

Extra Practice for Semester Review
MA 15300

(If none of these answers match, write E for ‘none of the above’. Note: There will be 5 choices of answers for each problem on the final review.)

1) Simplify: $\frac{(4x^2y^{-3})^{-3}}{x^5y^5}$

A. $\frac{1}{64x^6y^{11}}$ B. $\frac{x^4}{64y}$ C. $\frac{y^4}{64x^{11}}$ D. $\frac{y^{14}}{64x}$

2) Simplify. Rationalize the denominator, if necessary. $\sqrt{\frac{3x^7}{y^3}}$

A. $\frac{x^3\sqrt{3x}}{y}$ B. $\frac{3x\sqrt{x^5y}}{y^2}$ C. $\frac{x^3\sqrt{3}}{y^2}$ D. $\frac{x^3\sqrt{3xy}}{y^2}$

3) Simplify: $\left(\sqrt[3]{4x^4y^2}\right)\left(\sqrt[3]{2x^3y^6}\right) =$

A. $2x^2y^2\sqrt[3]{x^2y^2}$ B. $2x^2y^2\sqrt[3]{x^2y}$ C. $2x^2y^2\sqrt[3]{xy^2}$ D. $2x^2y^2\sqrt[3]{xy}$

4) What is one of the factors of $3x^6 + 10x^5 - 8x^4$?

A. $(x+2)$ B. $(3x+2)$ C. $(x-4)$ D. $(3x-2)$

5) Simplify completely: $\frac{3}{x} + \frac{1}{2x-8} + \frac{-x}{x^2-16}$

A. $\frac{5x-24}{2x(x+4)}$ B. $\frac{5x+24}{2x(x+4)}$ C. $\frac{5x+24}{x(x-4)}$ D. $\frac{5x-24}{x(x-4)}$

6) Rationalize the denominator: $\frac{\sqrt{x}}{3\sqrt{x}-\sqrt{y}}$

A. $\frac{3x+\sqrt{xy}}{9x+y}$ B. $\frac{3x+\sqrt{xy}}{3x+y}$ C. $\frac{3x+\sqrt{xy}}{3x-y}$ D. $\frac{3x+\sqrt{xy}}{9x-y}$

7) Multiply: $(2x^2 - 4x + 1)(x^2 + x - 2)$

- A. $2x^4 - 2x^3 - 7x^2 + 9x - 2$ B. $2x^4 - 5x^3 - 7x^2 + 9x - 2$
C. $2x^4 - 2x^3 - 7x^2 - 7x - 2$ D. $2x^4 + 2x^3 - 7x^2 + 9x - 2$

8) Factor completely: $16x^4 - y^4$

- A. $(2x - y)^4$ B. $(4x^2 - y^2)(4x^2 + y^2)$
C. $(2x + y)(2x - y)(4x^2 + y^2)$ D. $(2x + y)^2(2x - y)^2$

9) Solve for C and simplify. $\frac{1}{A} = 9\left(\frac{1}{B} + \frac{1}{C}\right)$

- A. $C = \frac{A - 9B}{9AB}$ B. $C = \frac{B - 9A}{9AB}$ C. $C = \frac{9AB}{B - 9B}$ D. $C = \frac{9AB}{B - 9A}$

10) If one person can mow the lawn in 50 minutes alone and a second person can mow it in 30 minutes alone, how long would it take to mow the lawn if they both worked together?

- A. 80 minutes B. 20 minutes C. 18.75 minutes D. 21.25 minutes

11) A solar heating panel requires 150 gallons of a fluid that is 55% antifreeze. The fluid comes in either a 75% or a 30% solution. How many gallons of the 75% solution should be used to prepare the mixed solution?

- A. $83\frac{1}{3}$ gallons B. 50 gallons C. $66\frac{2}{3}$ gallons D. 100 gallons

12) Solve this equation: $(x - 4)(x + 2) = 6$

- A. $x = -1 + \sqrt{3}, -1 - \sqrt{3}$ B. $x = 1 + \sqrt{3}, -1 - \sqrt{3}$
C. $x = 1 + \sqrt{15}, 1 - \sqrt{15}$ D. $x = -1 + \sqrt{15}, -1 - \sqrt{15}$

13) Solve this equation: $\frac{3x}{x-3} + \frac{-3}{x+3} = \frac{54}{x^2-9}$

- A. $x = -5, 3$ B. $x = -7$ C. $x = -5$ D. $x = -7, 3$

- 14) Divide this complex numbers. Write your answer in the form $a + bi$. $\frac{-2-5i}{-4+5i}$

A. $\frac{33}{41} + \frac{10}{41}i$ B. $\frac{17}{25} - \frac{6}{5}i$ C. $-\frac{17}{41} + \frac{30}{41}i$ D. $-\frac{33}{25} - \frac{2}{5}i$

