

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. How many prime numbers are there between -2 and 18 on the number line?

- a. 17
- b. 0
- c. 1
- d. 19
- e. 7
- f. 18

____ 2. Select the correct representation of the inequality in interval notation.

$$x \leq 9$$

- a. $[9, \infty)$
- b. $[-\infty, 9]$
- c. $(9, \infty)$
- d. $(-\infty, 9]$
- e. $(-\infty, 9)$

____ 3. Simplify the expression.

$$(x^5)^4 (x^3)^3$$

- a. x^{15}
- b. x^{29}
- c. x^6
- d. x^{-9}

____ 4. Simplify the expression.

$$(-14x)^0$$

Write the answer without using exponents.

- a. -14
- b. -1
- c. 1
- d. 14

- ____ 5. Simplify the expression.

$$\frac{1}{x^{-7}}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

- a. x^7
- b. $\frac{1}{x^8}$
- c. x^8
- d. $\frac{1}{x^7}$

- ____ 6. Simplify the expression.

$$\frac{x^4 x^2}{x^3 x}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

- a. x^4
- b. x^3
- c. x^2
- d. x^{10}

- ____ 7. Simplify the expression.

$$\frac{(8^{-2}z^{-4}y)^{-1}}{(5y^3z^{-3})^4(5yz^{-3})^{-1}}$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

- a. $\frac{8z^{12}}{125y^{13}}$
- b. $\frac{64z^{12}}{125y^{13}}$
- c. $\frac{125y^{12}}{64z^{13}}$
- d. $\frac{64z^{13}}{125y^{12}}$

- ____ 8. Simplify the expression.

$$\left(\frac{7x^{-5}y^3z^{-4}}{28x^6y^{11}z^{-9}} \right)^3$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

- a. $\frac{z^5}{4x^{11}y^8}$
- b. $\frac{z^{15}}{64x^{24}y^{33}}$
- c. $\frac{z^{15}}{64x^{33}y^{24}}$
- d. $\frac{z^{15}}{64x^{-33}y^{-24}}$
- e. $\frac{z^5}{4x^{33}y^{24}}$

- ____ 9. Rationalize the numerator and simplify.

$$\frac{\sqrt{5}}{20}$$

- a. $\frac{1}{4\sqrt{3}}$
- b. $\frac{1}{4\sqrt{5}}$
- c. $\frac{1}{8\sqrt{3}}$
- d. $\frac{1}{4\sqrt{9}}$
- e. $\frac{1}{5\sqrt{5}}$

- ____ 10. Simplify the radical expression.

$$\sqrt[6]{8}$$

- a. $18\sqrt{2}$
- b. $2\sqrt[2]{200}$
- c. $\sqrt[6]{2}$
- d. $2\sqrt{2}$
- e. $2\sqrt[2]{8}$

- ____ 11. We can often multiply and divide radicals with different indexes. For example:

$$\sqrt[3]{3}\sqrt[2]{5} = \sqrt[6]{27}\sqrt[6]{25} = \sqrt[6]{(27)(25)} = \sqrt[6]{675}$$

Use this idea to write the following expression as a single radical.

$$\frac{\sqrt[4]{2}}{\sqrt{6}}$$

- a. $\frac{\sqrt[4]{72}}{6}$
- b. $\frac{\sqrt[5]{72}}{6}$
- c. $\frac{\sqrt[4]{72}}{8}$
- d. $\frac{\sqrt[4]{72}}{2}$

- ____ 12. Simplify the expression.

$$-16^{3/2}$$

- a. -192
- b. 67
- c. -64
- d. -66
- e. -128
- f. -24

- ____ 13. Simplify the expression. Assume that all variables represent positive numbers, so that no absolute value symbols are needed.

$$\sqrt[4]{2xy^5} + y\sqrt[4]{512xy} - \sqrt[4]{2xy^5}$$

- a. $8y\sqrt{3xy}$
- b. $12y\sqrt{2xy}$
- c. $4y\sqrt{4xy}$
- d. $4y\sqrt{2xy}$

- ____ 14. Rationalize the denominator and simplify.

$$\frac{2}{\sqrt[3]{2}}$$

- a. $\sqrt[3]{104}$
- b. $\sqrt[3]{7}$
- c. $\sqrt[4]{5}$
- d. $\sqrt[3]{4}$
- e. $\sqrt[6]{4}$

- ____ 15. Perform division and write the answer without using negative exponents.

$$\frac{-12x^6y^4z^9}{3x^9y^6z^0}$$

- a. $\frac{4z^9}{x^3y^6}$
- b. $\frac{-4z^4}{x^3y^2}$
- c. $\frac{4z^9}{x^3y^2}$
- d. $\frac{-4z^9}{x^3y^2}$

- ____ 16. Perform the division and write the answer without using negative exponents.

