MATHS

BOOKS - KAPLAN INC MATHS (ENGLISH)

PRACTICE TEST 4

Practice Test

1. If $|2x - 4| \geq \frac{x}{4}$, which of the following statements must be true ?

A. $x \geq \frac{9}{16}$ or $x = \frac{16}{7}$

B. $x \geq \frac{9}{16}$ or $x \leq \frac{7}{16}$

C. $\frac{16}{9} < x < \frac{16}{7}$

D. $x \geq \frac{16}{7}$ or $x \leq \frac{16}{9}$

Answer: D

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2. $f(x) = |4x| - 2x^3$. If $f(a) = 66$, which of the followintg could be the value of a ?

A. -6

B. -4

C. -3

D. 3

Answer: C

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3. If $x \geq 4, A^2 = x^2 + 12x + 36,$ and $B^2 = 4x^2 - 28x + 49,$ then $(A + B)^2 =$

A. $2x^2 + 5x \pm 42$

B. $3x^2 - 9x - 1$

C. $4x^2 - x + 13$

D. $9x^2 - 6x + 1$

Answer: D

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4. $f(x) = 3x^{\frac{2}{3}}$

$f(64) =$

A. 48

B. 128

C. 256

D. 1204

Answer: A

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5. A circle center (3, 8) contains the point (2, -1). Which of the following is also a point on the circle ?

A. (1, -10)

B. (4, 17)

C. (5, -9)

D. (7, 15)

Answer: B

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6. For all $y \neq 5$, $\dfrac{y^3 - 6y^2 + 3y + 10}{y^2 - 10y + 25} =$

A. $\dfrac{y^2 - y + 2}{y + 5}$

B. $\frac{y^2 - y - 2}{y - 5}$

C. $\frac{y^2 + y - 2}{y + 5}$

D. $\frac{y^2 + y - 2}{y - 5}$

Answer: B

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7. Which of the following functions has a domain of $x \leq 3$?

A. $f(x) = (3 - x)^{\frac{1}{4}} + \frac{x}{2}$

B. $f(x) = (x-3)^{\frac{1}{2}} + \frac{x}{2}$

C. $f(x) = (x-2)^{\frac{1}{3}} + \frac{x}{4}$

D. $f(x) = (2-x)^{\frac{1}{4}} + \frac{x}{3}$

Answer: A

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8. If $x^2 - 8x + 13 = 0$, $x =$

A. $-4 \pm \sqrt{3}$

B. $-4 \pm 2\sqrt{3}$

C. $4 \pm \sqrt{3}$

D. $4 \pm 3\sqrt{2}$

Answer: C

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9. What is the perimeter of a triangle with vertices at coordinates (-2, 3), (4, 3), and (6, -3) ?

A. $4\sqrt{11}$

B. $18\sqrt{10}$

C. $10 + 4\sqrt{5}$

D. $16 + 2\sqrt{10}$

Answer: D

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10. $f(x) = x + 4$

$g(x) = 6 - x^2$

What is the maximum value of $g(f(x))$?

A. -6

B. -4

C. 2

D. 6

Answer: D

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11. If $x^{\frac{3}{2}} = 27, x^{\frac{5}{2}} =$

A. 27

B. 81

C. 243

D. 729

Answer: C

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12. Which of the following lines intersects $y = \frac{x}{3} + 5$ at (9, 8) and does not interset the line $y = -3x - 7$?

