

More problems for section 5.3 of *Essentials of Precalculus with Calculus Previews* by Zill and Dewar, 6e.

1. Solve for x . (Hint: a^x is always positive.)

a. $2^{1-3x} = \frac{1}{8}$	b. $2^{1+x} = 4^{1-x}$	c. $4 + 2^{2-x} = 0$
d. $3^{2-x} = 1$	e. $3^{2x-1} = 9$	f. $2^{3-x} = 16^{-x}$
g. $3^{3x} = \frac{1}{3}$	h. $3^{2x+4} = 27^{x-2}$	i. $3^x \cdot 3^{2+x} = 9^{3x}$
j. $10^{-3x} = 1,000,000$	k. $10^{-2x+4} = \frac{1}{10,000}$	l. $1 - 10^{4x+1} = 0$

2. Solve for x . No calculators. (Hint: a^{2x} is the same as $(a^x)^2$.)

a. $(3^x)^2 - 6 \cdot 3^x - 27 = 0$	b. $2^{2x} - 12 \cdot 2^x + 32 = 0$	c. $2^{2x} - 2 \cdot 2^x - 8 = 0$
d. $2 \cdot 2^{2x} - 17 \cdot 2^x + 8 = 0$	e. $3 \cdot 3^{2x} - 28 \cdot 3^x = -9$	f. $25 \cdot 5^{2x} - 1 = 0$
g. $2^{2x} + 2^x - 6 = 0$	h. $4 \cdot 2^{2x} - 17 \cdot 2^x + 4 = 0$	i. $9 \cdot 3^{2x} - 244 \cdot 3^x + 27 = 0$

3. Solve for x . No calculators.

a. $\ln(x-3) + \ln(x-4) = \ln 2$	b. $\ln(x+1) + \ln(x-4) = \ln 6$	c. $\log_6(x+1) + \log_6(x-4) = 1$
d. $\ln(3x) - \ln(x+1) = \ln 2$	e. $\ln(x+2) - \ln(x-1) = \ln 2$	f. $\log_2(x-1) - \log_2(2x+1) = 3$
g. $e^{x+2} = 1$	h. $e^{2x-1} = -3$	i. $3^x = 4$
j. $2^x = 8^{x-1}$	k. $9^x = 27^{2x+1}$	l. $4^x = 3^{x+1}$
m. $10^{-x} = 7^{2x+1}$	n. $3^{x+2} = 5^{x-1}$	o. $8^{3x} = 6^{1-x}$
p. $2^{x+1} = 3^{1-x}$	q. $e^{2x+1} = 4$	r. $e^{2-x} = 1$
s. $e^{4+x} = 2$	t. $2^{1-3x} = 5$	u. $3^{2x} = 7$
v. $3^{1-x} = 12$	w. $2^{x+4} = e^x$	x. $5^{x-1} = e^{2x}$
y. $5^x = -3^{2x}$	z. $e^{2x} - 9e^x + 20 = 0$	27. $3^{2x} + 3^x - 6 = 0$

Answers

1a. $x = 4/3$ 1b. $x = 1/3$ 1c. no solution 1d. $x = 2$ 1e. $x = 3/2$ 1f. $x = -1$ 1g. $x = -1/3$ 1h. $x = 10$ 1i. $x = 1/2$
 1j. $x = -2$ 1k. $x = 4$ 1l. $x = -1/4$ 2a. $x = 2$ ($3^x = -3$ has no solutions.) 2b. $x = 2$ or $x = 3$ 2c. $x = 2$ 2d. $x = -1$ or
 $x = 3$ 2e. $x = -1$ or $x = 2$ 2f. $x = -1$ 2g. $x = 1$ 2h. $x = \pm 2$ 2i. $x = -2$ or $x = 3$ 3a. $x = 5$ 3b. $x = 5$ 3c. same as
 part b. 3d. $x = 2$ 3e. $x = 4$ 3f. No solutions. 3g. $x = -2$ 3h. no solutions 3i. $x = \ln 4 / \ln 3$ 3j. $x = 3/2$ 3k. $x = -3/4$
 3l. $x = \ln 3 / (\ln 4 - \ln 3)$
 3m. $x = (-\ln 7) / (2 \ln 7 + \ln 10)$ 3n. $x = (2 \ln 3 + \ln 5) / (\ln 5 - \ln 3)$ 3o. $x = (\ln 6) / (3 \ln 8 + \ln 6)$ 3p. $x = (\ln 3 - \ln 2) / (\ln 3 + \ln 2)$
 3q. $x = \frac{1}{2}(-1 + \ln 4)$ 3r. $x = 2$ 3s. $x = -4 + \ln 2$ 3t. $x = \frac{1}{3}(1 - (\ln 5) / (\ln 2))$ 3u. $x = \frac{1}{2}(\ln 7) / (\ln 3)$ 3v. $x = -(\ln 4) / (\ln 3)$
 3w. $x = (4 \ln 2) / (1 - \ln 2)$ 3x. $x = (-\ln 5) / (2 - \ln 5)$ 3y. no solutions 3z. $x = \ln 4$ or $x = \ln 5$ 327. $x = \log_3 2$