$$\frac{160x^5y^7 - 96x^2y^5 + 32xy}{4x^5y^4}$$

- a. $24y^3 - \frac{40y}{x^3} + \frac{32}{x^4y^3}$
- b. $40y^3 - \frac{40y}{x^4} + \frac{32}{x^4y^3}$
- c. $24y^3 - \frac{24y}{x^3} + \frac{32}{x^4y^9}$
- d. $40y^3 - \frac{24y}{x^3} + \frac{8}{x^4y^3}$

- ____ 17. Give the degree of the polynomial.

$$\sqrt{791}$$

- a. $1/2$
- b. 0
- c. This is not a polynomial
- d. No defined degree

- ____ 18. Perform the operation and simplify.

$$-3a^2(a + 1) + 9a(a^2 - 6) - a^2(a + 6)$$

- a. $5a^3 - 9a^2 - 54a$
- b. $5a^3 - 9a^2 - 54$
- c. $5a^2 + 9a^4 - 54$
- d. 0

- ____ 19. Multiply the expression as you would multiply polynomials.

$$(x^{17/2} + y^{7/2})^2$$

- a. $x^{17} - 2x^{17}y^7 + y^7$
- b. $x^{17} + x^{17}y^7 + y^7$
- c. $x^{17} + y^7$
- d. $x^{17} + 2x^{17/2}y^{7/2} + y^7$

- ____ 20. Factor the expression completely.

$$4z^2 + 28z + 49$$

- a. $(2z + 7)^2$
- b. $7(2z + 7)$
- c. $(2z + 7)(2z - 7)$
- d. $(2z - 7)^2$

- ____ 21. Perform the operations and simplify.

$$\frac{2a}{13} \cdot \frac{3}{5b}$$

Assume that no denominators are 0.

- a. $\frac{3}{2}$
- b. $\frac{13a}{b5}$
- c. $\frac{6a}{65b}$
- d. $\frac{2}{3}$

- ____ 22. Simplify the fraction.

$$\frac{xy + 6x + 9y + 54}{x^3 + 729}$$

Assume that denominator is not 0.

- a. $\frac{y - 6}{x^2 - 9x - 81}$
- b. $\frac{y + 9}{x^2 - 9x + 81}$
- c. $\frac{y + 6}{x^2 - 9x + 81}$
- d. $\frac{y - 6}{x^2 - 9x + 81}$

- ____ 23. Perform the operations and simplify.

$$\frac{1}{x-4} + \frac{3}{x+4} - \frac{3x-4}{x^2-16}$$

Assume that no denominators are 0.

- a. $\frac{4}{x+4}$
- b. $\frac{1}{x+16}$
- c. $\frac{1}{x+4}$
- d. $\frac{1}{x-4}$

- ____ 24. Simplify the complex fraction.

$$\frac{\frac{4x^2}{y^4}}{\frac{8x^3z^3}{y^2}}$$

Assume that the denominators are not 0.

- a. $\frac{1}{2} x^{-1} y^{-2} z^{-3}$
- b. $\frac{1}{2} x^2 y^3 z^3$
- c. $\frac{1}{2} x^2 y^{-2} z^{-3}$
- d. $\frac{1}{2} x^{-1} y^4 z^{-3}$

____ 25. Simplify each complex fraction.

$$\frac{x + 1 - \frac{6}{x}}{x + 5 + \frac{6}{x}}$$

Assume that no denominators are 0.

a. $\frac{x + 3}{x - 3}$

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

c. $\frac{x + 2}{x - 2}$

d. $\frac{x - 3}{x + 3}$

Answer Section

MULTIPLE CHOICE

- | | |
|------------|--------|
| 1. ANS: E | PTS: 1 |
| 2. ANS: D | PTS: 1 |
| 3. ANS: B | PTS: 1 |
| 4. ANS: C | PTS: 1 |
| 5. ANS: A | PTS: 1 |
| 6. ANS: C | PTS: 1 |
| 7. ANS: D | PTS: 1 |
| 8. ANS: C | PTS: 1 |
| 9. ANS: B | PTS: 1 |
| 10. ANS: D | PTS: 1 |
| 11. ANS: A | PTS: 1 |
| 12. ANS: C | PTS: 1 |
| 13. ANS: D | PTS: 1 |
| 14. ANS: D | PTS: 1 |
| 15. ANS: D | PTS: 1 |
| 16. ANS: D | PTS: 1 |
| 17. ANS: B | PTS: 1 |
| 18. ANS: A | PTS: 1 |
| 19. ANS: D | PTS: 1 |
| 20. ANS: A | PTS: 1 |
| 21. ANS: C | PTS: 1 |
| 22. ANS: C | PTS: 1 |
| 23. ANS: C | PTS: 1 |
| 24. ANS: A | PTS: 1 |
| 25. ANS: B | PTS: 1 |

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. How many prime numbers are there between -6 and 14 on the number line?