A. $y = -3x + 13$

B. $y = -3x + 35$

C. $y = -\frac{x}{3} + 8$

D. $y = -\frac{x}{3} + 11$

Answer: B

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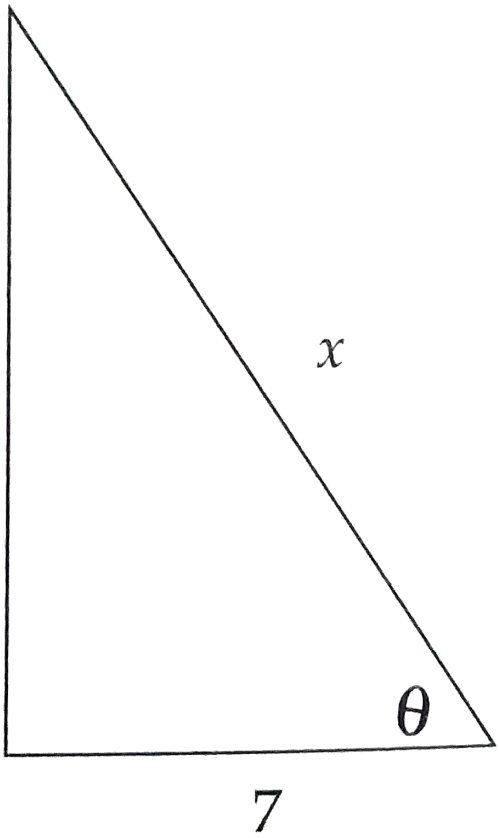
13. In the right triangle in Figure, If $\theta = 67^\circ$, what is the value of x ?



A. 2.9

B. 7.6

C. 16.5

D. 17.9

Answer: D

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14. What is the minimum value of $f(x) = |2x - 5| + 6$?

A. 2

B. 3

C. 5

D. 6

Answer: D

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15. If $\frac{n^n}{n!} = \frac{nx}{(n-1)!}, x =$

A. n^{n-2}

B. n^{n-1}

C. n^{n+1}

D. $n^{\frac{1}{2}}$

Answer: A

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16. $\frac{ac + b^2}{bc} =$

A. $\frac{a}{b} + c$

B. $1 + \frac{ab}{c}$

C. $\frac{a}{c} + b$

D. $\frac{a}{b} + \frac{b}{c}$

Answer: D

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17. The domain of $f(x) = \frac{4}{|x| - x}$ is

A. $x < -4$

B. $x \geq 0$

C. $x < 0$

D. $x > 1$

Answer: C

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18. A square is formed by the points (4, 5), (12, 5), (12, -3), and (4, -3). The diagonals of the square intersect at which of the following points ?

A. (8, 5)

B. (9, 6)

C. (8, 1)

D. (12, 1)

Answer: C

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19. If $s = t + \sqrt{\frac{r^3}{q}}$, what is the value of r in terms of q, s and t ?

A. $\sqrt[3]{qs^2 - qt}$

B. $\sqrt[3]{\frac{s^2 - 2st - t^2}{q}}$

C. $\sqrt[3]{qs^2 - 2qst + qt^2}$

D. $\sqrt{\frac{qs^2 + 2qst - t^2}{3}}$

Answer: C

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20. The hyberbola $\frac{x^2+4x+4}{25}-\frac{y^2-6x+9}{16}=1$ is centered at which of the following points ?

A. (-4, -9)

B. (-2, 3)

C. (2, -3)

D. (5, 4)

Answer: B

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21. If $3^n = n^6$, $n^{18} =$

A. $3^n n^3$

B. $3^n n^{12}$

C. 9^n

D. 3^{12n}

Answer: B

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22. What is the domain of $f(x) = \sqrt{(4-x)^2 - 5}$?

A. $x \leq -3$ or $x \geq 7$

B. $2 - \sqrt{5} \leq x \leq 2 + \sqrt{5}$

C. $x \leq 4 - \sqrt{5}$ or $x \geq 4 + \sqrt{5}$

D. $4 - \sqrt{5} \leq x \leq 4 + \sqrt{5}$

Answer: C

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23. If one solution of $x^2 - 22x + d = 0$ is 6, which of the following could be the value of d ?

A. 36

B. 48

C. 72

D. 96

Answer: D

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24. Which line has a slope of $\frac{5}{3}$?

A. $3x - 5y + 2 = 0$

B. $3x + 5y + 6 = 0$

C. $3x - 4y + 5 = 0$

D. $5x - 3y + 4 = 0$

Answer: D

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25. What is the range of $f(x) = x^3 - \sqrt{-x - 6}$?

