Calculus - Summer Packet

Name: _____ **Date:** _____

1. The expression $2^3 \cdot 4^2$ is equivalent to

   A. 2^7 B. 2^{12} C. 8^5 D. 8^6

2. The expression $\dfrac{(15w^2)^2}{5w^8}$ is equivalent to

3. The value of 10^{-2} is

4. What is the value of $\frac{3}{5}\left(\frac{2}{4}\right)^0$?

5. Evaluate: $-120x^0$

6. What is the value of 3^{-2}?

   A. $\frac{1}{9}$ B. $-\frac{1}{9}$ C. 9 D. -9

7. The expression $8^{-4} \cdot 8^6$ is equivalent to

   A. 8^{-24} B. 8^{-2} C. 8^2 D. 8^{10}

8. Which expression is equivalent to $(x^3)^{-1}$?

9. Expressed in simplest form, $\dfrac{2x^2 - 32}{4x - 16}$ is equivalent to

   A. $\dfrac{x+4}{2}$ B. $\dfrac{x-16}{2}$

   C. $\dfrac{x+16}{4}$ D. $x+4$

10. Expressed in simplest form, $\dfrac{x^2 - 64}{x^2 - 16x + 64}$, $x \neq 8$, is equivalent to

11. The y-intercept of the graph of the equation $y = 2x - 3$ is

A. -2 B. 2 C. 3 D. -3

12. What is the slope of the line that passes through the points $(4, 5)$ and $(2, 1)$?

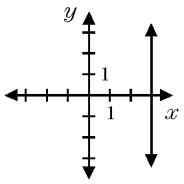
13. What is the slope of the line which passes through the points $(2, 5)$ and $(-1, 0)$?

14. Two points whose coordinates are $(4, 17)$ and $(2, a)$ determine a line whose slope is 6. Find the value of a.

15. The line that passes through points $(1, 3)$ and $(2, y)$ has a slope of 2. What is the value of y?

16. Which graph represents the equation $x = -3$?

A.



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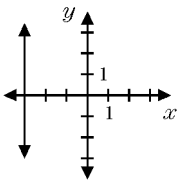

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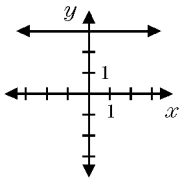

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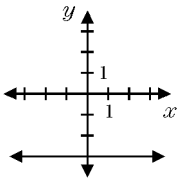


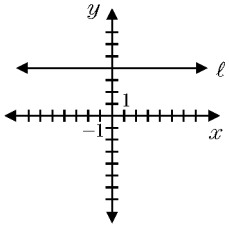
17. Which equation is represented by this graph of line ℓ?

A. $x = y + 4$

B. $y = x + 4$

C. $x = 4$

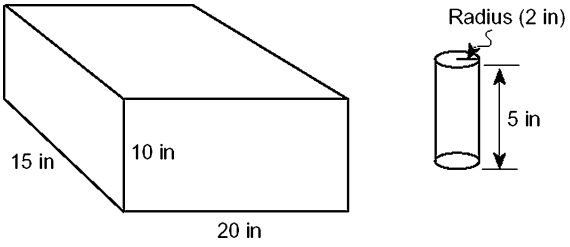
D. $y = 4$



18. Factor: $9x^2 - 1$

19. What is the volume, in cubic centimeters, of a cube whose edge measures 2 centimeters?

20. In the accompanying diagram, a rectangular container with the dimensions 10 inches by 15 inches by 20 inches is to be filled with water, using a cylindrical cup whose radius is 2 inches and whose height is 5 inches. What is the maximum number of full cups of water that can be placed into the container without the water overflowing the container?



21. The area of a triangle is 24 square centimeters. If the base of this triangle is 8 centimeters, find the number of centimeters in the altitude.

22. Find the area of a right triangle whose legs have lengths 8 and 4.

23. What is the inverse of the function $2y - 12 = 8x$?

24. The inverse of the function $y = 2x - 5$ is

A. $y = \frac{1}{2}(x + 5)$ B. $y = \frac{1}{2}(x - 5)$

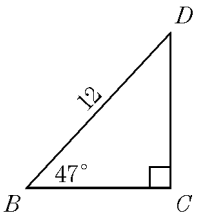
C. $y = 2x + 5$ D. $y = 5 - 2x$

25. Express 160° in radian measure.

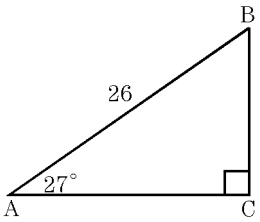
26. Express 300° in radian measure.