- a. 19
- b. 13
- c. 0
- d. 14
- e. 6
- f. 5

____ 2. Select the correct representation of the inequality in interval notation.

$$x \leq 3$$

- a. $(-\infty, 3)$
- b. $(-\infty, 3]$
- c. $[3, \infty)$
- d. $[-\infty, 3]$
- e. $(3, \infty)$

____ 3. Simplify the expression.

$$(x^3)^3 (x^3)^2$$

- a. x^{11}
- b. x^{-1}
- c. x^{10}
- d. x^{15}

____ 4. Simplify the expression.

$$(-13x)^0$$

Write the answer without using exponents.

- a. 1
- b. 13
- c. -13
- d. -1

- ____ 5. Simplify the expression.

$$\frac{1}{x^{-7}}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

- a. x^7
- b. $\frac{1}{x^7}$
- c. x^8
- d. $\frac{1}{x^8}$

- ____ 6. Simplify the expression.

$$\frac{x^6 x^4}{x^3 x}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

- a. x^8
- b. x^7
- c. x^{14}
- d. x^6

- ____ 7. Simplify the expression.

$$\frac{(8^{-2}z^{-5}y)^{-1}}{(5y^5z^{-1})^3(5yz^{-1})^{-2}}$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\frac{64z^6}{5y^{14}}$

b. $\frac{5y^{14}}{64z^6}$

c. $\frac{64z^{14}}{5y^6}$

d. $\frac{8z^5}{5y^{15}}$

- ____ 8. Simplify the expression.

$$\left(\frac{8x^{-4}y^5z^{-8}}{32x^4y^{12}z^{-13}} \right)^3$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

a. $\frac{z^5}{4x^8y^7}$

b. $\frac{z^{15}}{64x^{24}y^{21}}$

c. $\frac{z^{15}}{64x^{21}y^{24}}$

d. $\frac{z^{15}}{64x^{-24}y^{-21}}$

e. $\frac{z^5}{4x^{24}y^{21}}$

- ____ 9. Rationalize the numerator and simplify.

$$\frac{\sqrt{5}}{25}$$

- a. $\frac{1}{10\sqrt{2}}$
- b. $\frac{1}{5\sqrt{5}}$
- c. $\frac{1}{5\sqrt{2}}$
- d. $\frac{1}{6\sqrt{5}}$
- e. $\frac{1}{5\sqrt{10}}$

- ____ 10. Simplify the radical expression.

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

- a. $\sqrt[2]{4}$
- b. $\sqrt[2]{2}$
- c. $\sqrt[2]{200}$
- d. $\sqrt[4]{2}$
- e. $\sqrt[8]{2}$

- ____ 11. We can often multiply and divide radicals with different indexes. For example:

$$\sqrt[3]{3}\sqrt[3]{5} = \sqrt[6]{27}\sqrt[6]{25} = \sqrt[6]{(27)(25)} = \sqrt[6]{675}$$

Use this idea to write the following expression as a single radical.

$$\frac{\sqrt[6]{4}}{\sqrt{5}}$$

- a. $\frac{\sqrt[6]{500}}{9}$
- b. $\frac{\sqrt[6]{500}}{5}$
- c. $\frac{\sqrt[6]{500}}{4}$
- d. $\frac{\sqrt[7]{500}}{5}$

- ____ 12. Simplify the expression.

$$-25^{4/2}$$

- a. -1,250
- b. 628
- c. -1,875
- d. -625
- e. -50
- f. -627

- ____ 13. Simplify the expression. Assume that all variables represent positive numbers, so that no absolute value symbols are needed.

$$\sqrt[4]{2xy^5} + y\sqrt[4]{512xy} - \sqrt[4]{2xy^5}$$

- a. $4y\sqrt{4xy}$
- b. $4y\sqrt{2xy}$
- c. $12y\sqrt{2xy}$
- d. $8y\sqrt{3xy}$

- ____ 14. Rationalize the denominator and simplify.

$$\frac{4}{\sqrt[4]{4}}$$

- a. $\sqrt[4]{164}$
- b. $\sqrt[5]{65}$
- c. $\sqrt[4]{67}$
- d. $\sqrt[4]{64}$
- e. $\sqrt[8]{64}$

- ____ 15. Perform division and write the answer without using negative exponents.

$$\frac{-190x^6y^4z^9}{19x^9y^6z^0}$$

- a. $\frac{10z^9}{x^3y^6}$
- b. $\frac{10z^9}{x^3y^2}$
- c. $\frac{-10z^4}{x^3y^2}$
- d. $\frac{-10z^9}{x^3y^2}$