A. All real numbers less than or equal to -222

B. All real numbers than or equal to - 216

C. All real numbers greater than or equal to - 216

D. All real numbers greater than or equal to 216

Answer: B

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26. A cone has a slant height of 8 and a lateral area of 48π. What is the radius of the base of the cone ?

A. 3

B. 6

C. 12

D. 16

Answer: B

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27. If $f(x) = 4x - 3$ and $g(x) = x - 4$, which of the following has a value of -11 ?

A. $f(g(2))$

B. $g(f(2))$

C. $g(f(3))$

D. $f(g(3))$

Answer: A

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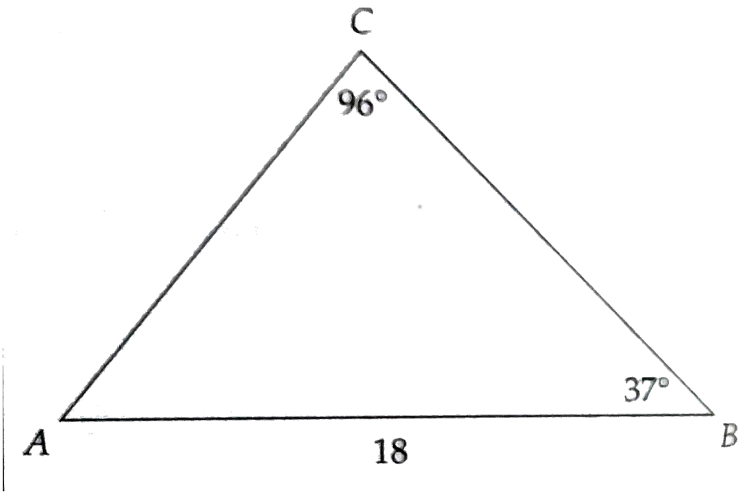
28. What is the length of side AC in Figure



A. 10.77

B. 10.83

C. 10.89

D. 13.16

Answer: C

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29. What is the range of $f(x) = -7\sin.\frac{x}{8}$?

A. All real numbers greater than or equal to -7 and less than or equal to 7

B. All real numbers greater than or equal to -7 and less than or equal to 0

C. All real numbers greater than or equal to 0 and less than or equal to 8

D. All real numbers greater than or equal to 0 and less than or equal to $\frac{1}{8}$

Answer: A

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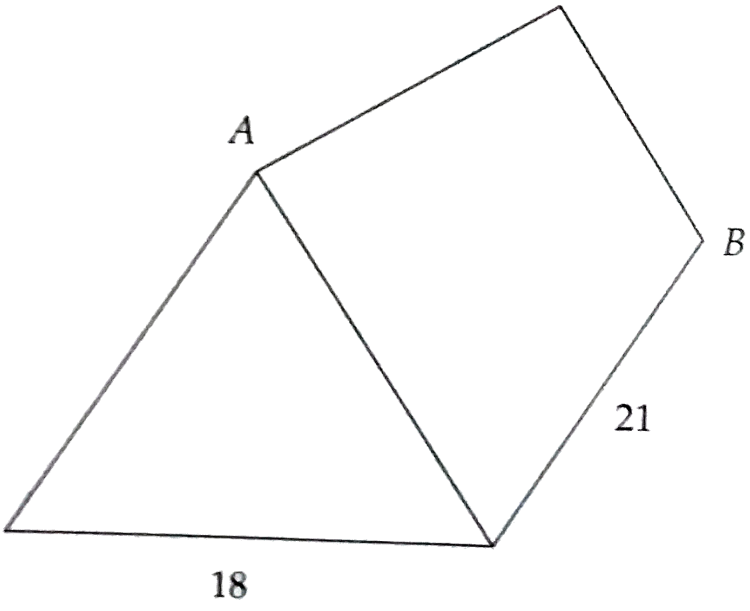
30. In the triangle solid shown in Figure points A and B are vertices. The triangular faces are isosceles. The solid has a height of 12, a length of 21, and a width of 18. What is the distance between A and B ?



