Multiple Choice. Select the letter choice containing the correct answer.

1. Simplify the expression

$$6 + 4[3x - 2(3x - 1)]$$

A. $8 + 6x$ **B.** $14 - 12x$ **C.** $20 - 30x$ **D.** $-2 - 12x$

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2. Multiply and simplify by combining like terms.

$$(3x - 1)(x^2 + 2x - 3)$$

A. $3x^3+5x^2+11x-3$ **B.** $3x^3+5x^2-11x+3$ **C.** $3x^3+5x^2+7x-3$

D. $3x^3 + 5x^2 + 7x - 3$

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3. Add and simplify.

$$\frac{x}{x-2} + \frac{3}{x+2}$$

A. $\dfrac{x+3}{2x}$ **B.** $\dfrac{x^2+5}{x^2-4}$ **C.** $\dfrac{x^2+3x-2}{x^2-4}$ **D.** $\dfrac{x^2+5x-6}{x^2-4}$

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4. Perform the indicated operation and simplify.

$$\frac{x^2 + x - 2}{x^2 + 2x - 3} \cdot \frac{x+3}{x+2}$$

A. $\dfrac{x+1}{x-1}$ **B.** $\dfrac{x-2}{x+2}$ **C.** $\dfrac{x+3}{x-3}$ **D.** 1

5. Which of the following is equivalent to $\left(\dfrac{x^{-3}y^{-4}}{x^{-2}y}\right)^{-2}$

A. x^2y^{10} **B.** $\dfrac{x^2}{y^6}$ **C.** $x^{10}y^{10}$ **D.** $\dfrac{x^2}{y^{10}}$

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6. Which of the following is equivalent to $\dfrac{3\sqrt[3]{x}+2\sqrt{x^3}}{x}$

A. $3x^{-1/3}+2x^{3/2}$ **B.** $3x^{1/3}+2x^{3/2}$ **C.** $3x^{2/3}+2x^{-1/2}$

D. $3x^{-2/3}+2x^{1/2}$

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7. Simplify. Assume all variables represent positive real numbers.

$$\sqrt[4]{32x^7y^9z^{12}}$$

A. $8z^3\sqrt[4]{x^7y^9}$ **B.** $2x^2y^4z^6\sqrt[4]{2x^3y}$ **C.** $2xy^2z^3\sqrt[4]{2x^3y}$

D. $x^3y^4z^6\sqrt[4]{8xy}$

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8. To make a B a student must average at least 80 on three exams. If the grades on the first two exams are 76 and 92 what is the lowest score the student can make on the third exam and still get a B?

A. 68 **B.** 72 **C.** 76 **D.** 80

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9. Find the solution set of the inequality

$$|5-x| \le 13$$

A. $[0,5]$ **B.** $[-8,18]$ **C.** $[-5,0]$ **D.** $[-18,8]$

10. Which of the following is a factor of $6x^2 - x - 40$?

A. $3x - 20$ **B.** $3x + 8$ **C.** $2x - 5$ **D.** $2x + 5$

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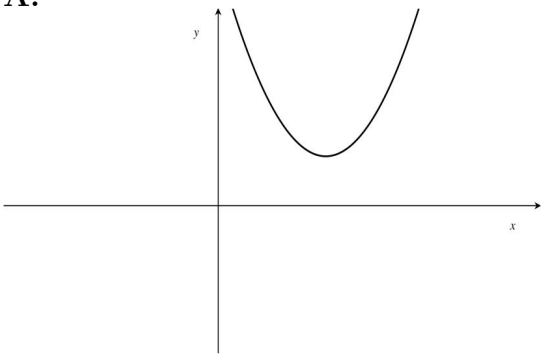
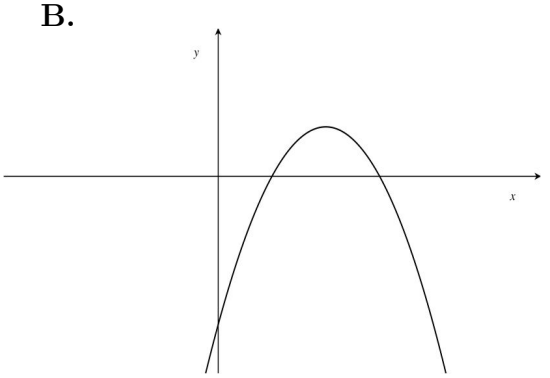
11. Which of the following could be the graph of $y = 2x^2 - 8x + 10$?

