



Solving exponential equations

Student name: _____ Score: _____

1. Find the **exact** solution of the equation $16^{2x} = 64^{(1-x)}$

2. Solve this equation giving the **exact** solution.

$$\ln(x - 5) = 3$$

3. Solve this equation giving the **exact** solution.

$$10^{3x} = 600$$

4. Solve this equation giving the **exact** solution.

$$3^{4x} = 9^{x-1}$$

5. Solve this equation giving the **exact** solution.

$$5^{2x} = 30$$

6. Solve this equation giving the **exact** solution.

$$e^{2x} = 18$$

7. Solve the equation $\log_5(2x + 1) - \log_5(2x - 3) = 1$

8. (a) Given that $(3^x)^2 + (3^x) - 42$ can be written as $(3^x + p)(3^x + q)$, where $p, q \in \mathbb{Z}$, find the value of p and of q .

(b) Hence find the exact solution of the equation $(3^x)^2 + (3^x) - 42 = 0$ and explain why there is only one solution.

9. Solve the equation $\log_3(2x + 3) + \log_3(2x - 3) = 3$

10. Solve for x , giving an exact answer

$$4(2)^{-x} = 0.12$$

11. Solve for x , giving an exact answer

$$300(5)^{0.1x} = 1000$$

12. Solve for x , giving an exact answer

$$32(3)^{-0.25x} = 4$$

13. Solve for x , giving an exact answer

$$e^{\frac{x}{2}} = 5$$

14. Solve for x , giving an exact answer

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



15. Solve this equation giving your answer to **3 significant figures**.

$$2^{4x} = 75$$

16. Solve this equation giving your answer to **3 significant figures**.

$$(3^{(x+1)})^2 = 480$$

17. Solve this equation giving your answer to **3 significant figures**.

$$7^{(2x+3)} = 1000$$

18. Solve this equation giving your answer to **3 significant figures**.

$$(0.8)^{3x} = 0.1$$

19. Solve this equation giving your answer to **3 significant figures**.

$$e^{2x} = 300$$



Solving exponential equations

Student name: _____ **ANSWERS** Score: _____

1. Find the **exact** solution of the equation $16^{2x} = 64^{(1-x)}$

2. Solve the following equations, giving the **exact** solution.

$$\ln(x-5) = 3 \quad x = e^3 + 5$$

3. Solve the following equations, giving the **exact** solution

$$10^{3x} = 600 \quad x = \frac{\log 600}{3}$$

4. Solve the following equations, giving the **exact** solution

$$3^{4x} = 9^{x-1} \quad x = -1$$

5. Solve the following equations, giving the **exact** solution

$$5^{2x} = 30 \quad x = 2$$

6. Solve the following equations, giving the **exact** solution

$$e^{2x} = 18 \quad x = \frac{\log 18}{2}$$

7. Solve the equation $\log_5(2x+1) - \log_5(2x-3) = 1$ $x = 2$

8. (a) Given that $(3^x)^2 + (3^x) - 42$ can be written as $(3^x + p)(3^x + q)$, where $p, q \in \mathbb{Z}$, find the value of p and of q .

$$p = 7; q = -6$$

(b) Hence find the exact solution of the equation $(3^x)^2 + (3^x) - 42 = 0$ and explain why there is only one solution.

$$x = \frac{\ln 6}{\ln 3} \quad 3^x + 7 = 0 \quad 3^x = -7$$

No real solution

9. Solve the equation $\log_3(2x+3) + \log_3(2x-3) = 3$ $x = 3$, only one solution

10. Solve for x , giving an exact answer

$$4(2)^{-x} = 0.12 \quad x = -\frac{\log 0.03}{\ln 2}$$

11. Solve for x , giving an exact answer

$$300(5)^{0.1x} = 1000 \quad x = \frac{10 \log(\frac{10}{3})}{\log 5}$$

12. Solve for x , giving an exact answer

$$32(3)^{-0.25x} = 4 \quad x = \frac{-4 \log(\frac{1}{8})}{\log 3}$$

13. Solve for x , giving an exact answer

$$e^{\frac{x}{2}} = 5 \quad x = 2 \ln 5$$

14. Solve for x , giving an exact answer

$$e^{-\frac{x}{2}} = 1 \quad x = 0$$



15. Solve this equation giving your answer to **3 significant figures**.

$$2^{4x} = 75 \qquad x = 1.56$$

16. Solve this equation giving your answer to **3 significant figures**.

$$(3^{(x+1)})^2 = 480 \qquad x = 1.81$$

17. Solve this equation giving your answer to **3 significant figures**.

$$7^{(2x+3)} = 1000 \qquad x = 0.275$$

18. Solve this equation giving your answer to **3 significant figures**.

$$(0.8)^{3x} = 0.1 \qquad x = 3.44$$

19. Solve this equation giving your answer to **3 significant figures**.

$$e^{2x} = 300 \qquad x = 2.85$$