Shade the appropriate region on the answer sheet. Choice "none" represents "none of these".

1. If (x, y) any point on the graph of $(x-5)^2+(y+2)^2=9$, which one of the following must be true?
   (a) $x \le 8$ (b) $x \ge 9$ (c) $y = -2$ (d) $y \ge 0$ (e) none

2. What time is it 100 hours after 3 pm?
   (a) 2 am (b) noon (c) 5 pm (d) 7 pm (e) none

3. Suppose that the yolk of an egg weighs $\frac{2}{3}$ and the total weight of an egg and 2 yolks weigh a total of 3 ounces. How many ounces do 5 eggs weigh?
   (a) 7.5 (b) 22.5 (c) 25 (d) 45 (e) none

4. For real numbers A, B, and C; $A(B+C) = (B+C)A$ is an example of
   (a) the commutative property of addition (b) the commutative property of multiplication
   (c) the associative property of addition (d) the associative property of multiplication
   (e) none

5. For real numbers A, B, and C; $A(B+C) = A(C+B)$ is an example of
   (a) the commutative property of addition (b) the commutative property of multiplication
   (c) the associative property of addition (d) the associative property of multiplication
   (e) none

6. For real numbers A, B, and C; $A(BC) = (BC)A$ is an example of
   (a) the commutative property of addition (b) the commutative property of multiplication
   (c) the associative property of addition (d) the associative property of multiplication
   (e) none

7. The volume of a cone with a base radius of r and a height of h is
   (a) $\frac{1}{3}\pi r^2 h$ (b) $\frac{1}{4}\pi r^2 h$ (c) $\frac{1}{3}\pi r^3 h$ (d) $\frac{1}{4}\pi r^3 h$ (e) none

8. If the probability that a given basketball player will make a free throw is 0.70, what is the probability she will make 3 free throws in 5 attempts?
   (a) 3/5 (b) 21/50 (c) 3087/10000 (d) 7/20 (e) none

9. If A and B are mutually exclusive events, which of the following must be true?
   (a) $P(A \cup B) = 1$ (b) $P(A \cap B) = P(A)P(B)$ (c) $P(A \cup B) = 0$ (d) $P(A \cap B) = P(A)$ (e) none

10. How many lines of symmetry are there for a square?
    (a) 6 (b) 7 (c) 8 (d) 9 (e) none

11. The equation for the circle through $(3, 4)$ with center $(-1, 2)$ is
    (a) $x^2+y^2=16$ (b) $(x-3)^2+(x-4)^2=12$ (c) $(x+1)^2+(y-2)^2=20$ (d) $x^2+y^2=30$ (e) none

12. The minimum value of $f(x) = 3x^2 - 4x - 2$ is
    (a) 4 (b) -2 (c) $-\frac{10}{3}$ (d) $-\frac{5}{3}$ (e) none

13. The avereage rate of change of $f(x) = x^3 - 3x$ from $x_1 = -2$ to $x_2 = 0$ is
    (a) 2 (b) 1 (c) 0 (d) -2 (e) none

14. Angle A measures $45°$. The measure of the suplement of A in radians is
    (a) $\frac{2\pi}{3}$ (b) $\frac{\pi}{3}$ (c) $\frac{3\pi}{4}$ (d) $\frac{\pi}{2}$ (e) none

15. If $f(x) = \dfrac{3x}{x+1}$, then $f^{-1}(x)$ is
    (a) $\dfrac{3x}{x-1}$ (b) $\dfrac{-3x}{x+1}$ (c) $\dfrac{x+1}{3x}$ (d) $\dfrac{x}{x+3}$ (e) none

16. If $\sin x < \cos x$, $\sin x = -\frac{\sqrt{2}}{2}$, and $0 \le x < 2\pi$, then x is
    (a) $\frac{\pi}{4}$ (b) $\frac{3\pi}{4}$ (c) $\frac{5\pi}{4}$ (d) $\frac{7\pi}{4}$ (e) none

17. The base 7 value of the base 10 number 1998 is
    (a) 285 $\frac{3}{7}$ (b) 2005 (c) 5553 (d) 6234 (e) none

18. Six balls numbered 1 through 6 are placed in a bag and 2 are drawn at random. What is the probability that the sum of the 2 ball selected will be 8?
    (a) 0.2 (b) $\frac{1}{15}$ (c) $\frac{1}{6}$ (d) $\frac{2}{15}$ (e) none

19. If $2x - 3y = 8$ and $4x - y = 6$, then xy is
    (a) -2 (b) -1 (c) 1 (d) 2 (e) none

20. The solution set of $|x - 3| = 5$ is
    (a) $\{2\}$ (b) $\{8\}$ (c) $\{2, 8\}$ (d) $\{3\}$ (e) none

21. The value of $\dfrac{1000!}{999!} \cdot \dfrac{99!}{100!}$ is
    (a) 10 (b) 100 (c) 1,000 (d) 10,000 (e) none

22. For the numbers: 3,5,7,9,12, let $\bar{x}$ denote the mean and x_m denote the median. Which of the following is true?
    (a) $x_m < \bar{x}$ (b) $x_m > \bar{x}$ (c) $x_m = \bar{x}$ (d) $x_m < 7$ (e) none

