Advanced Algebra
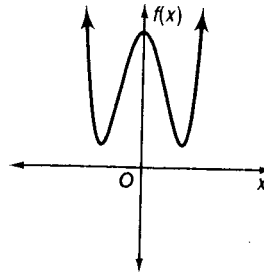
Semester 2 Exam Review

SEMESTER 2 EXAM REVIEW

Write the letter for the correct answer in the blank at the right of each question.
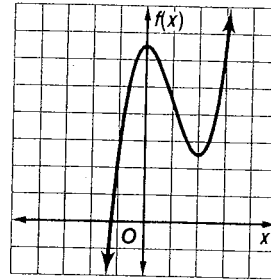
1. Find $p(-3)$ if $p(x) = 4 - x$.

   A. 12   **B.** 4   **C.** 1   **D.** 7

1. _____

2. State the number of real zeros for the function whose graph is shown at the right.

   A. 0   **B.** 1

   C. 2   **D.** 3

2. _____

For Questions 3 and 4, use the graph shown at the right.

3. Determine the values of x between which a real zero is located.

   A. between -1 and 0

   B. between 6 and 7

   C. between -2 and -1

   D. between 2 and 3

3. _____

4. Estimate the x-coordinate at which a relative minimum occurs.

   A. 3   **B.** 2   **C.** 0   **D.** -1

4. _____

5. Solve $x^4 - 13x^2 + 36 = 0$.

   A. $-3, -2, 2, 3$ **B.** $-9, -4, 4, 9$ **C.** $2, 3, 2i, 3i$ **D.** $-2, -3, 2i, 3i$

5. _____

6. One factor of $x^3 + 4x^2 - 11x - 30$ is $x + 2$. Find the remaining factors.

   A. $x - 5, x + 3$ **B.** $x - 3, x + 5$ **C.** $x - 6, x + 5$ **D.** $x - 5, x + 6$

6. _____

7. Which is *not* a root of the equation $x^3 - x^2 - 10x - 8 = 0$?

   A. 1   **B.** 4   **C.** -2 **D.** -1
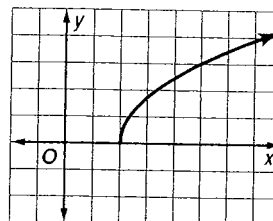
7. _____

8. If $f(x) = x^2$ and $g(x) = 3x - 1$ find $[g \circ f](x)$.

   A. $x^2 + 3x - 1$ **B.** $9x^2 - 1$

   C. $9x^2 - 6x + 1$ **D.** $3x^2 - 1$

8. _____

9. Find the inverse of $g(x) = -3x$.

   A. $g^{-1}(x) = x + 1$ **B.** $g^{-1}(x) = -3x - 3$

   C. $g^{-1}(x) = x - 1$ **D.** $g^{-1}(x) = -\frac{1}{3}x$

9. _____

10. State the domain and range of the function graphed.

   A. D: $x > 2$, R: $y > 0$

   B. D: $x < 2$, R: $y > 0$

   C. D: $x \geq 2$, R: $y < 0$

   D. D: $x \geq 2$, R: $y \geq 0$

10. _____

Simplify each expression.

11. $\dfrac{6a + 12}{5} \cdot \dfrac{10}{a + 2}$

    A. 12   **B.** 24   **C.** $12a + 12$ **D.** $24a$

11. _____

12. $\dfrac{y}{x^2 - y^2} \div \dfrac{y^2}{x - y}$

    A. $\dfrac{1}{y(x + y)}$ **B.** $\dfrac{y^3}{x^3 - x^2y - xy^2 + y^3}$ **C.** $\dfrac{x + y}{y}$ **D.** $\dfrac{1}{y(x - y)}$

12. _____

13. $\dfrac{\frac{m^2}{5n^3}}{\frac{m}{n^2}}$

    A. $5mn$ **B.** $\dfrac{m}{5n}$ **C.** $\dfrac{1}{5}mn$ **D.** $\dfrac{m^2}{n}$

13. _____

14. $\dfrac{4}{k + 1} + \dfrac{9}{2(k + 1)}$

    A. $\dfrac{13}{2(k + 1)}$ **B.** $\dfrac{17}{2(k + 1)}$ **C.** $\dfrac{11}{k + 1}$ **D.** $\dfrac{8}{9}$

14. _____

Find the LCM of the set of polynomials.

