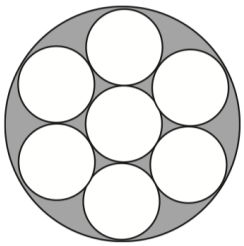
Pre-Calculus Quiz 4 version 1

name:

1. Each of the small circles in the fgure has radius, $r = 4$. The innermost circle is tangent to the six circles that surround it, and each of those circles is tangent to the large circle and to its small-circle neighbors. What is the area of the shaded region?



A $96\,\pi$ B $120\,\pi$ C $48\,\pi$ D $144\,\pi$
E none of these

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2. Find the real solution/s to

$$\log_4 (10\,x + 2)\,(7\,x + 2) = 1$$

A $[x = \frac{15}{8}, x = -\frac{7}{2}]$
B $[x = -\frac{17}{35}, x = 0]$
C $[x = -\frac{5}{7}, x = \frac{4}{3}]$
D none of these

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3. Find the real solution/s to

$$\log_3 (8\,x - 3)\,(10\,x - 3) = 2$$

A $[x = -\frac{47}{42}, x = \frac{3}{2}]$
B $[x = -\frac{4}{5}, x = \frac{4}{5}]$
C $[x = \frac{27}{40}, x = 0]$
D none of these

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4. Assume $A \neq 0$ and is real, suppose

$$f(t) = Ae^{\left(\frac{4}{3}\,t\right)}$$

Solve for t in the following equation

$$f(t) = 4\,A$$

A $[t = \frac{69}{2}\,\log(2)]$
B $[t = \frac{20}{3}\,\log(6)]$
C $[t = 22\,\log(12)]$
D $[t = 2\,\log(6)]$
E $[t = \frac{3}{2}\,\log(2)]$
F none of these

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5. Find the real solution/s to

$$\log_8 (x + 5) + \log_8 (9\,x + 9) = 2$$

A $[x = \frac{5}{42}, x = \frac{2}{3}]$
B $[x = -\frac{19}{3}, x = \frac{1}{3}]$
C $[x = -\frac{24}{7}, x = \frac{3}{2}]$
D none of these

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6. Find the real solution/s to

$$\log_6 (3\,x - 7)\,(10\,x + 6) = 1$$

A $[x = \frac{27}{20}, x = 0]$
B $[x = \frac{12}{5}, x = -\frac{2}{3}]$
C $[x = -\frac{15}{2}, x = -\frac{1}{4}]$
D none of these

7. Find the equation defining the inverse function of $f : \mathbf{A} \to \mathbf{A}$ where $\mathbf{A}$ is a suitable subset of the complex numbers and given that

$$f(x) = \frac{7x-2}{3(x-1)}$$

A $\left[y = \frac{3x-2}{3x-7}\right]$

B $\left[y = -\frac{2x+3}{4x+1}\right]$

C $\left[y = \frac{2(x-2)}{5(x-1)}\right]$

D $\left[y = \frac{3x-4}{5x-4}\right]$

E $\left[y = -\frac{7x+6}{4x-1}\right]$

F none of these

8. Suppose

$$f(x) = \left(\frac{1}{64}\right)^{-8x-7}$$

Solve for x in the following equation

$$f(x) = 16384$$

A $\left[x = \left(-\frac{19}{32}\right)\right]$

B $\left[x = \left(-\frac{23}{12}\right)\right]$

C $\left[x = \left(-\frac{1}{6}\right)\right]$

D $\left[x = \left(-\frac{7}{12}\right)\right]$

E $\left[x = \left(-\frac{26}{49}\right)\right]$

F none of these

9. An initial investment of 1000 dollars is appreciated for 83 years in an account that earns 21 percent interest, compounded 29 time/s annually. Find the amount of money in the account at the end of the period.

A 53219.181 B 1642667.747 C 34871986874.6
D 6448266.06 E 10976772.877 F none of these

10. An initial investment of 11000 dollars is appreciated for 62 years in an account that earns 4 percent interest, compounded 65 time/s annually. Find the amount of money in the account at the end of the period.

A 131253.755 B 4703.955 C 2486221745.28
D 132385251.585 E 825608.28 F none of these

11. An initial investment of 21500 dollars is appreciated for 66 years in an account that earns 4 percent interest, compounded 91 time/s annually. Find the amount of money in the account at the end of the period.