- ____ 16. Perform the division and write the answer without using negative exponents.

$$\frac{100x^5y^7 - 60x^2y^5 + 20xy}{10x^5y^4}$$

- a. $6y^3 - \frac{6y}{x^3} + \frac{20}{x^4y^9}$
- b. $10y^3 - \frac{10y}{x^4} + \frac{20}{x^4y^3}$
- c. $10y^3 - \frac{6y}{x^3} + \frac{2}{x^4y^3}$
- d. $6y^3 - \frac{10y}{x^3} + \frac{20}{x^4y^3}$

- ____ 17. Give the degree of the polynomial.

$$\sqrt{576}$$

- a. 0
- b. No defined degree
- c. $\frac{1}{2}$
- d. This is not a polynomial

- ____ 18. Perform the operation and simplify.

$$-3a^2(a + 1) + 6a(a^2 - 4) - a^2(a + 10)$$

- a. 0
- b. $2a^3 - 13a^2 - 24$
- c. $2a^3 - 13a^2 - 24a$
- d. $2a^2 + 13a^4 - 24$

- ____ 19. Multiply the expression as you would multiply polynomials.

$$(x^{7/2} + y^{9/2})^2$$

- a. $x^7 + 2x^{7/2}y^{9/2} + y^9$
- b. $x^7 - 2x^7y^9 + y^9$
- c. $x^7 + x^7y^9 + y^9$
- d. $x^7 + y^9$

- ____ 20. Factor the expression completely.

$$36z^2 + 84z + 49$$

- a. $(6z + 7)^2$
- b. $(6z - 7)^2$
- c. $(6z + 7)(6z - 7)$
- d. $7(6z + 7)$

- ____ 21. Perform the operations and simplify.

$$\frac{23a}{2} \cdot \frac{11}{2b}$$

Assume that no denominators are 0.

- a. $\frac{11}{23}$
- b. $\frac{253a}{4b}$
- c. $\frac{23}{11}$
- d. $\frac{2a}{b2}$

- ____ 22. Simplify the fraction.

$$\frac{xy + 6x + 4y + 24}{x^3 + 64}$$

Assume that denominator is not 0.

- a. $\frac{y - 6}{x^2 - 4x - 16}$
- b. $\frac{y + 6}{x^2 - 4x + 16}$
- c. $\frac{y - 6}{x^2 - 4x + 16}$
- d. $\frac{y + 4}{x^2 - 4x + 16}$

- ____ 23. Perform the operations and simplify.

$$\frac{1}{x-4} + \frac{3}{x+4} - \frac{3x-4}{x^2-16}$$

Assume that no denominators are 0.

- a. $\frac{1}{x+16}$
- b. $\frac{1}{x+4}$
- c. $\frac{1}{x-4}$
- d. $\frac{4}{x+4}$

- ____ 24. Simplify the complex fraction.

$$\frac{\frac{3x^5}{y^2}}{\frac{6x^2z^4}{y^4}}$$

Assume that the denominators are not 0.

- a. $\frac{1}{2} x^3 y^2 z^{-4}$
- b. $\frac{1}{2} x^4 y^2 z^4$
- c. $\frac{1}{2} x^5 y^2 z^{-4}$
- d. $\frac{1}{2} x^3 y^2 z^{-4}$

____ 25. Simplify each complex fraction.

$$\frac{x + 1 - \frac{6}{x}}{x + 5 + \frac{6}{x}}$$

Assume that no denominators are 0.

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

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

c. $\frac{x - 3}{x + 3}$

d. $\frac{x + 3}{x - 3}$

Answer Section

MULTIPLE CHOICE

- | | |
|------------|--------|
| 1. ANS: E | PTS: 1 |
| 2. ANS: B | PTS: 1 |
| 3. ANS: D | PTS: 1 |
| 4. ANS: A | PTS: 1 |
| 5. ANS: A | PTS: 1 |
| 6. ANS: D | PTS: 1 |
| 7. ANS: A | PTS: 1 |
| 8. ANS: B | PTS: 1 |
| 9. ANS: B | PTS: 1 |
| 10. ANS: B | PTS: 1 |
| 11. ANS: B | PTS: 1 |
| 12. ANS: D | PTS: 1 |
| 13. ANS: B | PTS: 1 |
| 14. ANS: D | PTS: 1 |
| 15. ANS: D | PTS: 1 |
| 16. ANS: C | PTS: 1 |
| 17. ANS: A | PTS: 1 |
| 18. ANS: C | PTS: 1 |
| 19. ANS: A | PTS: 1 |
| 20. ANS: A | PTS: 1 |
| 21. ANS: B | PTS: 1 |
| 22. ANS: B | PTS: 1 |
| 23. ANS: B | PTS: 1 |
| 24. ANS: A | PTS: 1 |
| 25. ANS: A | PTS: 1 |

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. How many prime numbers are there between -5 and 20 on the number line?