15. $3z + 12, 6z + 24$

    A. $18(z + 4)$ **B.** $3(z + 4)$ **C.** $6(z + 4)$ **D.** $z + 4$

15. _____

16. Which is an equation of the vertical asymptote of the graph of $f(x) = \dfrac{x - 1}{x - 2}$?

    A. $y = 1$ **B.** $y = 2$ **C.** $x = 2$ **D.** $x = 1$

16. _____

17. Suppose y varies jointly as x and z. If $y = 24$ when $x = 2$ and $z = 3$, find y when $x = 1$ and $z = 5$.

    A. 5   **B.** 20   **C.** 10   **D.** 4

17. _____

18. If y varies inversely as x and $y = 2$ when $x = 10$, find y when $x = 5$.

    A. 1   **B.** 4   **C.** 25   **D.** 100

18. _____

19. Identify the type of function represented by $y = \sqrt{16x}$.

    A. direction variation   **B.** quadratic

    C. inverse variation   **D.** square root

19. _____

20. Solve $y + 4 = \dfrac{5}{y}$.

    A. $-5, 1$ **B.** $-1, 5$ **C.** ± 1 **D.** $\varnothing$

20. _____

21. Find the domain and range of the function whose graph is shown.

$\quad$ **A.** $D = \{x \mid x > 0\}$; $R = \{y \mid y > 0\}$

$\quad$ **B.** $D = \{x \mid x \text{ is any real number.}\}$; $R = \{y \mid y > 0\}$

$\quad$ **C.** $D = \{x \mid x > 0\}$; $R = \{y \mid y \text{ is any real number.}\}$

$\quad$ **D.** $D = \{x \mid x \text{ is any real number.}\}$; $R = \{y \mid y < 0\}$

$y = 4(2)^x$
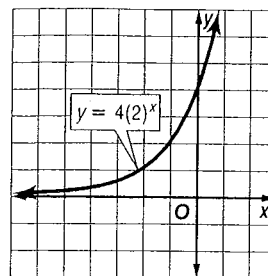
21. _____

22. Simplify $\left(x^{\sqrt{7}}\right)^{\sqrt{3}}$.

$\quad$ **A.** $x^{\sqrt{21}}$ $\qquad$ **B.** $x^{\sqrt{7} + \sqrt{3}}$ $\qquad$ **C.** $x^{\sqrt{10}}$ $\qquad$ **D.** $x^{\sqrt{\frac{7}{3}}}$

22. _____

23. Solve $2^{3m - 4} > 4$.

$\quad$ **A.** $m < 0$ $\qquad$ **B.** $m > 0$ $\qquad$ **C.** $m > 2$ $\qquad$ **D.** $m > \dfrac{5}{3}$

23. _____

24. Write the equation $4^3 = 64$ in logarithmic form.

$\quad$ **A.** $\log_4 3 = 64$ $\qquad$ **B.** $\log_3 4 = 64$ $\qquad$ **C.** $\log_{64} 4 = 3$ $\qquad$ **D.** $\log_4 64 = 3$

24. _____

25. Solve $\log_3 n = 2$.

$\quad$ **A.** 6 $\qquad$ **B.** 5 $\qquad$ **C.** 8 $\qquad$ **D.** 9

25. _____

26. Solve $\log_2 2m > \log_2 (m + 5)$.

$\quad$ **A.** $m > \dfrac{5}{3}$ $\qquad$ **B.** $m < 5$ $\qquad$ **C.** $m > 5$ $\qquad$ **D.** $m > -5$

26. _____

27. Solve $\log_6 10 + \log_6 x = \log_6 40$.

$\quad$ **A.** 180 $\qquad$ **B.** 4 $\qquad$ **C.** 5 $\qquad$ **D.** 30

27. _____

28. Solve $4^x = 20$. Round to four decimal places.

$\quad$ **A.** 0.4628 $\qquad$ **B.** 1.5214 $\qquad$ **C.** 0.6990 $\qquad$ **D.** 2.1610

28. _____

29. Evaluate $e^{\ln 4}$.

$\quad$ **A.** e^4 $\qquad$ **B.** 4^e $\qquad$ **C.** $\ln 4$ $\qquad$ **D.** 4

29. _____

30. **ART** Martin bought a painting for $5,000. It is expected to appreciate at 4% per year. How much will the painting be worth in 6 years? Use $y = a(1 + r)^t$ and round to the nearest cent.

