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MAT1033/MAC1105 – Test 4 Name _____

Calculator Allowed: You may use your calculator on this part of the test. Show all necessary work for full credit.

1. Given (-1, 7) and (5, -2), find:

3 A) The midpoint between the two points.

$\left(\frac{-1+5}{2}, \frac{7+(-2)}{2}\right) = \left(2, \frac{5}{2}\right)$

3 B) The distance between the two points.

$d = \sqrt{6^2 + 9^2} = \sqrt{36+81} = \sqrt{117} \approx 10.8$

2. Perform the indicated operation and simplify.

3 A) $-\sqrt{12s^7} \cdot \sqrt{3s^3} =$ $-6s^5$

$-\sqrt{36s^{10}}$

3 B) $7\sqrt[3]{54} - \sqrt[3]{2} =$ $20\sqrt[3]{2}$

$7\sqrt[3]{27 \cdot 2}$

$21\sqrt[3]{2} - \sqrt[3]{2}$

2 C) $7\sqrt{5} + 4\sqrt{5} =$ $11\sqrt{5}$

2 D) $b^{4/7}b^{1/5} =$ $b^{\frac{27}{35}}$

$b^{\frac{4}{7}+\frac{1}{5}} = b^{\frac{20}{35}+\frac{7}{35}}$

3 E) $\frac{15w^{-3}z^{11/3}}{3w^4z^{7/3}} =$ $5w^{-7}z^{4/3}$

2 F) $(x^{4/3})^{2/5} =$ $x^{8/15}$

3. Solve the equation algebraically. Show your work.

3 A) $(x + 2)^{5/3} - 11 = 16$

$(x+2)^{5/3} = 27$

$x+2 = (27)^{3/5}$

$x = (27)^{3/5} - 2 = 5.225$

3 B) $7 + 2\sqrt[4]{2x+3} = 17$

$2\sqrt[4]{2x+3} = 10$

$\sqrt[4]{2x+3} = 5$

$2x+3 = 625$

$2x = 622$

$x = 311$

27

4. If you are flying in an airplane at an altitude of h miles, on a clear day you can see a distance of d miles to the horizon, where $d = \sqrt{7920h}$.

3 A) At what altitude will you be able to see for a distance of 215 miles?

$$215 = \sqrt{7920h}$$
$$46225 = 7920h$$
$$h = 5.84$$

2 B) If you are 2 miles high, how far can you see to the horizon?

$$d = \sqrt{7920 \cdot 2} = 125.86$$

5. Divide using long division: $(x^3 - 5x^2 + 4x + 3) \div (x + 3)$

3

$$\begin{array}{r} x^2 - 8x + 28 \\ x+3 \overline{\big) x^3 - 5x^2 + 4x + 3} \\ x^3 + 3x^2 \\ \hline -8x^2 + 4x \\ -8x^2 - 24x \\ \hline 28x + 3 \\ 28x + 84 \\ \hline -81 \end{array}$$

$$x^2 - 8x + 28 - \frac{81}{x+3}$$

6. Divide using synthetic division: $(5x^2 + 2x - 9) \div (x - 2)$

3

$$\begin{array}{r|rrr} 2 & 5 & 2 & -9 \\ & & 10 & 24 \\ \hline & 5 & 12 & 15 \end{array}$$

$$5x + 12 + \frac{15}{x-2}$$

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MAT1033/MAC1105 - Test 4 Name _____

No Calculator Allowed: You may not use your calculator on this part of the test. Show all necessary work for full credit.

6 1. Find each of the following.

A) $5^{-2} =$ $\frac{1}{25}$ B) $\left(\frac{x^5y^3}{9}\right)^0 =$ 1 C) $81^{1/2} =$ 9