- a. 0
- b. 4
- c. 19
- d. 24
- e. 20
- f. 8

____ 2. Select the correct representation of the inequality in interval notation.

$$x \leq 7$$

- a. $[-\infty, 7]$
- b. $(7, \infty)$
- c. $[7, \infty)$
- d. $(-\infty, 7)$
- e. $(-\infty, 7]$

____ 3. Simplify the expression.

$$(x^6)^4 (x^2)^2$$

- a. x^{-8}
- b. x^6
- c. x^{14}
- d. x^{28}

____ 4. Simplify the expression.

$$(-4x)^0$$

Write the answer without using exponents.

- a. 1
- b. 4
- c. -4
- d. -1

- ____ 5. Simplify the expression.

$$\frac{1}{x^{-8}}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

- a. $\frac{1}{x^9}$
- b. x^8
- c. x^9
- d. $\frac{1}{x^8}$

- ____ 6. Simplify the expression.

$$\frac{x^7 x^4}{x^4 x}$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

- a. x^{16}
- b. x^6
- c. x^7
- d. x^8

- ____ 7. Simplify the expression.

$$\frac{(8^{-2}z^{-5}y)^{-2}}{(5y^2z^{-5})^5(5yz^{-5})^{-1}}$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

- a. $\frac{512z^{29}}{625y^{12}}$
- b. $\frac{625y^{11}}{4096z^{30}}$
- c. $\frac{4096z^{30}}{625y^{11}}$
- d. $\frac{4096z^{11}}{625y^{30}}$

- ____ 8. Simplify the expression.

$$\left(\frac{5x^{-5}y^5z^{-7}}{20x^6y^{10}z^{-12}} \right)^3$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

- a. $\frac{z^5}{4x^{33}y^{15}}$
- b. $\frac{z^{15}}{64x^{33}y^{15}}$
- c. $\frac{z^{15}}{64x^{15}y^{33}}$
- d. $\frac{z^5}{4x^{11}y^5}$
- e. $\frac{z^{15}}{64x^{-33}y^{-15}}$

- ____ 9. Rationalize the numerator and simplify.

$$\frac{\sqrt{2}}{8}$$

- a. $\frac{1}{8\sqrt{5}}$
- b. $\frac{1}{4\sqrt{2}}$
- c. $\frac{1}{4\sqrt{6}}$
- d. $\frac{1}{5\sqrt{2}}$
- e. $\frac{1}{4\sqrt{5}}$

- ____ 10. Simplify the radical expression.

$$\sqrt[4]{49}$$

- a. $\sqrt[8]{7}$
- b. $\sqrt[2]{700}$
- c. $\sqrt[2]{49}$
- d. $\sqrt[4]{7}$
- e. $\sqrt[2]{7}$

- ____ 11. We can often multiply and divide radicals with different indexes. For example:

$$\sqrt[3]{3}\sqrt[3]{5} = \sqrt[6]{27}\sqrt[6]{25} = \sqrt[6]{(27)(25)} = \sqrt[6]{675}$$

Use this idea to write the following expression as a single radical.

$$\frac{\sqrt[6]{4}}{\sqrt{7}}$$

- a. $\frac{\sqrt[6]{1372}}{11}$
- b. $\frac{\sqrt[7]{1372}}{7}$
- c. $\frac{\sqrt[6]{1372}}{4}$
- d. $\frac{\sqrt[6]{1372}}{7}$

- ____ 12. Simplify the expression.

$$-8^{4/3}$$

- a. -10.6667
- b. 19
- c. -32
- d. -48
- e. -18
- f. -16

- ____ 13. Simplify the expression. Assume that all variables represent positive numbers, so that no absolute value symbols are needed.

$$4\sqrt[4]{2xy^5} + y\sqrt[4]{512xy} - 4\sqrt[4]{2xy^5}$$

- a. $12y\sqrt{2xy}$
- b. $8y\sqrt{3xy}$
- c. $4y\sqrt{2xy}$
- d. $4y\sqrt{4xy}$

- ____ 14. Rationalize the denominator and simplify.

$$\frac{3}{\sqrt[5]{3}}$$

- a. $\sqrt[6]{82}$
- b. $\sqrt[5]{181}$
- c. $\sqrt[5]{84}$
- d. $\sqrt[10]{81}$
- e. $\sqrt[5]{81}$

- ____ 15. Perform division and write the answer without using negative exponents.

$$\frac{-56x^6y^4z^9}{14x^9y^6z^0}$$

- a. $\frac{-4z^4}{x^3y^2}$
- b. $\frac{-4z^9}{x^3y^2}$
- c. $\frac{4z^9}{x^3y^6}$
- d. $\frac{4z^9}{x^3y^2}$

