

- Change $\frac{7}{16}$ to percent notation.
A. 0.4375% B. 4.375% C. 43.75% D. 437.5% E. None of these
- $(\frac{2}{5} + \frac{1}{4}) \div \frac{1}{5} =$
A. $\frac{5}{3}$ B. $\frac{3}{4}$ C. $\frac{1}{15}$ D. $\frac{13}{4}$ E. $\frac{13}{100}$
- The slope of a line passing through the two points (1, 3) and (3, -2) is
A. $\frac{1}{4}$ B. $\frac{1}{2}$ C. $-\frac{2}{5}$ D. -2 E. None of these
- $(\frac{1}{2}x - 5)^2 =$
A. $\frac{1}{4}x^2 + 5x - 25$ B. $\frac{1}{4}x^2 - 5x + 25$ C. $\frac{1}{4}x^2 - \frac{5}{2}x - 25$ D. $\frac{1}{4}x^2 - \frac{5}{2}x + 25$
E. None of these
- The slope of a line perpendicular to the line with the equation $3x - 5y + 4 = 0$ is
A. $-\frac{3}{5}$ B. $\frac{3}{5}$ C. $\frac{5}{3}$ D. $-\frac{5}{3}$ E. None of these
- Solve the inequality $3x - 7 > 5x + 6$.
A. $x < -\frac{13}{2}$ B. $x > -\frac{13}{2}$ C. $x < -\frac{1}{2}$ D. $x > -\frac{1}{2}$ E. None of these
- If y varies inversely as x and $y = 18$ when $x = 6$, find x when $y = 2$.
A. 54 B. $\frac{1}{54}$ C. $\frac{2}{3}$ D. $\frac{3}{2}$ E. None of these
- Simplify $(\frac{a^2b^{-3}}{a^{-3}b^2})^{-2}$.
A. $\frac{b}{a}$ B. $(\frac{a}{b})^2$ C. $(\frac{a}{b})^6$ D. $(\frac{b}{a})^{10}$ E. None of these
- Divide and simplify $\frac{x^2 - 2x + 1}{x^2 - 1} \div \frac{x^2 - 3x + 2}{x - 2}$.
A. $\frac{(x - 1)^2}{x + 1}$ B. $\frac{1}{x + 1}$ C. $\frac{x - 2}{(x + 1)(x + 2)}$ D. 1 E. None of these
- Which of the following is a factor of $x^3 + x^2 - ax^2 - ax$?
A. $x - a$ B. $x - 1$ C. x^2 D. ax E. None of these
- Combine terms and simplify: $12\sqrt{45} - 8\sqrt{80}$.
A. $-20\sqrt{5}$ B. $-4\sqrt{35}$ C. $4\sqrt{5}$ D. $8\sqrt{5}$ E. None of these
- Factor: $16x^2 - 4y^8$
A. $(4x - y^2)(4x + y^2)$ B. $(4x - 2y^4)^2$ C. $4(2x - y^4)(2x + y^4)$ D. $4(2x - y^2)$ E. None of these.
- Solve the system of equations for x : $3x + y = -1$, $x + 2y = 3$.
A. $x = -2$ B. $x = 2$ C. $x = 1$ D. $x = -1$ E. None of these.
- Solve for x : $2x^2 - 3x = 2$.
A. $-\frac{1}{2}$, -2 B. $-\frac{3}{2}$, 2 C. $\frac{3}{2}$, 2 D. $\frac{1}{2}$, -2 E. None of these

