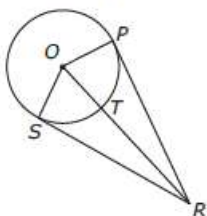
B   3

C   4

D 8π

39 | Page:

To completely cover a spherical ball, a ball company uses a total area of 36 square inches of material. What is the maximum volume the ball can have?

(Note: Surface area of a sphere = $4\pi r^2$. Volume of a sphere = $\frac{4}{3}\pi r^3$.)

A 27π cubic inches

B $36\sqrt{\pi}$ cubic inches

C $\frac{36}{\sqrt{\pi}}$ cubic inches

D $\frac{27}{\pi}$ cubic inches

40. | Page:

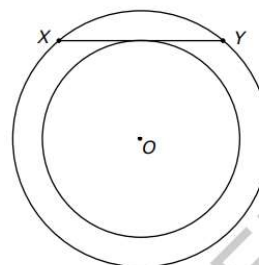A farmer wants to buy between 90 and 100 acres of land.

- He is interested in a rectangular piece of land that is 1,500 yards long and 300 yards wide.
- The piece of land is being sold as one complete unit for $87,000.

If the farmer does not want to spend more than $900 an acre, does the land meet all of his requirements? (1 acre ≈ 43,560 ft²)

A   Yes, the amount of land satisfies his needs, and the price is low enough.

B   No, the price is low enough, but there is too much land.

C   No, the price is low enough, but there is not enough land.

D   No, the amount of land satisfies what he needs, but the price is too high.

41. | Page:

In the figure below, $\overline{PR}$ and $\overline{SR}$ are tangent to circle O.

If OT = 11 cm and PR = 60 cm, what is the length of $\overline{OR}$?

A   61 cm

B   59 cm

C   50 cm

D   48 cm

42. | Page:

The figure below shows concentric circles, both centered at O.

- Chord XY is tangent to the smaller circle.
- The radius of the larger circle is 15 cm.
- The radius of the smaller circle is 12 cm.

What is the length of chord XY?

A   27 cm

B   24 cm

C   18 cm

D   10 cm

43. | Page:

What is the **approximate** length of the arc subtended by an angle of $\frac{4\pi}{3}$ radians on a circle with a radius of 6.00 meters?

A   12.57 meters

B   14.14 meters

C   25.13 meters

D   28.27 meters

44. | Page:

What value of h is needed to complete the square for the equation $x^2 + 10x - 8 = (x - h)^2 - 33$?

A $^-25$

B $^-5$

C 5

D 25

45. | Page:

If $f(x) = \frac{4}{3}x - 9$, what is $f^{-1}(^-3)$?

A $^-13$

B $^-9.5$

C $^-7$

D 4.5

46. | Page:

Which function has a point of discontinuity at $x = 3$ when graphed?

A $f(x) = \begin{cases} 3x + 1 & \text{for } x < 3 \\ x^2 + 1 & \text{for } x \geq 3 \end{cases}$

B $f(x) = |x - 3| + 2$

C $f(x) = \frac{x - 3}{x^2}$

D $f(x) = \frac{x + 2}{x^2 - 9}$

47. Page:

The function $y = a(1.20)^t$ models the value of an investment after t years. Based on the function, what is the **approximate** monthly interest rate?

A   8.9%

B   8.3%

C   1.5%

D   1.0%

48. Page:

Simplify: $\dfrac{\frac{1}{y} - \frac{1}{x}}{\frac{1}{y} + \frac{1}{x}}$

A $\dfrac{x - y}{x + y}$ C   0

B $\dfrac{x + y}{x - y}$ D   ¯1

49. Page:

Which function goes to positive ∞ most quickly as x increases?

A $y = \log(x) + 100$

B $y = e^{x - 9} - 3$

C $y = x^2 + 5x + 6$

D $y = 3x^5 + 4x^3 - 11x - 6$

50. Page:

The equation $2x^2 - 5x = {}^-12$ is rewritten in the form of $2(x - p)^2 + q = 0$. What is the value of q?

A $\dfrac{167}{16}$

B $\dfrac{71}{8}$

C $\dfrac{25}{8}$

D $\dfrac{25}{16}$

51. Page:

A company that manufactures jeans estimates that the profit for selling a particular style is given by the equation:

$P = {}^-250x^3 + 1,505x^2 - 300$, for $0 < x < 6$

where P is profit in tens of thousands of dollars and x is the advertising expense in tens of thousands of dollars. What does an x-intercept mean in the context of the problem?