A $3.89240446421 \times 10^{13}$ B $2.88329186774 \times 10^{15}$
C $7.2285710166 \times 10^{13}$ D $1.45122217769 \times 10^{14}$
E 301109.169 F none of these

12. The ratio

$$\frac{5^{4000} + 5^{4002}}{5^{4001} + 5^{4001}}$$

is closest to which of the following numbers?

A $\frac{13}{10}$ B $\frac{13}{16}$ C $\frac{26}{15}$ D $\frac{26}{25}$ E $\frac{26}{5}$
F $\frac{26}{29}$ G $\frac{13}{5}-$ H none of these

13. The number

$$8000 \cdot (8000)^{8000}$$

is the same as which of the following?

A $8000^{64000000}$ B 16000^{8000} C 64000000^{8000}
D 64000000^{16000} E 16000^{8001} F 8000^{16000}
G 8000^{8001} H none of these

14.

Solve the equation.

$$9^{-5\,x+4} = 3^{3\,x+5}$$

A $[x = 5]$

B $[x = 2]$

C $\left[x = \left(\frac{3}{13}\right)\right]$

D $\left[x = \left(\frac{6}{5}\right)\right]$

E $[x = (-2)]$

F none of these

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15. Solve

$$\pi^{x+1} = e^{(2\,x+2)}$$

A $\left[x = \frac{3\,(\log(\pi)-1)}{2\,(\log(\pi)+1)}\right]$

B $\left[x = \frac{\log(\pi)+3}{3\,\log(\pi)-4}\right]$

C $[x = (-1)]$

D $\left[x = \frac{4\,\log(\pi)+1}{2\,\log(\pi)+5}\right]$

E $\left[x = -\frac{2\,(\log(\pi)-2)}{5\,\log(\pi)+3}\right]$

F none of these

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16. Assume $A \neq 0$ and is real, suppose

$$f\,(t) = Ae^{\left(-\frac{1}{2}\,t\right)}$$

Solve for t in the following equation

$$f\,(t) = \frac{1}{11}\,A$$

A $\left[t = 5\,\log\left(\frac{7}{2}\right)\right]$

B $[t = 6\,\log(5)]$

C $[t = 8\,\log(9)]$

D $\left[t = 3\,\log\left(\frac{1}{2}\cdot 5^{\frac{1}{5}}2^{\frac{4}{5}}\right)\right]$

E $[t = 2\,\log(11)]$

F none of these

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17. Find the positive real solution/s to

$$\log_x(cCc) = cAc$$

A $cBAD1c$ B $cSOLc$ C $cBAD2c$ D none of these

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18. Find the real solution/s to

$$\log_3(19\,x-2)\,(12\,x-9) = 4$$

A $\left[x = \frac{21}{19}, x = -\frac{1}{4}\right]$

B $\left[x = -\frac{1}{2}, x = -\frac{7}{6}\right]$

C $\left[x = -\frac{9}{5}, x = \frac{1}{3}\right]$

D none of these

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19. Find the real solution/s to

$$\log_6(7\,x-6)\,(x-5) = 2$$

A $\left[x = -3, x = \frac{19}{13}\right]$

B $\left[x = 6, x = -\frac{1}{7}\right]$

C $\left[x = -\frac{3}{4}, x = \frac{18}{35}\right]$

D none of these

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20. An initial investment of 8500 dollars is appreciated for 76 years in an account that earns 36 percent interest, compounded 16 time/s annually. Find the amount of money in the account at the end of the period.

A 174539.871 B 1939171.777 C 437627.619 D $4.78643326184 \times 10^{15}$ E 2876427717.76 F none of these