D) $\sqrt[3]{8} =$ 2 E) $9^{3/2} =$ 27 F) $\left(\sqrt[7]{31}\right)^7 =$ 31

2 2. Rewrite n^{-9} without negative exponents. $\frac{1}{n^9}$

2 3. Rewrite $\frac{2}{d^5}$ using negative exponents. $2d^{-5}$

2 4. Write $(2d)^{3/4}$ using radical notation. $\sqrt[4]{(2d)^3}$

2 5. Rewrite $\frac{1}{\sqrt[7]{x^5}}$ using rational exponents. $x^{-5/7}$

6. Simplify.

2 A) $\frac{m^{15}}{m^8} =$ m^7 2 B) $(a^2 b^{-4})^{-5} =$ $a^{-10} b^{20}$

3 C) $-4xy^5(5x^2y^3) =$ $-20x^3y^8$ 3 D) $\left(\frac{2b}{8b^5}\right)^2 =$ $\frac{1}{16} b^{-8}$

3 E) $\sqrt[4]{g^{20}h^{28}} =$ $g^5 h^7$ 3 F) $\sqrt[3]{16x^{11}} =$ $2x^3\sqrt[3]{2x^2}$

3 G) $\sqrt{x^8y^{15}} =$ $x^4y^7\sqrt{y}$ 3 H) $\frac{\sqrt{45x^7}}{\sqrt{5x^2}} =$ $3x^2\sqrt{x}$

$\sqrt{9x^5}$

7. Identify whether $11x^2 - 7x$ is a monomial, binomial, or trinomial. binomial

8. What is the degree of $11x^6 - 7x^3 - 9x$? 6

9. What is the degree of $5x^6y^2$? 8 What is the coefficient of $5x^6y^2$? 5

10. Is $t + 24t^{-3}$ a polynomial? Why or why not?

No, negative exponents

11. Subtract: $(17x^3y - 5x^2 + 9y) - (4x^3y + 13x^2 - 8y)$ $13x^3y - 18x^2 + 17y$

12. Multiply and simplify: $(5t + 1)(2t - 3)$ $10t^2 - 13t - 3$

13. Multiply: $3m^2n^4(2m^5n^2 - 7mn^3)$ $6m^7n^6 - 21m^3n^7$

14. Divide: $\dfrac{9rs^3 - 12rs + 6s}{3s}$ $3rs^2 - 4r + 2$

15. Simplify: $\sqrt{-49}$ $7i$

16. Subtract: $(13 - 4i) - (10 + 2i)$ $3 - 6i$

17. Multiply: $(3 + 4i)(1 + 2i)$ $-5 + 10i$

$3 + 6i + 4i + 8i^2$

18. Divide: $\dfrac{1+3i}{2+5i} \cdot \dfrac{2-5i}{2-5i}$ $\frac{17}{29} + \frac{1}{29}i$

$\dfrac{2 - 5i + 6i - 15i^2}{4 + 25}$

MAT1033/MAC1105 – Test 4 Name _____

Calculator Allowed: You may use your calculator on this part of the test. Show all necessary work for full credit.

1. Given (1, 9) and (5, -2), find:

3 A) The midpoint between the two points.

$$\left(\frac{1+5}{2}, \frac{9+(-2)}{2}\right) = \left(3, \frac{7}{2}\right)$$

3 B) The distance between the two points.

$$d = \sqrt{4^2+11^2} = \sqrt{16+121} = \sqrt{137}$$

2. Perform the indicated operation and simplify.

3 A) $-\sqrt{8s^5}\cdot\sqrt{2s^3} =$ $-4s^4$

$-\sqrt{16s^8}$

3 B) $2\sqrt[3]{54}-\sqrt[3]{2} =$ $5\sqrt[3]{2}$

$6\sqrt[3]{2}-\sqrt[3]{2}$

2 C) $7\sqrt{10}+2\sqrt{10} =$ $9\sqrt{10}$

2 D) $b^{4/7}b^{1/5} =$ $b^{27/35}$

3 E) $\frac{15w^{-3}z^{11/3}}{3w^4z^{7/3}} =$ $5w^{-7}z^{4/3}$

2 F) $(x^{4/3})^{2/5} =$ $x^{8/15}$

3. Solve the equation algebraically. Show your work.

A) $(x+4)^{5/3}-9=16$

3

$(x+4)^{5/3}=25$

$x+4=(25)^{3/5}$

$x=(25)^{3/5}-4 = 2.899$

3 B) $5+2\sqrt[4]{2x+3}=11$

$2\sqrt[4]{2x+3}=6$

$\sqrt[4]{2x+3}=3$

$2x+3=81$

$2x=78$

$x=39$

4. If you are flying in an airplane at an altitude of h miles, on a clear day you can see a distance of d miles to the horizon, where $d = \sqrt{7920h}$.