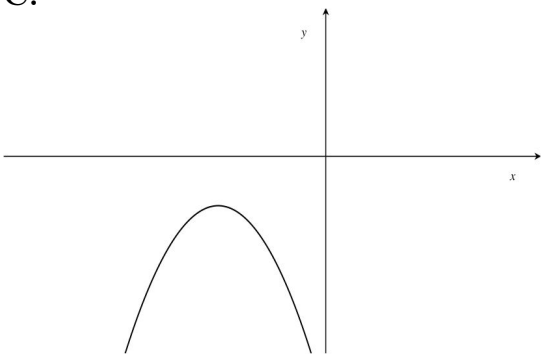
A.



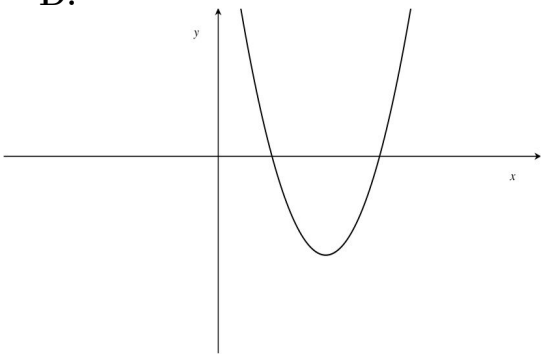
B.



C.



D.



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12. Find the solution set of the equation

$$3 + \sqrt{3x + 1} = x$$

A. $\{-2\}$ **B.** $\{1\}$ **C.** $\{8\}$ **D. No Solution**

13. **The vertex of the parabola given by the equation $y = 3x^2 - 18x + 4$ is located at which point?**

A. $(-3, 85)$ **B.** $(0, 4)$ **C.** $(3, 4)$ **D.** $(3, -23)$

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14. **The y-intercept of the graph of the equation $y = 2(x - 5)^2 + 6$ is located at which point?**

A. $(0, 56)$ **B.** $(5, 6)$ **C.** $(0, 6)$ **D.** $(5, 0)$

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15. **The x-intercepts of the parabola whose equation is $y = x^2 + 4x - 32$ are located at which points?**

A. $(-16, 0)$ **and** $(2, 0)$ **B.** $(-8, 0)$ **and** $(4, 0)$

C. $(-4, 0)$ **and** $(8, 0)$ **D.** $(-2, 0)$ **and** $(16, 0)$

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16. **A basketball player throws a ball toward the basket and it is found that its height above the ground as a function of time is given by $h(t) = -2t^2 + 7t + 6.5$. At what time does the ball first reach a height of 12.5 feet?**

A. 1 second **B. 1.5 seconds** **C. 1.75 seconds**

D. 2 seconds

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17. **If $f(x) = \dfrac{x - 3}{\sqrt{x - 3}}$ then $f(5) =$**

A. 1 **B.** $\sqrt{2}$ **C.** 2 **D.** $f(5)$ **is not defined**

18. What is the domain of the function $f(x) = \sqrt[3]{x^2 - 1}$?

A. $[-1, 1]$ **B.** $(-\infty, -1]$ **C.** $[1, \infty)$ **D.** $(-\infty, \infty)$

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19. A gardner wishes to enclose a rectangular plot of land using a wire fence. If the total area to be enclosed is 75 sq. ft. and the length of the plot must be 3 times the width how much fence will be needed?

A. 40 **ft** **B.** 35 **ft** **C.** 25 **ft** **D.** 20 **ft**

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20. Evaluate the expression for the given values of a, b, and c

$$\frac{a-b}{ac} \quad ; \quad a = 10 \text{ , } b = -6 \text{ , } c = -1$$

A. -6 **B.** -7 **C.** $-\frac{8}{5}$ **D.** $-\frac{2}{5}$

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21. Assume that x and y represent positive real numbers. Then,
$\sqrt{24x^3y^4} + \sqrt{54xy^2} =$

A. $6xy(2xy + 3)$ **B.** $6xy^2(4x^2y^2 + 9)$ **C.** $6xy^3\sqrt{6x}$

D. $(2xy^2 + 3y)\sqrt{6x}$

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22. If $h \neq 0$ and $\dfrac{h}{1 + \dfrac{x}{h}} = 4$ then $x =$

A. $x = \frac{h}{4}(h - 4)$ **B.** $x = \frac{h^2}{4} - 4$ **C.** $x = \frac{1}{4} - h$

D. $x = \frac{h}{4}$

23. Find the equation of the line that is parallel to the line $18x - 9y = 16$ and passes through the point $(4, 15)$

A. $y = 2x + 7$ **B.** $y = -2x + 23$ **C.** $y = -\frac{1}{2}x + 17$

D. $y = \frac{1}{2}x + 13$

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24. Find the solution set of the equation $\frac{x^2 - 1}{x^2 - 4x + 3} + \frac{3}{x^2 - x - 6} = \frac{x}{x - 3}$

A. $\{1\}$ **B.** $\{5\}$ **C.** $\{-1\}$ **D.** $\{-5\}$

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25. If $\log_x 6 = \frac{1}{3}$ **then** $x =$