A   the number of times the company spent zero dollars on advertising

B   the profit when the company spent zero dollars on advertising

C   the advertising expense when the company had the most profit

D   the advertising expense when the company's profit was zero dollars

52. Page:

A single microscopic organism divides into two organisms every 3 days. Use the formula $N(t) = N_0(2)^{\frac{t}{3}}$, where t is the time in days, $N(t)$ is the number of organisms at t days, and N_0 is the number of organisms at $t = 0$. **Approximately** how long would it take one organism to produce a population of about 10,000 organisms?

A   1,667 days

B   333 days

C   126 days

D   40 days

53.

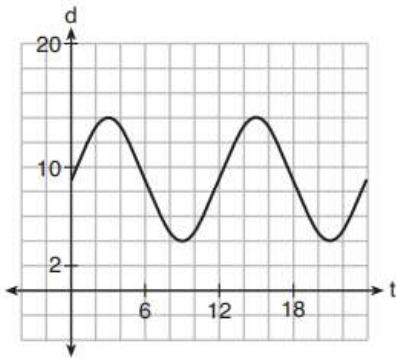Consider the function $p(x) = 3x^3 + x^2 - 5x$ and the graph of $y = m(x)$ below.
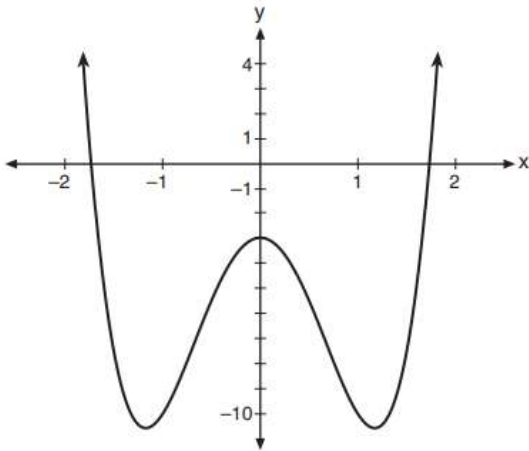
Which statement is true?

A $p(x)$ has three real roots and $m(x)$ has two real roots.

B $p(x)$ has one real root and $m(x)$ has two real roots.

C $p(x)$ has two real roots and $m(x)$ has three real roots.

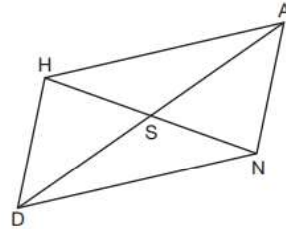D $p(x)$ has three real roots and $m(x)$ has four real roots.

54.

Which function's graph has a period of 8 and reaches a maximum height of 1 if at least one full period is graphed?

A $y = -4\cos\left(\frac{\pi}{4}x\right) - 3$

B $y = -4\cos\left(\frac{\pi}{4}x\right) + 5$

C $y = -4\cos(8x) - 3$

D I $y = -4\cos(8x) + 5$

55.

Parallelogram *HAND* is drawn below with diagonals $\overline{HN}$ and $\overline{AD}$ intersecting at *S*.

Which statement is always true?

A $HN = \frac{1}{2}AD$

B $AS = \frac{1}{2}AD$

C $\angle AHS \cong \angle ANS$

D $\angle HDS \cong \angle NDS$

56.

The depth of the water at a marker 20 feet from the shore in a bay is depicted in the graph below.

If the depth, d, is measured in feet and time, t, is measured in hours since midnight, what is an equation for the depth of the water at the marker?

A $d = 5\cos\left(\frac{\pi}{6}t\right) + 9$

B $d = 9\cos\left(\frac{\pi}{6}t\right) + 5$

C $d = 9\sin\left(\frac{\pi}{6}t\right) + 5$

D $d = 5\sin\left(\frac{\pi}{6}t\right) + 9$

57.

A right hexagonal prism is shown below. A two-dimensional cross section that is perpendicular to the base is taken from the prism.
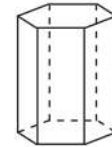
Which figure describes the two-dimensional cross section?

A triangle

B rectangle

C pentagon

D hexagon

58.

An equation of circle O is $x^2 + y^2 + 4x - 8y = -16$. The statement that best describes circle O is the

A center is $(2,-4)$ and is tangent to the x-axis

B center is $(2,-4)$ and is tangent to the y-axis

C center is $(-2,4)$ and is tangent to the x-axis

D center is $(-2,4)$ and is tangent to the y-axis