- ____ 16. Perform the division and write the answer without using negative exponents.

$$\frac{400x^5y^7 - 240x^2y^5 + 80xy}{16x^5y^4}$$

- a. $25y^3 - \frac{15y}{x^3} + \frac{5}{x^4y^3}$
- b. $15y^3 - \frac{15y}{x^3} + \frac{80}{x^4y^9}$
- c. $15y^3 - \frac{25y}{x^3} + \frac{80}{x^4y^3}$
- d. $25y^3 - \frac{25y}{x^4} + \frac{80}{x^4y^3}$

- ____ 17. Give the degree of the polynomial.

$$\sqrt{127}$$

- a. $1/2$
- b. No defined degree
- c. This is not a polynomial
- d. 0

- ____ 18. Perform the operation and simplify.

$$-3a^2(a+1) + 7a(a^2-4) - a^2(a+9)$$

- a. $3a^2 + 12a^4 - 28$
- b. $3a^3 - 12a^2 - 28$
- c. 0
- d. $3a^3 - 12a^2 - 28a$

- ____ 19. Multiply the expression as you would multiply polynomials.

$$(x^{11/2} + y^{15/2})^2$$

- a. $x^{11} + 2x^{11/2}y^{15/2} + y^{15}$
- b. $x^{11} + x^{11}y^{15} + y^{15}$
- c. $x^{11} - 2x^{11}y^{15} + y^{15}$
- d. $x^{11} + y^{15}$

- ____ 20. Factor the expression completely.

$$9z^2 + 42z + 49$$

- a. $(3z - 7)^2$
- b. $(3z + 7)(3z - 7)$
- c. $7(3z + 7)$
- d. $(3z + 7)^2$

- ____ 21. Perform the operations and simplify.

$$\frac{5a}{3} \cdot \frac{2}{7b}$$

Assume that no denominators are 0.

a. $\frac{3a}{b7}$

b. $\frac{5}{2}$

c. $\frac{2}{5}$

d. $\frac{10a}{21b}$

- ____ 22. Simplify the fraction.

$$\frac{xy + 6x + 8y + 48}{x^3 + 512}$$

Assume that denominator is not 0.

a. $\frac{y - 6}{x^2 - 8x + 64}$

b. $\frac{y + 8}{x^2 - 8x + 64}$

c. $\frac{y - 6}{x^2 - 8x - 64}$

d. $\frac{y + 6}{x^2 - 8x + 64}$

- ____ 23. Perform the operations and simplify.

$$\frac{1}{x-6} + \frac{3}{x+6} - \frac{3x-6}{x^2-36}$$

Assume that no denominators are 0.

- a. $\frac{1}{x-6}$
- b. $\frac{1}{x+36}$
- c. $\frac{1}{x+6}$
- d. $\frac{6}{x+6}$

- ____ 24. Simplify the complex fraction.

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

Assume that the denominators are not 0.

- a. $\frac{1}{2} x^2 y^2 z^{-3}$
- b. $\frac{1}{2} x^{-2} y^3 z^{-3}$
- c. $\frac{1}{2} x^{-2} y^2 z^{-3}$
- d. $\frac{1}{2} x^5 y^4 z^3$

____ 25. Simplify each complex fraction.

$$\frac{x + 2 - \frac{63}{x}}{x + 16 + \frac{63}{x}}$$

Assume that no denominators are 0.

a. $\frac{x + 9}{x - 9}$

b. $\frac{x - 7}{x + 7}$

c. $\frac{x + 7}{x - 7}$

d. $\frac{x - 9}{x + 9}$

Answer Section

MULTIPLE CHOICE

- | | |
|------------|--------|
| 1. ANS: F | PTS: 1 |
| 2. ANS: E | PTS: 1 |
| 3. ANS: D | PTS: 1 |
| 4. ANS: A | PTS: 1 |
| 5. ANS: B | PTS: 1 |
| 6. ANS: B | PTS: 1 |
| 7. ANS: C | PTS: 1 |
| 8. ANS: B | PTS: 1 |
| 9. ANS: B | PTS: 1 |
| 10. ANS: E | PTS: 1 |
| 11. ANS: D | PTS: 1 |
| 12. ANS: F | PTS: 1 |
| 13. ANS: C | PTS: 1 |
| 14. ANS: E | PTS: 1 |
| 15. ANS: B | PTS: 1 |
| 16. ANS: A | PTS: 1 |
| 17. ANS: D | PTS: 1 |
| 18. ANS: D | PTS: 1 |
| 19. ANS: A | PTS: 1 |
| 20. ANS: D | PTS: 1 |
| 21. ANS: D | PTS: 1 |
| 22. ANS: D | PTS: 1 |
| 23. ANS: C | PTS: 1 |
| 24. ANS: C | PTS: 1 |
| 25. ANS: B | PTS: 1 |

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 1. How many natural numbers are there between -16.5 and 6.5 on the number line?

