

1. Solve.

$$x^{\frac{4}{3}} - 81 = 0$$

- a)  $\{9, -9\}$
- b)  $\{9\}$
- c)  $\{27, -27\}$
- d)  $\{27\}$

2. A man is walking away from a street light 20 ft above the ground. The man is 6 ft tall. How long is the man's shadow when he is 10 ft from the lamp post?

- a)  $\frac{30}{7}$  ft.
- b) 5 ft.
- c) 7.5 ft.
- d)  $\frac{6}{7}$  ft.

3. Raisins sell for \$4.50/pound and bran flakes sell for \$2.00/pound. Find the number of pounds of raisins that should be mixed with 12 pounds of bran flakes to obtain a mixture that sells for \$3.00/pound.

- a)  $\frac{48}{9}$  lbs.
- b) 12 lbs.
- c) 8 lbs.
- d) 4 lbs.

4. Completing the square to solve  $3x^2 + 18x + 4 = 0$  results in which one of the equations?

- a)  $(3x + 2)^2 = 4$
- b)  $(x + 3)^2 = \frac{23}{3}$
- c)  $(x + 9)^2 = \frac{31}{3}$
- d)  $(x + 3)^2 = \frac{31}{3}$

5. For what value(s) of  $k$  will the equation  $x^2 + kx + 5 = 0$  have exactly one real root?

- a)  $k = \pm 2\sqrt{5}$
- b)  $k = \pm 5\sqrt{2}$
- c)  $k = \pm 20$
- d)  $k = \pm 4$

6. A box with a square base and no top is to be made from a square piece of cardboard by cutting 3-in squares from each corner and folding up the sides. The box is to hold  $75 \text{ in}^3$ . Let the side length of the uncut square cardboard be  $x$ -inches. By which one equation can the value of  $x$  be obtained?

- a)  $(x - 6)^2 = 75$
- b)  $3(x - 3)^2 = 25$
- c)  $(x - 6)^2 = 25$
- d)  $(x - 6)^3 = 75$

7.  $i^{233} =$ 

- a)  $i$
- b)  $-i$
- c)  $-1$
- d)  $1$

8.  $(3 - 2i)^{-1} =$ 

- a)  $\frac{3}{5} - \frac{2}{5}i$
- b)  $\frac{3}{5} + \frac{2}{5}i$
- c)  $\frac{3}{13} + \frac{2}{13}i$
- d)  $\frac{3}{13} - \frac{2}{13}i$

9. Find all real solutions of  $t^{-2} - 7t^{-1} + 12 = 0$ .

- a)  $\{4, 3\}$
- b)  $\{4\}$
- c)  $\{\frac{1}{4}, \frac{1}{3}\}$
- d)  $\{3\}$

10. Find all real solutions of  $\frac{x + \frac{3}{x}}{4 + \frac{8}{x}} = x$ .

- a)  $\{-3\}$
- b)  $\{3\sqrt{3}\}$
- c)  $\{\sqrt{3}, -\sqrt{3}\}$
- d)  $\{-3, \frac{1}{3}\}$

11. Solve the inequality  $(x - \frac{1}{2})(x + \frac{1}{2})(x + \frac{3}{2}) < 0$ .
- $(-\frac{3}{2}, -\frac{1}{2}) \cup (\frac{1}{2}, \infty)$
  - $(-\infty, -\frac{3}{2}) \cup (-\frac{1}{2}, \frac{1}{2})$
  - $(-\frac{1}{2}, \frac{1}{2}) \cup (\frac{3}{2}, \infty)$
  - $(-\frac{1}{2}, \frac{1}{2})$
12. Solve the inequality  $\frac{2x+5}{x+1} \leq 1$ .
- $(-\infty, -\frac{5}{2}] \cup (-1, \infty)$
  - $[-\frac{5}{2}, -1)$
  - $[-4, -1)$
  - $[-4, -1]$
  - $(-\infty, -4] \cup (-1, \infty)$
13. Solve the absolute value inequality  $6 - |2x + 7| \geq 3$ .
- $[-5, -2]$
  - $(-\infty, -5] \cup [-2, \infty)$
  - $(-\infty, -2] \cup [1, \infty)$
  - $[-2, 1]$
14. If  $(-7, 3)$  is the midpoint of line segment  $AB$ , and  $A$  has coordinates  $(-9, -15)$ , then  $B$  has coordinates
- $(-4, 23)$
  - $(-5, 21)$
  - $(-5, 33)$
  - $(-4, 21)$
15. The graph of the equation  $y = (x - 3)^2$  is
- symmetric about the origin and has intercepts  $(3, 0)$  and  $(0, 3)$ .
  - symmetric about the  $y$ -axis and has intercepts  $(3, 0)$ ,  $(-3, 0)$ , and  $(0, 9)$ .
  - not symmetric about the  $y$ -axis or origin and has intercepts  $(3, 0)$  and  $(0, 9)$ .
  - not symmetric about the  $y$ -axis or origin and has intercepts  $(3, 0)$  and  $(0, 3)$ .
16. Find an equation of the circle with center  $(5, -2)$  which is tangent to the  $y$ -axis.
- $(x - 5)^2 + (y + 2)^2 = 25$
  - $(x + 5)^2 + (y - 2)^2 = 4$
  - $(x - 5)^2 + (y + 2)^2 = 5$
  - $(x - 5)^2 + (y + 2)^2 = 4$
17. Find an equation of the line through  $(-2, 7)$  which is parallel to the line  $3x + 5y = 9$ .
- $3x + 5y = 29$
  - $5x - 3y = -31$
  - $5x + 3y = 31$
  - $5x - 3y = 11$
  - $3x - 5y = 27$
18. Find an equation of the line which is tangent to the circle  $x^2 + y^2 = 10$  at the point  $(1, -3)$ .
- $y = \frac{1}{3}x + \frac{1}{3}$
  - $y = -3x$
  - $y = 3x$
  - $y = \frac{1}{3}x - \frac{10}{3}$
19. Suppose  $m$  is jointly proportional to  $n$  and  $p$ , and is inversely proportional  $a$ . If  $m = 16$  when  $n = 3$ ,  $p = 4$ , and  $a = 6$ , write an equation that expresses this variation.
- $m = \frac{32np}{a}$
  - $m = \frac{8np}{a}$
  - $m = \frac{a}{16np}$
  - $m = \frac{32a}{np}$
20. The speed of a pulley varies inversely as its diameter. A pulley with diameter 3 inches, turns at 150 revolutions per minute. Find the speed of a pulley with diameter 5 inches.
- 90 rev./min
  - 450 rev./min
  - 50 rev./min
  - 100 rev./min

MATH 22 - EXAM 1 FA 07 KEY

- |    |   |
|----|---|
| 1  | C |
| 2  | A |
| 3  | C |
| 4  | B |
| 5  | A |
| 6  | C |
| 7  | A |
| 8  | C |
| 9  | C |
| 10 | D |
| 11 | B |
| 12 | C |
| 13 | A |
| 14 | B |
| 15 | C |
| 16 | A |
| 17 | A |
| 18 | D |
| 19 | B |
| 20 | A |