- 15) Solve for x : $\sqrt{2x+87} + x = 6$

A. $x = -3$ B. $x = -3, 17$ C. $x = 15, 17$ D. $x = 15$

- 16) Solve for x : $x^4 - 3x^2 + 2 = 0$

A. $x = -1, 0, 2$ B. $x = 0, 1, 2$ C. $x = 1, 2$ D. $x = -\sqrt{2}, \sqrt{2}, -1, 1$
E. No solution

- 17) Solve and express your answer using interval notation. $\left| \frac{2-5x}{4} \right| > 3$

A. $(-\infty, -2) \cup (\frac{14}{5}, \infty)$ B. $(-2, \frac{14}{5})$ C. $(-\infty, -2) \cup (2, \infty)$ D. $(-2, 2)$

- 18) Solve and express your solution using interval notation. $-4x^2 + 17x + 15 \leq 0$

A. $(-\infty, -\frac{3}{4}] \cup [5, \infty)$ B. $(-\infty, -\frac{4}{3}] \cup [\frac{1}{5}, \infty)$
C. $(-\infty, -5) \cup [\frac{3}{4}, \infty)$ D. $(-\infty, -\frac{1}{5}] \cup [\frac{4}{3}, \infty)$

- 19) Write $(2+i) + (3-i)^2$, where i is the imaginary unit, as a complex number $a + bi$.

A. $10 - 5i$ B. $10 + 5i$ C. $-10 - 5i$ D. $-10 + 5i$

- 20) Solve: $2|3x-1| - 4 = 20$

A. $x = \frac{13}{3}$ B. $x = -\frac{11}{3}, \frac{13}{3}$ C. $x = \frac{13}{3}, 3$ D. no solution

- 21) Solve: $0 \leq \frac{-3-3x}{5} < 5$

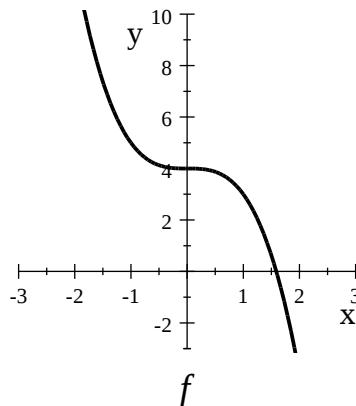
A. $[-\frac{28}{5}, -1]$ B. $(-1, -\frac{28}{3})$ C. $(-\frac{28}{3}, -1]$ D. $[-\frac{28}{3}, -1)$

- 22) Find the midpoint of the segment connecting the points $A(-6, 4)$ and $B(4, -5)$.

A. $\left(5, -\frac{9}{2}\right)$ B. $(-2, -1)$ C. $\left(-1, -\frac{1}{2}\right)$ D. $\left(-5, \frac{9}{2}\right)$

- 23) Which equation best describes the graph of f ?

A. $f(x) = -x^2 + 4$ B. $f(x) = x^3 - 4$
 C. $f(x) = -x^3 + 4$ D. $f(x) = -x + 4$



- 24) Find the slope-intercept form of the line that passes through the points $(4, 3)$ and $(-3, 7)$.

A. $y = -\frac{7}{4}x + 4$ B. $y = -\frac{4}{7}x - \frac{5}{7}$ C. $y = -\frac{7}{4}x + 10$ D. $y = -\frac{4}{7}x + \frac{37}{7}$

- 25) Evaluate the difference quotient, $\frac{f(a+h) - f(a)}{h}$ if $f(x) = 3x^2 - 4x + 12$.

A. $6a + 3h$ B. $3h - 4$ C. $\frac{3h^2 - 4h + 12}{h}$ D. $6a + 3h - 4$

- 26) Find the domain of $g(x) = \frac{\sqrt{3x-1}}{x^2 - 7x + 10}$.

A. $\left[\frac{1}{3}, 2\right) \cup (2, 5) \cup (5, \infty)$ B. $\left[\frac{1}{3}, \infty\right)$
 C. $(-\infty, 2) \cup (2, 5) \cup (5, \infty)$ D. $\left(-\infty, \frac{1}{3}\right] \cup (2, 5) \cup (5, \infty)$

- 27) A hot-air balloon is released at 1 PM and rises vertically at a rate of 2 meters per second. An observation point is situated 49 meters from a point on the ground directly below the balloon. If t denotes the time in seconds after 1 PM, express the distance d between the balloon and the observation point as a function of t .

A. $d(t) = \sqrt{2401 + 4t^2}$ B. $d(t) = \sqrt{2401 + 2t^2}$
C. $d(t) = 2401 + 4t^2$ D. $d(t) = 2401 + 2t^2$

- 28) If the point $P(5, -1)$ is on the graph of function f , find the corresponding point on the graph of $y = 7f(x+2) - 3$.

A. $(7, -10)$ B. $(3, -4)$ C. $(3, -10)$ D. $(7, -4)$

- 29) Given the piece-wise defined function below, find the value of $f(-3) + f(-2) + f(2)$.

$$f(x) = \begin{cases} -5 & \text{if } x < -2 \\ x^2 & \text{if } -2 \leq x < 2 \\ x+1 & \text{if } x \geq 2 \end{cases}$$

A. -3 B. 2 C. 3 D. 17

- 30) Find the standard form of the equation for a parabola with vertex $V(-2, 5)$ and passing through the point $P(-1, 6)$.