27. Express 210° in radian measure.

28. In right triangle BCD, $BD = 12$, $m\angle C = 90$, and $m\angle DBC = 47$. Find BC to the *nearest tenth*.



29. In the accompanying diagram of right triangle ABC, a right angle is at C, $AB = 26$, and $m\angle A = 27$. Find the length of $\overline{AC}$ to the *nearest tenth*.



30. Given $f(x) = 2 - x$, find all c in the interval $(2, 7)$ such that $f'(c) = \dfrac{f(7) - f(2)}{7 - 2}$.

31. Given $f(x) = 8 - 10x$, determine all c in the interval $(1, 7)$ such that $f'(c) = \dfrac{f(7) - f(1)}{7 - 1}$.

32. Given $f(x) = 10 - \dfrac{16}{x}$, find all c in the interval $(2, 8)$ such that $f'(c) = \dfrac{f(8) - f(2)}{8 - 2}$.

A. 4 B. $\frac{8}{5}$ C. ± 4 D. 7

33. Find the vertical asymptote(s) of $y = \dfrac{3x^2}{x^2 - 9}$.

34. What is the equation of the line that passes through the point $(3, -7)$ and has a slope of $-\frac{4}{3}$?

A. $y = -\frac{4}{3}x + 3$ B. $y = -\frac{4}{3}x - 3$

C. $y = \frac{37}{3}x - \frac{4}{3}$ D. $y = -\frac{59}{9}x - \frac{4}{3}$

35. Which is an equation of the line that passes through the point $(1, 4)$ and has a slope of 3?

A. $y = 3x + 4$ B. $y = \frac{1}{3}x + 4$

C. $y = 3x - 1$ D. $y = 3x + 1$

36. What is an equation of the line that passes through the point $(1, 3)$ and has a slope of 3?

37. An equation of the line that passes through the point $(0, -1)$ and whose slope is 2 is

A. $y = 2x - 1$ B. $y = 2x + 2$

C. $y = -x + 2$ D. $y = -2x - 1$

38. Write an equation of the straight line whose slope is 2 and whose y-intercept is the same as that of the line represented by the equation $y = 4x - 2$.

39. Which equation represents a line that has a slope of $\frac{3}{4}$ and passes through the point $(2, 1)$?

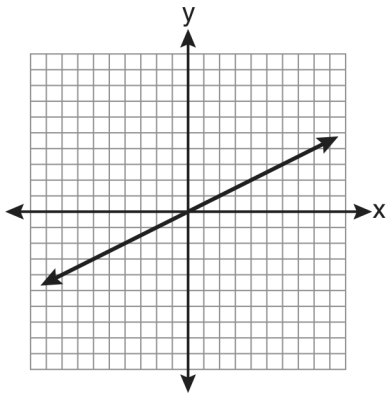
A. $3y = 4x - 5$ B. $3y = 4x + 2$

C. $4y = 3x - 2$ D. $4y = 3x + 5$

40. If $f(b) = b^0 + b^{-1} + b^{-2}$, find $f(3)$.

41. Which graph represents an exponential equation?

A.



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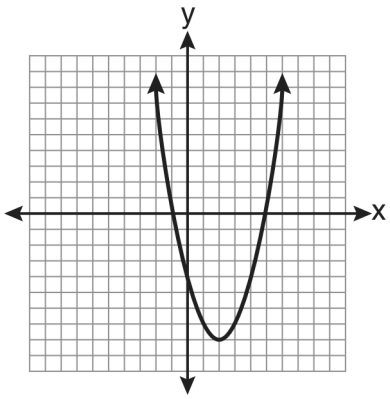