A) At what altitude will you be able to see for a distance of 175 miles?

$$175 = \sqrt{7920h}$$
$$30625 = 7920h$$
$$h = 3.867$$

B) If you are 3 miles high, how far can you see to the horizon?

$$d = \sqrt{7920 \cdot 3} = 154.14$$

5. Divide using long division: $(x^3 - 3x^2 + 4x + 7) \div (x + 2)$

$$\begin{array}{r} x^2 - 5x + 14 \\ x+2 \overline{\big) x^3 - 3x^2 + 4x + 7} \\ x^3 - 2x^2 \\ \hline -5x^2 + 4x \\ -5x^2 - 10x \\ \hline 14x + 7 \\ 14x + 28 \\ \hline -21 \end{array}$$

$$x^2 - 5x + 14 - \frac{21}{x+2}$$

6. Divide using synthetic division: $(4x^2 + 2x - 11) \div (x - 3)$

$$\begin{array}{r|rrr} 3 & 4 & 2 & -11 \\ & & 12 & 42 \\ \hline & 4 & 14 & 31 \end{array}$$

$$4x + 14 + \frac{31}{x-3}$$

65

MAT1033/MAC1105 - Test 4 Name _____

No Calculator Allowed: You may not use your calculator on this part of the test. Show all necessary work for full credit.

1. Find each of the following.

6 A) $6^{-2} =$ $\frac{1}{36}$ B) $\left(\frac{x^5y^3}{6}\right)^0 =$ 1 C) $100^{1/2} =$ 10

D) $\sqrt[3]{27} =$ 3 E) $16^{3/2} =$ 64 F) $\left(\sqrt[6]{19}\right)^6 =$ 19

2 2. Rewrite t^{-7} without negative exponents. $\frac{1}{t^7}$

2 3. Rewrite $\frac{3}{d^6}$ using negative exponents. $3d^{-6}$

2 4. Write $(3b)^{5/6}$ using radical notation. $\sqrt[6]{(3b)^5}$

2 5. Rewrite $\frac{1}{\sqrt[9]{x^5}}$ using rational exponents. $x^{-5/9}$

6. Simplify.

2 A) $\frac{m^{12}}{m^8} =$ m^4 2 B) $(ab^{-3})^{-5} =$ $a^{-5}b^{15}$

3 C) $-7xy^2(5x^5y^3) =$ $-35x^6y^5$ 3 D) $\left(\frac{2b}{6b^5}\right)^2 =$ $\frac{1}{9}b^{-8}$

3 E) $\sqrt[5]{g^{20}h^{35}} =$ g^4h^7 3 F) $\sqrt[3]{24x^{10}} =$ $2x^3\sqrt[3]{3x}$

3 G) $\sqrt{x^7y^{12}} =$ $x^3y^6\sqrt{x}$ 3 H) $\frac{\sqrt{45x^7}}{\sqrt{5x^2}} =$ $3x^2\sqrt{x}$

$\sqrt{9x^5}$

36

1 7. Identify whether $11x^3 - 7x + 6$ is a monomial, binomial, or trinomial. trinomial

1 8. What is the degree of $11x^5 - 7x^3 - 9x$? 5

2 9. What is the degree of $11x^7y^2$? 9 What is the coefficient of $11x^7y^2$? 11

3 10. Is $t^{-2} + 24t$ a polynomial? Why or why not?

No, negative coefficient

3 11. Subtract: $(7x^3y - 5x^2 + 11y) - (4x^3y + 13x^2 - 8y)$ $3x^3y - 18x^2 + 19y$

3 12. Multiply and simplify: $(4t + 5)(2t - 3)$ $8t^2 - 2t - 15$

3 13. Multiply: $3m^2n^4(2m^6n^2 - 7mn^5)$ $6m^8n^6 - 21m^3n^9$

3 14. Divide: $\dfrac{18rs^2 - 3rs + 6s}{3s}$ $6rs - r + 2$

2 15. Simplify: $\sqrt{-64}$ $8i$

2 16. Subtract: $(9 - 4i) - (-10 + 2i)$ $19 - 6i$

3 17. Multiply: $(3 + 4i)(1 + 2i)$ $-5 + 10i$

$3 + 6i + 4i + 8i^2$

3 18. Divide: $\dfrac{1+5i}{2+3i} \cdot \dfrac{2-3i}{2-3i}$ $\dfrac{17}{13} + \dfrac{7}{13}i$

$\dfrac{2 - 3i + 10i - 15i^2}{4 + 9}$

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