A. $y = -5(x+2)^2 + 5$ B. $y = (x-5)^2 - 2$
C. $y = (x+1)^2 + 6$ D. $y = (x+2)^2 + 5$

- 31) Express the quadratic function $f(x) = 2x^2 + 6x - 7$ in standard form.

A. $f(x) = 2\left(x + \frac{3}{2}\right)^2 - \frac{23}{2}$ B. $f(x) = \left(x + \frac{3}{2}\right)^2 - \frac{23}{4}$
C. $f(x) = \left(x + \frac{3}{2}\right)^2 + \frac{5}{4}$ D. $f(x) = 2\left(x + \frac{3}{2}\right)^2 - 10$

- 32) Given that $f(x) = 2x^2 - 2x + 5$ and $g(x) = 2x + 3$, find $(f \circ g)(x)$.

A. $8x^2 + 8x + 1$ B. $8x^2 + 20x + 29$ C. $8x^2 + 20x + 1$ D. $8x^2 + 20x + 17$

- 33) Find $(fg)(x)$ if $f(x) = \frac{x-1}{x^2-4}$ and $g(x) = x^2$.

A. $\frac{x^2-1}{x^4-4}$ B. $\frac{x^3-x^2}{x^2-4}$ C. $\frac{x-1}{x^4-4x^2}$ D. $\left(\frac{x-1}{x^2-4}\right)^2$

- 34) Find the inverse function for $f(x) = 8x^2 + 3$ if $x \geq 0$.

A. $f^{-1}(x) = \sqrt{\frac{x-3}{8}}$ B. $f^{-1}(x) = -\sqrt{\frac{x}{8}-3}$ C. $f^{-1}(x) = \sqrt{\frac{x}{8}-3}$ D. $f^{-1}(x) = -\sqrt{\frac{x-3}{8}}$

- 35) In which formula is y inversely proportional to the square of x and directly proportional to the cube of z ?

A. $y = \frac{kx^2}{z^3}$ B. $y = kx^2z^3$ C. $y = \frac{kz^3}{x}$ D. $y = \frac{kz^3}{x^2}$

- 36) Express the following statement as a formula and determine the constant of proportionality from the given conditions: y is directly proportional to the square root of x and inversely proportional to the cube of z . If $x = 25$ and $z = 5$, then $y = 18$.

A. $y = \frac{18\sqrt{x}}{25z^3}$ B. $y = \frac{18z^3}{25\sqrt{x}}$ C. $y = \frac{450\sqrt{x}}{z^3}$ D. $y = \frac{450z^3}{\sqrt{x}}$

- 37) True or false? The triangle with vertices at points below is a right triangle.
A(-5, 4), B(4, -4), and C(0, 6)

TRUE

FALSE

- 38) True or false? The lines with equations below are perpendicular.
 $4x + 5y = 20$ and $4y - 5x = -12$

TRUE

FALSE

- 39) True or false? The maximum value of the function below is -1 .
 $f(x) = -5x^2 + 10x - 7$

TRUE

FALSE

40) A child weighs 32 pounds at age 2 and 57 pounds at age 4. If childhood weight W (in pounds) is linearly related to age t (in years), what did the child weigh at birth?

A. 5 lb. B. 8 lb. C. 9 lb. D. 6 lb.

41) Suppose the function $y = f(x)$ has been graphed. In terms of that graph, describe the location of the graph of $y = f(x-3)+1$.

- A. shifted 3 units right and shifted one unit up
- B. shifted 3 units left and shifted one unit up
- C. shifted one unit right and 3 units down
- D. shifted one unit right and 3 units up

42) True or false? The value of $i^{48} - i^{42}$ is 2, where i is the complex unit.

TRUE

FALSE

Answers for the Extra Practice for Semester Review MA 15300

Problem	Answer	Problem	Answer
1)	<i>C</i>	2)	<i>D</i>
3)	<i>C</i>	4)	<i>D</i>
5)	<i>B</i>	6)	<i>D</i>
7)	<i>A</i>	8)	<i>C</i>
9)	<i>D</i>	10)	<i>C</i>
11)	<i>A</i>	12)	<i>C</i>
13)	<i>C</i>	14)	<i>C</i>
15)	<i>A</i>	16)	<i>D</i>
17)	<i>A</i>	18)	<i>A</i>
19)	<i>A</i>	20)	<i>B</i>
21)	<i>C</i>	22)	<i>C</i>
23)	<i>A</i>	24)	<i>D</i>
25)	<i>D</i>	25)	<i>D</i>
26)	<i>A</i>	27)	<i>A</i>
28)	<i>C</i>	29)	<i>B</i>
30)	<i>D</i>	31)	<i>A</i>
32)	<i>D</i>	33)	<i>B</i>
34)	<i>A</i>	35)	<i>D</i>
36)	<i>C</i>	37)	TRUE
38)	TRUE	39)	FALSE
40)	<i>E</i>	41)	<i>A</i>
42)	TRUE		