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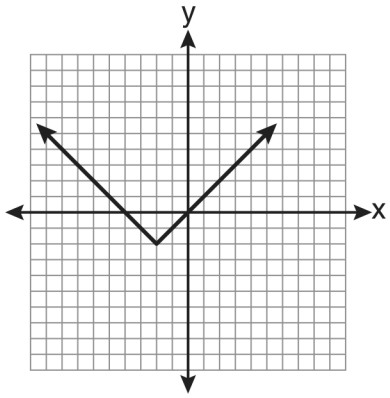
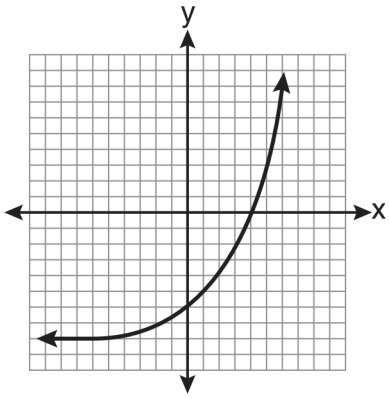
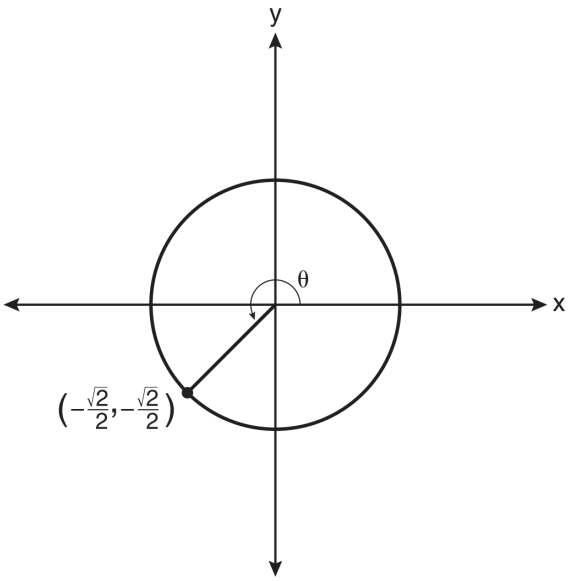


D.



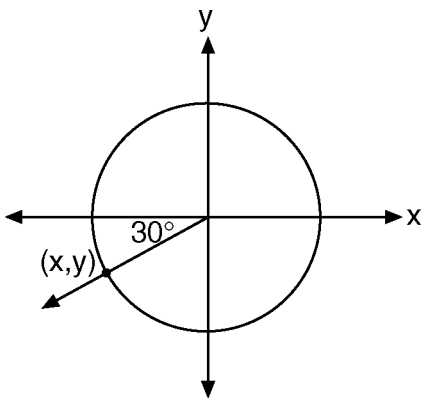
42. In the diagram below of a unit circle, the ordered pair $(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})$ represents the point where the terminal side of θ intersects the unit circle.



What is m$\angle\theta$?

A. 45 B. 135 C. 225 D. 240

43. In the unit circle shown in the accompanying diagram, what are the coordinates of (x, y)?



A. $\left(-\frac{\sqrt{3}}{2}, -0.5\right)$ B. $\left(-0.5, -\frac{\sqrt{3}}{2}\right)$

C. $(-30, -210)$ D. $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

44. Find the value of the following functions:

sin(0) =

cos(0) =

sin (pi/2) =

cos (pi/2) =

sin (pi) =

cos (pi) =

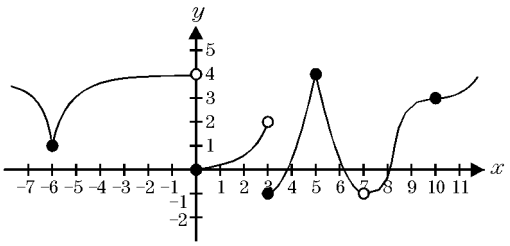
sin (3pi/2) =

cos (3pi/2) =

sin (2pi) =

cos(2pi) =

45. The figure below shows the graph of f. Use the figure to answer the following question(s).



$\lim_{x \to 10} f$ is

A. 1 B. 3 C. 4 D. -1

46. $\lim_{x \to -6} f$ is

A. 1 B. 2 C. 6

D. no limit

47. $\lim_{x \to 5} f$ is

A. 1 B. 2 C. -1

D. 4

48. $\lim_{x \to 0^+} f$ is

A. 2 B. -1 C. 0

D. no limit

49. $\lim_{x \to 0} f$ is

A. 1 B. 0 C. 4

D. no limit

50. $\lim_{x \to 3} f$ is

A. 1 B. 2 C. -1

D. no limit