A. $9\sqrt{5}$

B. $3\sqrt{58}$

C. $3\sqrt{74}$

D. $3\sqrt{85}$

Answer: C

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31. If $0 \leq x \leq \frac{\pi}{2}$ and $\sin^2 x = a$ and $\cos^2 x = b$, then $\sin 2x + \cos 2x =$

A. $2\sqrt{ab} + b - a$

B. $2ab + a^2 - b^2$

C. $2\sqrt{ab} + 2a - 1$

D. $2ab + 2a - 1$

Answer: A

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32. The mean number of tickets sold daily by a theater over a seven - day period was 52. The theater sold 46 tickets on the last day of that

period. What was the mean number of tickets sold daily over the first six days ?

A. 53

B. 54

C. 55

D. 56

Answer: A

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33. The ratio of the surface area of sphere A to the surface area of sphere B is 729 : 1. What is ratio of the volume of sphere A to sphere B ?

A. $27:1$

B. $81:1$

C. $19,683:1$

D. $26,224:1$

Answer: C

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34. If $f(x) = \frac{2x}{5} + \frac{7}{3}$, $f^{-1}(x) =$

A. $\frac{15}{6x + 35}$

B. $\frac{6}{15x + 35}$

C. $\frac{15x - 6}{35}$

D. $\frac{15x - 35}{6}$

Answer: D

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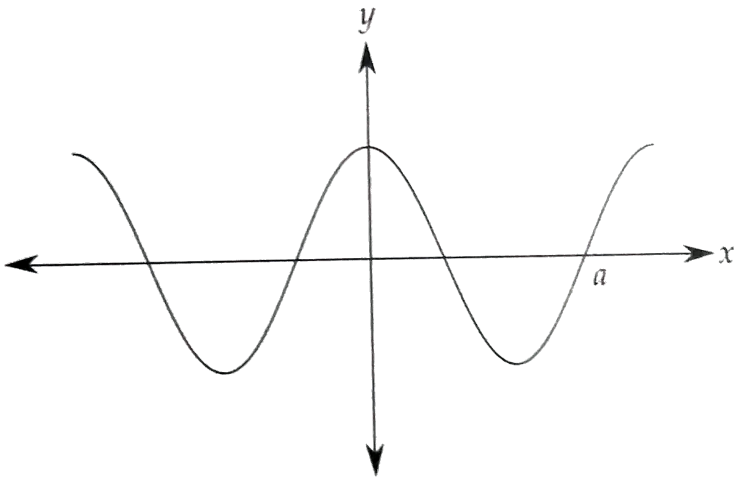
35. The graph of $y = \cos. \frac{x}{2}$ is shown in Figure Point a has coordinates (t, 0). What is the value of t in radians ?



A. $\frac{2\pi}{3}$

B. $\frac{3\pi}{4}$

C. $\frac{3\pi}{2}$

D. 3π

Answer: D

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36. The domain of which function does NOT include 2 ?

A. $f(x) = \dfrac{x^2 - 2x}{x^2 - 2x^3}$

B. $f(x) = \dfrac{x^{-2} - \frac{2}{x}}{x^2 - 2x^2}$

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

D. $f(x) = \dfrac{4x^2}{x^{-2} + 2x}$

Answer: C

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37. The arithmetic sequence $s = \{4, 7, 10, 13, n_s, n_6, \ldots\}$. Which step in the sequence involves a 12% increase over the immediately preceding term ?

A. n_5 to n_6

B. n_6 to n_7

C. n_7 to n_8

D. n_8 to n_9

Answer: D

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38. To what sum does the geometric series $2.8 + 2.1 + 1.575 + \ldots$ converge ?