$\quad$ **A.** $6200.00 $\qquad$ **B.** $5360.38 $\qquad$ **C.** $37,647.68 $\qquad$ **D.** $6326.60

30. _____

31. Find the next four terms of the arithmetic sequence 11, 15, 19, ...

    A. 24, 29, 34, 39   **B.** 22, 25, 28, 31

    C. 20, 21, 22, 23   **D.** 23, 27, 31, 35

31. _____

32. Find the seventh term of the arithmetic sequence in which $a_1 = 3$ and $d = 5$.

    A. 33   **B.** 38   **C.** 30   **D.** 31

32. _____

33. Find $\displaystyle\sum_{n=1}^{5} (4n + 1)$.

    A. 44   **B.** 60   **C.** 65   **D.** 90

33. _____

34. Find the next two terms of the geometric sequence 567, 189, 63 ... .

    A. 21, 3   **B.** 21, 7   **C.** −63, −189   **D.** 9, 3

34. _____

35. Find the fifth term of a geometric sequence for which $a_3 = 20$ and $r = 2$.

    A. 80   **B.** 40   **C.** 160   **D.** 24

35. _____

36. Find the sum of a geometric series for which $a_1 = 7$, $n = 4$, and $r = 3$.

    A. 91   **B.** 280   **C.** 147   **D.** 189

36. _____

37. Find $\displaystyle\sum_{n=1}^{4} 3 \cdot 2^{n-1}$.

    A. 80   **B.** −80   **C.** 45   **D.** −45

37. _____

38. Find a_1 in a geometric series for which $S_n = 93$, $r = 2$, and $n = 5$.

    A. −3   **B.** 15.5   **C.** 3   **D.** $\dfrac{1}{3}$

38. _____

39. Find the sum of the infinite geometric series $12 + 6 + 3 + \cdots$, if it exists.

    A. 24   **B.** 8   **C.** 27   **D.** does not exist

39. _____

40. Find the value of $\tan \theta$.

    A. $\dfrac{4}{3}$ **B.** $\dfrac{3}{4}$

    C. $\dfrac{4}{5}$ **D.** $\dfrac{5}{3}$

40. _____
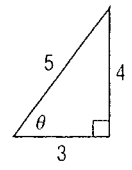
41. Which equation can be used to find x?

    A. $\cos 60° = \dfrac{4}{x}$ **B.** $\tan 60° = \dfrac{x}{4}$

    C. $\sin 60° = \dfrac{4}{x}$ **D.** $\cot 60° = \dfrac{4}{x}$

41. _____
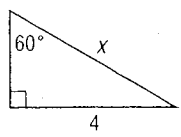
42. Find P to the nearest degree.

A. 21°   B. 23°

C. 67°   D. 69°
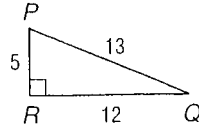
42. _____

43. Rewrite $\frac{\pi}{6}$ radians in degree measure.

A. $30\pi°$ B. $30°$ C. $120°$ D. $60°$

43. _____

44. Find the exact value of sin 150°.

A. $-\frac{\sqrt{3}}{2}$ B. $\frac{\sqrt{3}}{2}$ C. $\frac{1}{2}$ D. $-\frac{1}{2}$

44. _____

45. Which formula can be used to find the area of $\triangle ABC$?

A. area $= \frac{1}{2}ac \sin C$ B. area $= \frac{1}{2}ab \sin A$

C. area $= \frac{1}{2}bc \sin A$ D. area $= \frac{1}{2}bc \sin B$

45. _____

46. In $\triangle ABC$, $A = 42°$, $C = 56°$, and $a = 12$. Find c.

A. 9.7   B. 21.6   C. 16.0   D. 14.9

46. _____

47. In $\triangle ABC$, find a if $b = 2$, $c = 6$, and $A = 35°$.

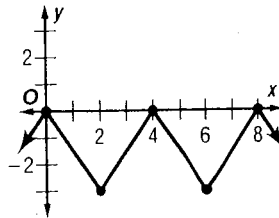A. 20.3   B. 7.7   C. 5.5   D. 4.5

47. _____

48. $P\left(-\frac{4}{5}, -\frac{3}{5}\right)$ is located on the unit circle. Find $\cos \theta$.

A. $\frac{4}{5}$ B. $-\frac{4}{5}$ C. $-\frac{3}{5}$ D. $\frac{3}{4}$

48. _____

49. Determine the period of the function.

A. 2   B. 8

C. 3   D. 4

49. _____

50. Solve $y = \text{Sin}^{-1} \frac{\sqrt{3}}{2}$.

A. 30°   B. 60°   C. 45°   D. 90°

50. _____