Math Xb—Spring 2004

Properties of Exponents

Note that $\log x = \log_{10} x$ and $\exp(x) = e^x$.

1. Find the expression that is equivalent to

$$\frac{(xy)^{-3}}{xy^{-3}}.$$

(a) xy^3
(b) $\dfrac{1}{x^4}$
(c) $\dfrac{1}{xy^3}$
(d) $\dfrac{x}{y^3}$
(e) x^4

2. Find the expression that is equivalent to

$$2^{5x}.$$

(a) $e^{2x \ln 5}$
(b) $e^{2 \ln x}$
(c) $e^{5x \ln 2}$
(d) $e^{5 \ln x}$
(e) $e^{10 \ln x}$

3. Find the expression that is equivalent to

$$\frac{(a^{-x+1}b)^3}{(a^2b^3)^x}.$$

(a) $\dfrac{(ab)^x}{(a^5b^3)^3}$
(b) $\dfrac{(a^5b^3)^x}{(ab)^3}$
(c) $\dfrac{(ab)^3}{(a^5b^3)^x}$
(d) $\dfrac{(a^5b^3)^3}{(ab)^x}$
(e) $a^{-2x-1}b^{6+x}$

4. Find the expression that is equivalent to

$$a^{2x} + a^{x+1}.$$

(a) $(a^x + a)a^x$
(b) a^{3x+1}
(c) a^{2x^2+2x}
(d) $(a^x + a)a$
(e) None of the above.

5. Find the expression that is equivalent to

$$(ab^2)^x + \left(\frac{a}{b}\right)^{-x}.$$

(a) $\left(\frac{a^x}{b^x} + a^x\right) b^x$
(b) $\left(a^x b^x + \frac{1}{b^x}\right) b^x$
(c) $\left(a^x b^x + \frac{1}{b^x}\right) a^x$
(d) $\left(a^x b^x + \frac{1}{a^x}\right) a^x$
(e) $\left(a^x b^x + \frac{1}{a^x}\right) b^x$

6. Find the expression that is equivalent to

$$\frac{a^{2x} - b^{2x}}{a^x + b^x}.$$

(a) $a^x + b^x$
(b) $a^x b^x$
(c) $\frac{a^{2x} - b^{2x}}{2}$
(d) $\frac{a^{2x} + b^{2x}}{2}$
(e) $a^x - b^x$

7. Find the expression that is equivalent to

$$e^{2x} + e^x - 2.$$

(a) $(e^x - 1)(e^x + 2)$
(b) $e^{3x} - 2$
(c) $(e^x - 1)(e^x - 2)$
(d) $(e^x + 1)(e^x + 2)$
(e) $(e^x + 1)(e^x - 2)$

8. Find the expression that is equivalent to

$$e^{-(\ln x)/2}.$$

(a) $-\dfrac{1}{\sqrt{x}}$
(b) $\dfrac{1}{\sqrt{x}}$
(c) $-\sqrt{x}$
(d) $-\dfrac{x}{2}$
(e) $\sqrt{x}$

9. Find the expression that is equivalent to

$$e^{2\ln x - \ln y}.$$

(a) $2x - y$
(b) $\dfrac{y}{x^2}$
(c) $\dfrac{x^2}{y}$
(d) $x^2 - y$
(e) $\dfrac{x}{y^2}$

10. Find the expression that is equivalent to

$$5e^{-3\ln 2}.$$

(a) $\dfrac{8}{5}$
(b) -40
(c) -30
(d) $\dfrac{5}{8}$
(e) $-\dfrac{5}{8}$

Answers

1. b	3. c	5. e	7. a	9. c
2. c	4. a	6. e	8. b	10. d