- a. 0
- b. 7
- c. 12
- d. 6
- e. 23

____ 2. Identify the correct union of intervals for the inequality.

$$x \leq -16 \text{ or } x > 5$$

- a. $(-\infty, -16] \cup (5, \infty)$
- b. $(-\infty, -16) \cup [5, \infty)$
- c. $(-\infty, -16) \cup (5, \infty)$
- d. $(-\infty, -16] \cup (5, \infty]$
- e. $(-\infty, -16] \cup [5, \infty)$

____ 3. Write the expression without using absolute value symbols.

$$|x + 4| - |x - 11| \quad \text{for } x < -8$$

$$|x + 4| - |x - 11| = \underline{\hspace{2cm}} \quad \text{for } x < -8$$

- a. 15
- b. $2x - 15$
- c. 7
- d. $15 - 2x$
- e. -15

____ 4. Calculate the volume of a box that has dimensions of 6,000 by 8,600 by 4,800 millimeters.

- a. $2.4768 \times 10^{10} \text{ mm}^3$
- b. $2.4768 \times 10^{11} \text{ mm}^3$
- c. $1.9975 \times 10^{10} \text{ mm}^3$
- d. $1.9975 \times 10^{11} \text{ mm}^3$

- ____ 5. Simplify the expression.

$$\left(\frac{a^{-5}}{b^{-3}} \right)^{-4}$$

Write the answer without using negative exponents. Assume that all variables are restricted to those numbers for which the expression is defined.

- a. $\frac{a^{12}}{b^{20}}$
- b. $\frac{a^{20}}{b^{12}}$
- c. $\frac{b^{12}}{a^{20}}$
- d. $\frac{b^{20}}{a^{12}}$

- ____ 6. Simplify the expression.

$$\left(\frac{r^5 r^{-1}}{r^3 r^{-3}} \right)^2$$

Write the answer without using negative exponents. Assume that the variable is restricted to those numbers for which the expression is defined.

- a. r^2
- b. r^8
- c. r^0
- d. r^{12}

- ____ 7. Express the number -176,000,000 in scientific notation.

- a. -1.76×10^8
- b. -1.76×10^7
- c. -17.6×10^9
- d. -1.76×10^9

- ____ 8. We can often multiply and divide radicals with different indexes. For example:

$$\sqrt{3} \sqrt[3]{5} = \sqrt[6]{27} \sqrt[6]{25} = \sqrt[6]{(27)(25)} = \sqrt[6]{675}$$

Use this idea to write the following expression as a single radical.

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

- a. $\sqrt{1024}$
- b. $\sqrt[6]{1024}$
- c. $\sqrt[3]{1024}$
- d. $\sqrt[6]{4}$
- e. $\sqrt[6]{256}$

- ____ 9. Simplify the expression.

$$(9y^2)^{1/2}$$

- a. $9|y|$
- b. $3y$
- c. $3y^2$
- d. $3|y|$
- e. $3|y^2|$

- ____ 10. Simplify the expression.

$$\left(-\frac{3,125x^{10}}{32y^5} \right)^{1/5}$$

- a. $\frac{5x^2}{2y}$
- b. $-\frac{5x^2}{2y^2}$
- c. $\frac{5x^3}{2y}$
- d. $-\frac{5x^2}{2y}$

- ____ 11. Simplify the expression.

$$\frac{a^{1/5} a^{4/5}}{a^{2/5}}$$

Write all answers without using negative exponents. Assume that all variables represent positive numbers.

- a. $a^{3/10}$
- b. $a^{7/5}$
- c. $a^{3/5}$
- d. $a^{5/5}$
- e. $a^{3/8}$

- ____ 12. Perform the division.

$$x^2 + x - 1 \overline{) 13x^3 - 8x^2 - 34x + 21}$$

- a. $13x - 23$
- b. $13x - 21$
- c. $13x^2 - 21$
- d. $23 - 13x$

- ____ 13. Perform the operations and simplify.

$$(8x^3 - 3x^2) + (5x^3 - 3x)$$

- a. $13x - 3x^2 - 3x^3$
- b. 0
- c. $7x^3$
- d. $13x^3 - 3x^2 - 3x$

- ____ 14. Perform the operation and simplify.

$$(a - 15)^2$$

- a. $a^2 + 30a + 225$
- b. $a^2 - 15a + 225$
- c. $a^2 - 225$
- d. $a^2 - 30a + 225$
- e. $a^2 + 225$

- ____ 15. Multiply the expression as you would multiply polynomials.