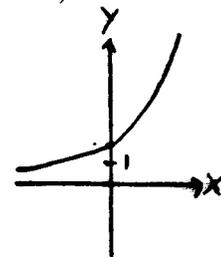
15. Solve for x : $\frac{1}{x-4} - \frac{1}{x-2} = \frac{1}{4}$.
 A. $x = 4, x = 2$ B. $x = 0, x = 2$ C. $x = 0, x = 6$ D. $x = 6, x = 4$ E. None of these
16. Rationalize the denominator: $\frac{2}{\sqrt{x}-5}$.
 A. $\frac{2(\sqrt{x}-5)}{x+25}$ B. $\frac{2(\sqrt{x}-5)}{x+5}$ C. $\frac{2(\sqrt{x}+5)}{x-25}$ D. $\frac{2(\sqrt{x}+5)}{x-5}$ E. None of these
17. Multiply and simplify completely: $(3i-2)(2i-5)$.
 A. $4+19i$ B. $-16-19i$ C. $4-19i$ D. $-16+19i$ E. None of these.
18. Give the equation of the line in slope-intercept form which is parallel to the line $2x-3y=7$ and contains the point $(2, -1)$.
 A. $y = \frac{3}{2}x - 4$ B. $y = -\frac{2}{3}x + \frac{1}{3}$ C. $y = \frac{2}{3}x - \frac{7}{3}$ D. $y = \frac{2}{3}x + \frac{8}{3}$ E. None of these.
19. One solution of $2x^2 + 2x - 1 = 0$ is
 A. $-1 - \sqrt{3}$ B. $-2 - \frac{1}{2}\sqrt{3}$ C. $-2 - \sqrt{3}$ D. $\frac{1}{2} - \frac{1}{2}\sqrt{3}$ E. $-\frac{1}{2} - \frac{1}{2}\sqrt{3}$
20. Express in terms of $\log x$, $\log y$ and $\log z$: $\log \sqrt{\frac{z^3}{xy}}$.
 A. $\left(\frac{3 \log z}{(\log x)(\log y)}\right)^{1/2}$ B. $\frac{3}{2} \log z - \frac{1}{2} \log x - \frac{1}{2} \log y$ C. $(3 \log z - \log x - \log y)^{1/2}$
 D. $\frac{1}{2} \frac{3 \log z}{(\log x)(\log y)}$ E. $\frac{3}{2} \log z - \frac{3}{2} \log x + \frac{3}{2} \log y$
21. $(\frac{1}{8})^{-2/3} =$
 A. $\frac{1}{4}$ B. 4 C. $16\sqrt{2}$ D. $\frac{1}{16\sqrt{2}}$ E. None of these
22. Express as a single logarithm and simplify: $\log_a 7 - \log_a 20 + 2 \log_a 4$.
 A. $\log_a(\frac{28}{5})$ B. $\log_a 3$ C. $\log_a(\frac{7}{10})$ D. $\log_a 6$ E. None of these
23. $\log_2(\frac{1}{16}) =$
 A. $\frac{1}{4}$ B. $-\frac{1}{4}$ C. 4 D. -4 E. None of these
24. If $2^{x+1} = 3$, then find x . (Give your answer correct to 2 decimal places.)
 A. 0.41 B. 0.50 C. 0.56 D. 0.60 E. 0.58
25. The sum of two positive numbers is $\frac{3}{2}$ and their difference is $\frac{1}{2}$. Find the smaller of the two numbers.
 A. $\frac{1}{2}$ B. $\frac{3}{2}$ C. 1 D. $\frac{1}{4}$ E. None of these
26. Bob is 25 years older than his daughter Jane. Three years ago, Bob was twice as old as Jane. What is Jane's present age?
 A. 26 B. 27 C. 22 D. 28 E. 25

27. Paul can paint a room in 5 hours. Sally can paint the same room in 3 hours. How long will it take for them to paint the room if they work together?
 A. 4 hours B. $1\frac{7}{8}$ hours C. 3 hours D. $\frac{8}{15}$ hours E. None of these
28. The base of a triangle is 5 inches less than its altitude. The area is 18 square inches. Find the base of the triangle.
 A. 9 inches B. 6 inches C. 4 inches D. 34 inches E. None of these
29. At 2:00 P.M. two cars start toward each other from towns 240 miles apart. If the rate of one car is 10 mph faster than the other, find the rate of the faster car if the two cars meet at 5:00 P.M.
 A. 45 mph B. 35 mph C. 40 mph D. 30 mph E. None of these
30. A stereo dealer marks up all his merchandise 55% over his cost. If he sells a radio for \$30.00, how much did he pay for it?
 A. \$16.50 B. \$24.55 C. \$19.35 D. \$13.50 E. \$20.69
31. Two investments are made totaling \$4800. Part of the money is invested at 8% and the rest at 9%. In the first year they yield \$412 in simple interest. How much money is invested at 8%?
 A. \$1820 B. \$2980 C. \$2600 D. \$2000 E. None of these
32. Let x and y be two consecutive integers such that x is less than y and the difference of their squares is 145. Find x .
 A. 73 B. 72 C. 12 D. 8 E. None of these.
33. A truck enters a freeway traveling 40 mph. One hour later a car enters the same freeway traveling 55 mph. After how many miles will the car overtake the truck?
 A. $146\frac{2}{3}$ miles B. $201\frac{2}{3}$ miles C. 120 miles D. $106\frac{2}{3}$ E. None of these.
34. An aquarium in the shape of a rectangular box is to have a height of 1.5 feet and a volume of 6 cubic feet. Let x denote the length of the base and y the width of the base. Express y as a function of x .
 A. $y = 1.5x$ B. $y = \frac{4}{x}$ C. $y = x^2$ D. $y = \frac{6}{x}$ E. $y = 9x$
35. At what simple interest rate will \$2000 accumulate to \$3480 in 8 years?
 A. 9.25 percent B. 5.75 percent C. 18.5 percent D. 8.5 percent E. None of these.
36. What amount invested today will accumulate to \$34,000 by the end of 8 years if it is invested at 8.5% compounded monthly? (Give your answer correct to the nearest cent.)
 A. \$17,702.76 B. \$20,238.09 C. \$66,951.16 D. \$15,186.83 E. \$17,266.32
37. Maria Valdez is going to make 48 quarterly deposits of \$425 in a savings account starting 3 months from now. How much will she have after her last deposit if interest is at 6% compounded quarterly? (Give your answer correct to the nearest dollar.)
 A. \$20,400 B. \$25,296 C. \$41,687 D. \$29,565 E. \$32,659