23. Which of the following is not prime?
    (a) 7,555,549 (b) 125,845,999 (c) 5,486,603 (d) 13,479,842 (e) none

24. If $V(r)$ is the volume of a sphere of radius r, then $V(2r)$ is
    (a) $2V(r)$ (b) $8V(r)$ (c) $(V(r))^2$ (d) $\frac{32\pi}{3}$ (e) none

25. The area of a circle inscribed in a square which is inscribed in a circle of radius 1 cm is
    (a) $\sqrt{2}$ cm^2 (b) $\sqrt{2}/2$ cm^2 (c) $2/\pi$ cm^2 (d) $\pi/2$ cm^2 (e) none

26. If $A = \{1, 2, 3, 6, 7, 8\}$, $B = \{2, 3, 4, 5, 6\}$, and $C = \{1, 3, 5, 7, 9\}$, then $A \cap B$ is
    (a) $\{1, 2, 3, 4, 5, 6, 7\}$ (b) $\{2, 3, 6\}$ (c) $\{\ \}$ (d) $\{1, 7, 8\}$ (e) none

27. $\dfrac{x^3 - 8}{x - 2}$ is identically equal to
    (a) $x^2 - 4$ (b) $x^2 + 2x + 4$ (c) $x^2 + 4$ (d) $(x - 2)^2$ (e) none

28. Given data points $x_1, x_2, \ldots, x_k$ with standard deviation s, then the standard deviation of $x_1 + 3, x_2 + 3, \ldots, x_k + 3$ is

    (a) s (b) $s + 3$ (c) $s + \frac{3}{k}$ (d) $s + 3k$ (e) none

29. $\begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix} + \begin{bmatrix} 4 & -1 & 0 \\ 3 & 2 & 4 \end{bmatrix}$ is

    (a) $\begin{bmatrix} 6 & 2 \\ 7 & 3 \end{bmatrix}$ (b) $\begin{bmatrix} 6 & 2 & 0 \\ 7 & 3 & 4 \end{bmatrix}$ (c) $\begin{bmatrix} 12 & 4 \\ 1 & 3 \end{bmatrix}$ (d) 4 (e) none

30. The value of $\sum_{k=1}^{200}(k + 5)$ is

    (a) 20000 (b) 21000 (c) 21100 (d) 21110 (e) none

31. $|\sqrt{6} - 17|$ is equal to

    (a) -1 (b) $17 - \sqrt{6}$ (c) $\sqrt{6} + 17$ (d) $\sqrt{6} - 17$ (e) none

32. $\frac{\sqrt{121}}{\sqrt{6}}$ is equal to

    (a) $11\sqrt{6}$ (b) $\frac{121\sqrt{6}}{6}$ (c) $\frac{11\sqrt{6}}{6}$ (d) 47 (e) none

33. The solution set of $x - \sqrt{3x - 2} = 4$ is

    (a) $\{2, 9\}$ (b) $\{-1\}$ (c) $\{1, 2\}$ (d) $\{9\}$ (e) none

34. Find the three angles of the triangle if one angle is twice the smallest angle and the third angle is 28° greater than the smallest angle.

    (a) 24°, 52°, 104° (b) 24°, 48°, 108° (c) 30°, 60°, 90° (d) 38°, 76°, 66° (e) none

35. The sum of all of the solutions of $2x^3 - 3x^2 - 8x + 12 = 0$ is

    (a) 11/2 (b) 3/2 (c) 5 (d) -3 (e) none

36. If Sally can paint a room in 5 hours and Bob can paint the room in 7 hours, how long will it take them if they work together?

    (a) 2 hrs. 55 min. (b) 3 hrs. 15 min. (c) 6 hrs. (d) 12 hrs. (e) none

37. The volume of a sphere with a surface area of 200 m^2 is

    (a) $\frac{1000\sqrt{2\pi}}{3\pi}$ m^3 (b) $\frac{1000\sqrt{2\pi}}{3}$ m^3 (c) $\sqrt{200\pi}$ m^3 (d) 4,354 m^3 (e) none

38. Which of the following is true for all sets A and B?

    (a) $A \cap B = A$ (b) $A \cup B = A \cap B$ (c) $A \cup B \subseteq A$ (d) $A \subseteq A \cup B$ (e) none

39. The sum of the interior angles of a regular 7-sided polygon is

    (a) 720° (b) 800° (c) 900° (d) 1000° (e) none

40. The slope of the line tangent to the graph of $y = 2x^3 - 5x + 1$ at $x = 2$ is

    (a) -10 (b) 19 (c) 5/2 (d) 3.69 (e) none