A. 3.73

B. 4.97

C. 6.47

D. 11.20

Answer: D

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39. $\frac{1-\cos 40^\circ}{2} =$

A. $\cos^2 20^\circ$

B. $\sin^2 20^\circ$

C. $\tan 20^\circ$

D. $\cos 20^\circ$

Answer: B

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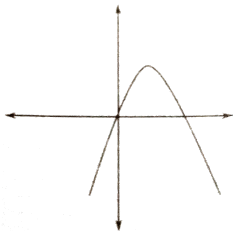
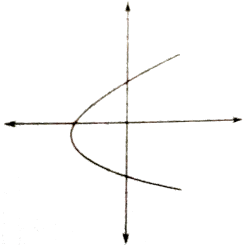
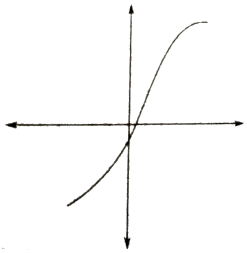
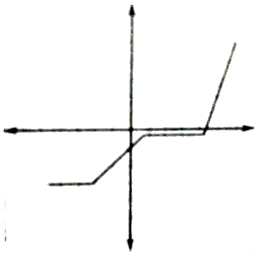
40. Which of the following graphs is NOT a function ?

A. 

B. 

C. 

D. 

Answer: B

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41. What is the angle measure of 4 radians ?

A. 114.591°

B. 141.372°

C. 229.183°

D. 282.743°

Answer: C

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42. The median of the numbers $n+3, n+7, \ldots . N+31, n+35$ is 30. What is the value of n ?

A. 11

B. 14

C. 19

D. 27

Answer: A

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43. If $g(x) = (2x + 3)^2$, then $g\left(\frac{x}{3} - 1\right) =$

A. $\frac{4x^2}{9} + \frac{4x}{3} + 4$

B. $\frac{4x^2}{3} + 2x + 2$

C. $\frac{4x^2 + 2x}{3} + 1$

D. $\frac{4x^2}{9} + \frac{4x}{3} + 1$

Answer: D

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44. What is the amplitude of $y = 3 - 6\sin^2 x$?

A. 2

B. 3

C. 4

D. 6

Answer: B

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45. A spinner has the numbers one through five evenly spaced. If the spinner is used three times, what is the probability that it will land on an odd number exactly once ?

A. $\frac{12}{125}$

B. $\frac{18}{125}$

C. $\frac{27}{125}$

D. $\frac{36}{125}$

Answer: D

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46. What is the arithmetic mean of $\frac{1}{2}, \frac{1}{3}, 2n$ and m ?

A. $\frac{5+12n+6m}{24}$

B. $\frac{5+8n+4m}{24}$

C. $\frac{5+2n+m}{4}$

D. $\frac{5+12n+6m}{6}$

Answer: A

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47. Four letters mailed today each have a $\frac{1}{3}$ probability of arriving in two days sooner. What is the probability that exactly two of the the four letters will arrive in two days or sooner ?

A. $\frac{4}{81}$

B. $\frac{16}{81}$

C. $\frac{6}{27}$

D. $\frac{8}{27}$

Answer: D

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48. Paula jogged for a total of 30 minutes. Her average speed for the first 10 minutes was 5 miles per hour. During the remainder of her time, she jogged 2.5 miles. What was Paula's average for her entire jog ?

A. $6\frac{1}{2}$ mph

B. $6\frac{2}{3}$ mph

C. $7\frac{1}{2}$ mph

D. $7\frac{1}{3}$ mph

Answer: B

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49. The front row of an auditorium has 28 sets. Each of the remaining rows has 3 more sets than the row in front of it. If the auditorium has 32 rows, how many sets does it have ?

A. 1440

B. 2384

C. 2688

D. 2784

Answer: B

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50. Charles put $1,000 in a saving account that ears 2% compound interest each year. The account would earn approximately $126 in how many years ?

A. 5

B. 6

C. 7

D. 8

Answer: B

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