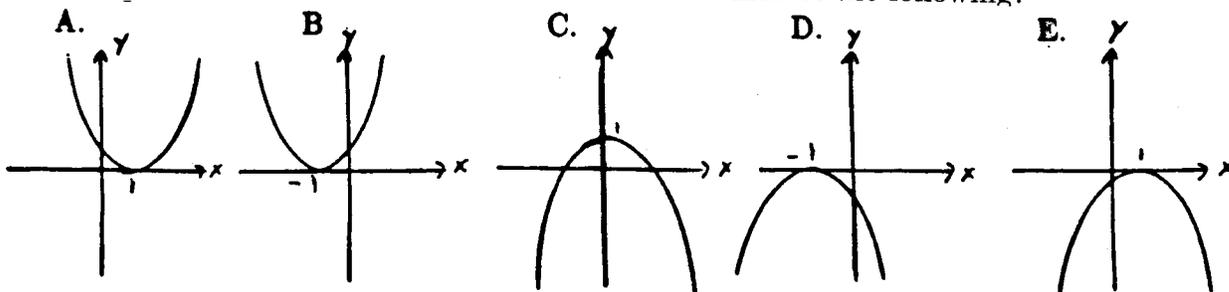
38. Jeff Chow expects to buy a new car 5 years from now. In order to have \$10,000 available by that time, he plans to make 20 equal quarterly payments in a fund that accumulates at 7.6% compounded quarterly. If the first deposit is 3 months from now, find the size of these deposits. (Give your answer correct to the nearest dollar.)
 A. \$190 B. \$686 C. \$416 D. \$500 E. \$473

39. The graph to the right can best be described by which equation?

- A. $y = 2^x + 1$ B. $y = \log_2 x + 1$ C. $y = x^2 + 1$
 D. $y = 2^{-x} + 1$ E. $y = \log_2(x + 1)$



40. The graph of $y = -x^2 + 2x - 1$ looks most like which of the following?



41. In which quadrants do the graphs of the functions $y = x^2$ and $y = x + 2$ intersect? (Hint: Sketch a graph.)

- A. I and III B. I and II C. II and III D. III and IV E. None of these

SOLUTIONS

1. C; 2. D; 3. E $(-\frac{5}{2})$; 4. B; 5. D; 6. A; 7. A; 8. D; 9. B; 10. A; 11. C; 12. C;
 13. D; 14. E $(-\frac{1}{2}, 2)$; 15. C; 16. C; 17. C; 18. C; 19. E; 20. B; 21. B; 22. A; 23. D;
 24. E; 25. A; 26. D; 27. B; 28. C; 29. A; 30. C; 31. D; 32. B; 33. A; 34. B;
 35. A; 36. E; 37. D; 38. C; 39. A; 40. E; 41. B.

TABLE OF FORMULAS

1. CIRCLE

$$(x - h)^2 + (y - k)^2 = r^2$$

2. PARABOLA

$$y = a(x - h)^2 + k$$

3. COMPOUND INTEREST

$$F = P \left(1 + \frac{r}{m}\right)^{mt}$$

(where P is the principal, r is the annual rate, the money is compounded m times a year for t years, and F is the final amount.)

$$r_e = \left(1 + \frac{r}{m}\right)^m - 1$$

(where r_e is the effective rate.)

4. ANNUITIES

$$S_f = R \frac{(1 + i)^n - 1}{i}$$

(where the annuity consists of n payments of R dollars each with an interest rate of r compounded m times a year, $i = r/m$, and S_f is the final amount of the annuity.)

$$S_p = R \frac{1 - (1 + i)^{-n}}{i}$$

(where S_p is the present value of the annuity.)