$$(a^{11/2} + b^{3/2})(a^{11/2} - b^{3/2})$$

- a. $a^{11} - b^3$
- b. $(a + b)^4$
- c. $(a - b)^7$
- d. $a^{22} - b^6$

- ____ 16. Perform the multiplication and simplify.

$$(x - y)(3x + 14y)^2$$

- a. $9x^3 + 75x^2y + 112xy^2 + 196y^3$
- b. $9x^3 + 112x^2y + 196xy^2 + 75y^3$
- c. $196x^3 + 112x^2y + 75xy^2 + 9y^3$
- d. $9x^3 + 75x^2y + 112xy^2 - 196y^3$
- e. $9x^3 - 75x^2y + 112xy^2 + 196y^3$

- ____ 17. Factor the expression completely.

$$10x^2 + 5x^3$$

- a. $5x^2(2 - x)$
- b. $5x^2(2 + x^2)$
- c. $5x^2(3 + x)$
- d. $5x^2(2 + x)$

- ____ 18. Factor the expression completely.

$$3x^3 + 3x^2 - 13x - 13$$

- a. $(x - 1)(3x^2 + 13)$
- b. $(1 - x)(3x^2 - 13)$
- c. $(x + 1)(3x^2 - 13)$
- d. $(x + 1)(13 - 3x^2)$

- ____ 19. Factor the expression completely.

$$64x^{10} + 1$$

- a. $(8x^5 + 1)^2$
- b. $(8x^5 - 1)^2$
- c. $(8x^5 + 1)(8x^5 - 1)$
- d. The expression is prime.

- ____ 20. Factor the expression completely.

$$56x^2 - 29xy - 40y^2$$

- a. $(7x - 8y)(8x + 5y)$
- b. $(7x - 8y)(5x + 8y)$
- c. $(5x - 8y)(8x + 7y)$
- d. $(7x + 8y)(8x - 5y)$

- ____ 21. Factor the expression completely.

$$22r^2 - 13rs - 30s^2$$

- a. $(2r - 3s)(11r + 10s)$
- b. $(3r - 2s)(11r + 10s)$
- c. $(2r + 3s)(11r - 10s)$
- d. $(2r - 3s)(10r + 11s)$

- ____ 22. Factor the expression completely.

$$z^2 + 4z + 4 - 144y^2$$

- a. $(z - 2 + 12y)(z + 2 + 12y)$
- b. $(z + 2 + 12y)(z + 2 - 12y)$
- c. $(z - 2 + 12y)(z - 2 - 12y)$
- d. $(z + 12 + 2y)(z + 12 - 2y)$

- ____ 23. Factor the expression completely.

$$(4x - 4y)^3 + 125$$

- a. $(4x + 4y - 5) \cdot (16x^2 - 20x - 32xy + 20y + 16y^2 + 25)$
- b. $(4x - 4y + 5) \cdot (16x^2 + 20x + 32xy - 20y - 16y^2 + 25)$
- c. $(4x + 4y - 5) \cdot (16x^2 + 20x + 32xy - 20y - 16y^2 + 25)$
- d. $(4x - 4y + 5) \cdot (16x^2 - 20x + 32xy - 20y + 16y^2 + 25)$
- e. $(4x - 4y + 5) \cdot (16x^2 - 20x - 32xy + 20y + 16y^2 + 25)$

- ____ 24. Simplify the fraction.

$$\frac{3x - 9}{x^2 - 9}$$

Assume that the denominator is not 0.

- a. $\frac{x}{x - 3}$
- b. $\frac{3}{x + 3}$
- c. $\frac{1}{x - 1}$
- d. $\frac{1}{x + 1}$
- e. $\frac{x}{x + 3}$
- f. $\frac{3}{x - 3}$

- ____ 25. Perform the operations and simplify.

$$\frac{x + 8}{x^2 + 11x + 24} + \frac{x}{x^2 - 9}$$

Assume that no denominators are 0.

- a. $\frac{2x - 9}{x^2 - 3}$
- b. $\frac{2x + 3}{x^2 - 9}$
- c. $\frac{2x - 3}{x^2 - 9}$
- d. $\frac{2x - 3}{x^2 + 9}$

Answer Section

MULTIPLE CHOICE

- | | |
|------------|--------|
| 1. ANS: D | PTS: 1 |
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| 4. ANS: B | PTS: 1 |
| 5. ANS: B | PTS: 1 |
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| 13. ANS: D | PTS: 1 |
| 14. ANS: D | PTS: 1 |
| 15. ANS: A | PTS: 1 |
| 16. ANS: D | PTS: 1 |
| 17. ANS: D | PTS: 1 |
| 18. ANS: C | PTS: 1 |
| 19. ANS: D | PTS: 1 |
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| 23. ANS: E | PTS: 1 |
| 24. ANS: B | PTS: 1 |
| 25. ANS: C | PTS: 1 |