21. Assume $A \neq 0$ and is real, suppose

$$f(t) = Ae^{\left(\frac{2}{5}t\right)}$$

Solve for t in the following equation

$$f(t) = \frac{7}{2}A$$

A $\left[t = 5 \log\left(\frac{1}{2}\sqrt{7}\sqrt{2}\right)\right]$

B $[t = 3 \log(8)]$

C $\left[t = \frac{3}{2} \log(5)\right]$

D $\left[t = \frac{3}{5} \log(7)\right]$

E $[t = 11 \log(11)]$

F none of these

22. Suppose

$$f(x) = \left(\frac{1}{27}\right)^{-3x+3}$$

Solve for x in the following equation

$$f(x) = 9$$

A $\left[x = \left(\frac{11}{8}\right)\right]$

B $\left[x = \left(\frac{11}{9}\right)\right]$

C $\left[x = \left(-\frac{30}{49}\right)\right]$

D $\left[x = \left(\frac{5}{28}\right)\right]$

E $\left[x = \left(-\frac{7}{6}\right)\right]$

F none of these

23. Assume $A \neq 0$ and is real, suppose

$$f(t) = Ae^{\left(-\frac{5}{23}t\right)}$$

Solve for t in the following equation

$$f(t) = \frac{1}{12}A$$

A $\left[t = \frac{23}{5} \log(12)\right]$

B $\left[t = \frac{1}{4} \log(7)\right]$

C $\left[t = \frac{13}{2} \log(2)\right]$

D $\left[t = \frac{5}{6} \log(3)\right]$

E $\left[t = 19 \log\left(\frac{1}{2} \cdot 11^{\frac{1}{6}} 2^{\frac{5}{6}}\right)\right]$

F none of these

24. Suppose

$$f(x) = \left(\frac{1}{27}\right)^{3x+5}$$

Solve for x in the following equation

$$f(x) = \left(\frac{1}{9}\right)$$

A $\left[x = \left(-\frac{5}{8}\right)\right]$

B $\left[x = \left(\frac{9}{4}\right)\right]$

C $\left[x = \left(\frac{11}{4}\right)\right]$

D $\left[x = \left(\frac{7}{6}\right)\right]$

E $\left[x = \left(-\frac{13}{9}\right)\right]$

F none of these

25. Suppose

$$f(x) = \left(\frac{1}{64}\right)^{6x+5}$$

Solve for x in the following equation

$$f(x) = 16384$$

A $\left[x = \left(-\frac{3}{28}\right)\right]$

B $\left[x = \left(-\frac{11}{9}\right)\right]$

C $\left[x = \left(\frac{2}{5}\right)\right]$

D $\left[x = \left(-\frac{1}{3}\right)\right]$

E $\left[x = \left(\frac{16}{21}\right)\right]$

F none of these

26. Find the real solution/s to

$$\log_{10}(18x-1)+\log_{10}(2x+10)=2$$

A $[x=\frac{5}{9}, x=-\frac{11}{2}]$

B $[x=-\frac{69}{55}, x=1]$

C $[x=-\frac{2}{3}, x=-\frac{1}{6}]$

D none of these

27. Let us define the operator ♣ such that

$$\clubsuit(a,b,c)=-\frac{b-c}{2a-c}$$

for any three real numbers a, b, c where the denominator is non-zero. Determine the value of $\clubsuit(\clubsuit(-4,-1,3),\clubsuit(-1,3,-4),\clubsuit(3,-4,-1))$

A -13 B $-\frac{1}{6}$ C $-\frac{15}{4}$ D $-\frac{605}{178}$ E $-\frac{5}{18}$ F none of these

28. Solve the equation.

$$4^{6x+5}=\left(\frac{1}{2}\right)$$

A $[x=(-\frac{11}{7})]$

B $[x=(-4)]$

C $[x=(-\frac{11}{12})]$

D $[x=1]$

E $[x=(-\frac{13}{6})]$

F none of these

29. Find the real solution/s to

$$-\frac{1}{2}e^{(-x)}+\frac{1}{2}e^{x}=2$$

A $[x=\log(\frac{1}{2}\sqrt{29}+\frac{5}{2})]$

B $[x=\log(\frac{1}{2}\sqrt{229}-\frac{15}{2})]$

C $[x=\log(\sqrt{13}\sqrt{5}+8)]$

D $[x=\log(\sqrt{5}+2)]$

E $[x=\log(\frac{1}{2}\sqrt{13}+\frac{3}{2})]$

F none of these

30. Find the equation defining the inverse function of $f : \mathbf{A} \to \mathbf{A}$ where $\mathbf{A}$ is a suitable subset of the complex numbers and given that

$$f(x)=-\frac{8x-7}{2(3x+1)}$$

A $\left[y=-\frac{2(3x+1)}{6x-7}\right]$

B $\left[y=\frac{4x-5}{8(x-1)}\right]$

C $\left[y=-\frac{2x-7}{2(3x+4)}\right]$

D $\left[y=\frac{2x-5}{6x+7}\right]$

E $\left[y=-\frac{x+7}{2(x+3)}\right]$

F none of these