

* methods in boxes are not "required" by ministry guidelines.

Solving Exponential Equations

* may want to use TI-83 to show finding intersection to get solution.

1. Solve for the value of x:

a) $2^x = 2^{10}$

↳ bases are the same so exponents must be the same.

∴ $x = 10$

b) $2^x = 8$

∴ $2^3 = 8$
 $2^x = 2^3$
 $x = 3$

c) $8^x = 2^6$

$8^x = 64$

x	8^x
0	1
1	8
2	64

∴ $x = 2$

rewrite so both powers have the same base

$8^x = 2^6$
 $(2^3)^x = 2^6$
 $2^{3x} = 2^6$
 $3x = 6$
 $x = 2$

d) $3^{x+2} = 3^5$

$x+2$ has to be 5
 $x = 3$

e) $8^{x-2} = 2^{x+4}$

x	8^{x-2}	2^{x+4}
2	8^0	2^6
3	8^1	2^7
4	$8^2 = 64$	$2^8 = 256$
5	$8^3 = 512$	$2^9 = 512$

the same
 So $x = 5$

$8^{x-2} = 2^{x+4}$
 $(2^3)^{x-2} = 2^{x+4}$
 $2^{3x-6} = 2^{x+4}$
 $3x-6 = x+4$
 $3x-x = 4+6$
 $2x = 10$
 $x = 5$

f) $5^{x+2} - 5^x = 24$

x	$5^{x+2} - 5^x$
1	$5^3 - 5 = 120$ x
2	$5^4 - 5^2 = 625 - 25$ x
0	$5^2 - 5^0 = 25 - 1 = 24$ ✓

∴ $x = 0$

recall: $x^4 + x^5y + x^3y^2 = x^3(x + x^2y + y^2)$
 $5^{x+2} - 5^x = 24$
 $5^x(5^2 - 1) = 24$
 $5^x(25 - 1) = 24$
 $5^x(24) = 24$
 $5^x = 1$
 $5^x = 5^0$
 $x = 0$

$3^{3x+1} = 27^x$
 $(3^3)^{3x+1} = (3^3)^x$
 $3^{6x+2} = 3^{3x}$
 $6x+2 = 3x$
 $6x-3x = -2$
 $3x = -2$
 $x = -\frac{2}{3}$

* will not have question with fraction answer on test.

g) $9^{3x+1} = 27^x$

x	9^{3x+1}	27^x
1	9^4 x	27
2	9^7 x	27^2
0	9	1 closer
-1	$9^{-2} = \frac{1}{81}$	$2^{-1} = \frac{1}{27}$ x

wah!

page 23 #1-6 eoo, 9abd, 10abf
 11 challenge

11 eoo, 11abd, 11c, 11d, 11e, 11f, 11g, 11h, 11i, 11j, 11k, 11l, 11m, 11n, 11o, 11p, 11q, 11r, 11s, 11t, 11u, 11v, 11w, 11x, 11y, 11z