Worked Solutions for ENGAA Papers by Topic

Section 1

Topic: Exponentials & Algorithms

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ENGAA S1 2020 - Question 38

38 Find the product of the real roots of the equation

$$\left(\log_{10} x^2\right)^2 + \log_{10} x = 3$$

A $10^{-\frac{3}{2}}$ **B** 10^{-1} **C** $10^{-\frac{1}{2}}$ **D** $10^{-\frac{1}{4}}$ **E** $10^{\frac{3}{5}}$ **F** 10^{1}

ENGAA S1 2020 - Question 38 - Worked Solution



Answer is D

ENGAA S1 2019 - Question 31

31 Which one of the following is the real solution of the equation

 $3 \times 5^{2x+1} - 5^x - 2 = 0$



Answer is B

ENGAA Specimen S1 - Question 23

23 Given that $a^{x}b^{2x}c^{3x} = 2$, where a, b, and c are positive real numbers, then x =

A
$$\log_{10}\left(\frac{2}{a+2b+3c}\right)$$

B $\frac{\log_{10}2}{\log_{10}(a+2b+3c)}$
C $\frac{2}{\log_{10}(a+2b+3c)}$
D $\frac{2}{a+2b+3c}$
E $\log_{10}\left(\frac{2}{ab^2c^3}\right)$
F $\frac{\log_{10}2}{\log_{10}(ab^2c^3)}$
G $\frac{2}{\log_{10}(ab^2c^3)}$
H $\frac{2}{ab^2c^3}$
ENGAA Specimen S1 - Question 23 - Worked Solution

$$a^{x}b^{2x}c^{3x} = 2$$

Take logs

$$log log a^{x} + log log b^{2x} + log log c^{3x} = log log 2$$

$$x log log a + 2x log log b + 3x log log c = log log 2$$

$$x(log log a + 2 log log b + 3 log log c) = log log 2$$

$$x(log log ab^{2}c^{3}) = log log 2$$

$$x(log log ab^{2}c^{3}) = log log 2$$

$$x = \frac{2}{(ab^{2}c^{3})}$$

Answer is F

ENGAA Specimen S1 - Question 27

27 The sum of the roots of the equation $2^{2x} - 8 \times 2^{x} + 15 = 0$ is

A 3

- **B** 8
- C 2log₁₀ 2
- $D = \log_{10}\left(\frac{15}{4}\right)$
- $\textbf{E} \quad \frac{\log_{10} 15}{\log_{10} 2}$

ENGAA Specimen S1 - Question 27 - Worked Solution



Answer is E

ENGAA Specimen S1 - Question 33

33 The variables x and y and the constants a and b are real and positive. The variables x and y are related.

A graph of $\log y$ against $\log x$ is drawn.

For which one of the following relationships will this graph be a straight line?

- A $y^6 = a^x$
- **B** $y = ab^x$
- **c** $y^2 = a + x^b$
- **D** $y = ax^b$
- **E** $y^x = a^b$

ENGAA Specimen S1 - Question 33 - Worked Solution



Answer is D

ENGAA S1 2018 - Question 41

41 Evaluate

$$\log_2\left(\frac{5}{4}\right) + \log_2\left(\frac{6}{5}\right) + \log_2\left(\frac{7}{6}\right) + \dots + \log_2\left(\frac{64}{63}\right)$$

$$A \quad -2$$

$$B \quad 3$$

$$C \quad 4$$

$$D \quad 6$$

$$E \quad \log_2(3!)$$

$$F \quad \log_2 60$$

$$ENGAA S1 2018 - Question 41 - Worked Solution$$

$$= \begin{bmatrix} 5 \times 6 \times 7 \times ... \times 64 \\ 14 \times 5 \times 6 \times ... \times 63 \end{bmatrix}$$

$$= 4$$
Answer is C.

Answer is

ENGAA S1 2017 - Question 33

33 Which of the following is a solution to the equation $3^{(2x+1)} - 6(3^x) = 0$?

- A $\log_2 3$
- **B** log₃2
- **C** 2
- D log₁₀2
- $E \frac{2}{3}$

ENGAA S1 2017 - Question 33 - Worked Solution



Answer is B

ENGAA S1 2017 - Question 37

- 37 It is given that $y = 8^{p}$ and $z = \left(\frac{1}{2}\right)^{2q}$ where *p* and *q* are real numbers. Which of the following expressions is a simplification of $\log_2\left(\frac{y^3}{z^2}\right)$?
- Α 6p-4qВ 6p+4qC = 6p - 8qD 6p + 8qE 9p-4qF 9p + 4qnission G 9p - 8q9p + 8qн ENGAA S1 2017 - Question 37 - Worked Solution $= (y^3) - (z^2)$ $\left(\frac{y^3}{z^2}\right)$ $= (8^{3p})$ $3p(8) - 4q\left(\frac{1}{2}\right)$ $= 3p(2^3) - 4q \log \log (2 - 1)$ $= 3p \times 3 - 4q \times -1$ = 9p + 4q

Answer is F

ENGAA S1 2016 - Question 25