A. 2 **B.** 18 **C.** 36 **D.** 216

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26. If $9^{2x+1} = \frac{1}{27}$ **then** $x =$

A. -2 **B.** $-\frac{3}{2}$ **C.** $-\frac{5}{4}$ **D.** -1

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27. Find the solution set of the equation

$$\log_5(x + 1) + \log_5(x - 3) = 1$$

A. $\{-4, 2\}$ **B.** $\{-2, 4\}$ **C.** $\{-2\}$ **D.** $\{4\}$

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28. Which point is an x-intercept of the graph of the function $f(x) = \frac{x^2 - 25}{x + 5}$ **?**

A. $(0, 0)$ **B.** $(0, -5)$ **C.** $(5, 0)$ **D.** $(-5, 0)$

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29. The domain of the function $f(x) = \dfrac{\sqrt{x-1}}{x}$ is

A. $(-\infty, 0) \cup (0, \infty)$ **B.** $(0, \infty)$ **C.** $(1, \infty)$ **D.** $[1, \infty)$

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30. If $h \neq 0$ and $f(x) = (x+1)^2$ then $\dfrac{f(x+h) - f(x)}{h} =$

A. $h^2 + h$ **B.** $2x + h$ **C.** $2x + 2$ **D.** $2x + 2 + h$

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31. If $f(x) = x^2 + 1$ and $g(x) = \sqrt{x}$, then $g\big(f(x)\big) =$

A. $x + 1$ **B.** $\sqrt{x} + 1$ **C.** $\sqrt{x^2 + 1}$ **D.** $\sqrt{x}(x^2 + 1)$

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32. A solution of $4 - \dfrac{1}{2}e^{3x} = 0$

A. $3 \ln 2$ **B.** $3 \ln 8$ **C.** $\ln 2$ **D.** $\dfrac{\ln 2}{3}$

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33. Of the following, which has the greatest value?

A. $\sin\left(\frac{\pi}{3}\right)$ **B.** $\sin\left(\frac{5\pi}{6}\right)$ **C.** $\sin\left(\frac{4\pi}{3}\right)$ **D.** $\sin\left(\frac{7\pi}{4}\right)$

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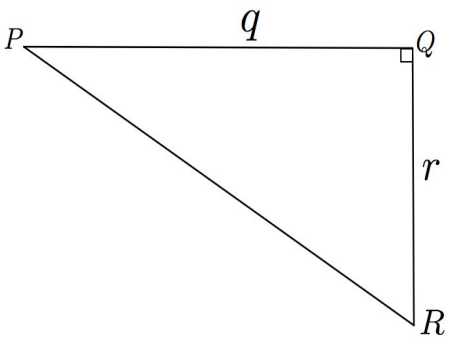
34. In the figure shown to right, if $\tan P = 0.4$ and $r = 4$, then $q =$
Note: The figure is not drawn to scale.

A. 4

B. 5

C. 8

D. 10



35. Which of the following is equivalent to $\frac{\sqrt{3}}{3}$?

A. $\tan\left(-\frac{\pi}{6}\right)$ **B.** $\tan\left(-\frac{4\pi}{3}\right)$ **C.** $\tan\left(\frac{\pi}{6}\right)$ **D.** $\tan\left(\frac{4\pi}{3}\right)$

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36. If $\sin\theta = \frac{12}{13}$ and θ is in the 2nd quadrant then $\tan\theta =$

A. $-\frac{12}{5}$ **B.** $-\frac{5}{13}$ **C.** $\frac{5}{13}$ **D.** $\frac{12}{5}$

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37. For which values of x in the interval $[-\pi, \pi]$ is $\sec(2x) = 2$?

A. $\frac{\pi}{6}$ **B.** $\frac{\pi}{3}$ **C.** $\frac{11\pi}{6}$ **D.** $\frac{10\pi}{3}$

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38. Evaluate the function $f(x) = \cos^{-1}(x)$ when $x = -\frac{\sqrt{3}}{2}$

A. $-\frac{\pi}{3}$ **B.** $\frac{2\pi}{3}$ **C.** $\frac{5\pi}{6}$ **D.** $\frac{7\pi}{6}$

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39. Determine the value of the expression $\sin\left(\frac{5\pi}{8}\right)\cos\left(\frac{5\pi}{8}\right)$

A. $-\frac{\sqrt{2}}{2}$ **B.** $-\frac{\sqrt{2}}{4}$ **C.** $\frac{1}{4}$ **D.** 1

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40. The expression $\frac{\sin x \sec^2 x}{\sec^2 x - 1}$ is equivalent to

A. $-\sin x$ **B.** $\csc x$ **C.** $\cot^2 x$ **D.** 1
