

MTH 121
Some Review Problems for Exam 1
Spring 2013

No calculators. (For this exam, assume any variables represent positive numbers.)

These formulas may or may not be useful:

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2) \qquad a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

1. Is $\frac{6}{3}$ a natural number? a whole number? an integer? a rational number? an irrational number?

2. Evaluate: $|-1| - |-2|$

3. Use absolute value notation to describe the situation.

The distance between x and 5 is no more than 3.

4. Evaluate the expression for the given value of x .

$$x^2 - 3x + 4 \qquad x = -2$$

5. Identify the rule of algebra illustrated by the statement.

(a) $x + 9 = 9 + x$

(b) $2(x + 3) = 2 \cdot x + 2 \cdot 3$

(c) $x + (y + 10) = (x + y) + 10$

6. Perform the operation and simplify: $\frac{5}{8} - \frac{5}{12} + \frac{1}{6}$

7. Perform the operation and simplify: $12 \div \frac{1}{4}$

8. Evaluate: $(-3)^{-5}$

9. Evaluate: $(\frac{3}{4} + \frac{5}{8})^{-2}$

10. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$\left(\frac{3u^2v^{-1}}{3^3u^{-1}v^3} \right)^{-2}$$

11. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$[(x^{-4}y^{-6})^{-1}]^2$$

12. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$\frac{(2a^{-2}b^4)^3}{(10a^3b)^2}$$

13. The radicand is a perfect power. Find the specified root. $\sqrt{y^4w^6}$

14. The radicand is a perfect power. Find the specified root. $\sqrt[3]{\frac{216}{125}x^6}$

15. The radicand is a perfect power. Find the specified root. $\sqrt{0.09x^8}$

16. The radicand is a perfect power. Find the specified root. $\sqrt[5]{\frac{32x^{10}}{y^5}}$

17. The radicand is a perfect power. Find the specified root. $\sqrt[5]{\frac{-1}{32x^5}}$

18. Simplify by removing perfect powers from the radicand. Leave the radical sign in your answer. $\sqrt[4]{z^{19}}$

19. Simplify by removing perfect powers from the radicand. Leave the radical sign in your answer. $\sqrt[3]{24u^4v^5}$

20. Simplify by removing perfect powers from the radicand. Leave the radical sign in your answer. $\sqrt[3]{-a^4y^8}$

21. Simplify by removing perfect powers from the radicand. Leave the radical sign in your answer. $\sqrt[4]{\frac{16a^2b^6}{81u^4v^5}}$

22. Simplify by removing perfect powers from the radicand. Leave the radical sign in your answer. $\sqrt[3]{-\frac{16a^7}{x^3y^4}}$

23. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$a^{1/3}a^3$$

24. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$(a^{3/4})^6$$

25. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$(4x^{-3}y^2)^{-2}$$

26. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$(125u^{-9})^{2/3}$$

27. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$\frac{x^{-2}y^5}{x^{-3}y^{-4}}$$

28. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$\left(\frac{25a^6}{49b^4}\right)^{3/2}$$

29. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$\left(\frac{64a^3b^6}{125x^6}\right)^{2/3}$$

30. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$\sqrt[4]{16y^2}$$

31. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$(a^3b^{4/3})^3$$

32. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$(x^{-3}y^0)^{2/3}$$

33. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$\sqrt[3]{a}\sqrt[4]{a}$$

34. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$\left(\frac{49a^8}{4b^4c^8}\right)^{3/2}$$

35. Put in simplest exponential form: (1) no radicals, and (2) positive exponents only.

$$\left(\frac{u^xv^z}{2a^k}\right)^{-n}$$

- 36.** Simplify: $(15x^2 - 6) - (-8.3x^3 - 14.7x^2 - 17)$
- 37.** Simplify: $5z - [3z - (10z + 8)]$
- 38.** Multiply and simplify: $(3x - 5)(2x + 1)$
- 39.** Multiply and simplify: $(2x + 3)^2$
- 40.** Multiply and simplify: $(4x^3 - 3)^2$
- 41.** Multiply and simplify: $(-x^2 + x - 5)(3x^2 + 4x + 1)$
- 42.** Multiply and simplify: $(\frac{1}{4}x - 5)^2$
- 43.** Multiply and simplify: $(u + 2)(u - 2)(u^2 + 4)$
- 44.** Factor completely: $(x + 3)^2 - 4(x + 3)$
- 45.** Factor completely: $9u^2 - 4v^2$
- 46.** Factor completely: $9u^2 + 24uv + 16v^2$
- 47.** Factor completely: $4x^2 - \frac{4}{3}x + \frac{1}{9}$
- 48.** Factor completely: $8t^3 - 1$
- 49.** Factor completely: $20 - y - y^2$
- 50.** Factor completely: $3x^2 - 5x + 2$
- 51.** Factor completely: $2x^3 - x^2 - 6x + 3$
- 52.** Factor completely: $15x^2 - 11x + 2$
- 53.** Factor completely: $3x^2 - 11x - 20$
- 54.** Factor completely: $(x^2 + 8)^2 - 36x^2$