

- Multiply: $(\sqrt{10} - \sqrt{6})(\sqrt{5} + \sqrt{3})$
 - $\sqrt{68}$
 - $5\sqrt{2} - 3\sqrt{2}$
 - $4\sqrt{5} + 5\sqrt{2} - 3\sqrt{2}$
 - $5\sqrt{2} + 3\sqrt{2}$
- Using the quadratic formula solve the following quadratic: $x^2 - 6x = -13$
 - $3 \pm 2i$
 - 3 ± 2
 - $3 \pm 3\sqrt{22}$
 - no solutions
- Find the vertex of the parabola. $y - 8 = x^2 + 6x$
 - $(-3, 1)$
 - $(3, -1)$
 - $(-3, -1)$
 - $(-3, 17)$
- Find $R(x)$ given $P(x) = 4x^4 - 5x^2 + 2x + 4$ and $D(x) = (x+1)$
 - 4
 - 4
 - 1
 - 8
- Which of the following is a factor of $x^2 - 4x + 4$.
 - $(x+2)$
 - $(x-2)$
 - $(x+1)$
 - $(x-1)$
- Suppose $P(x) = x^3 + 2x^2 - 3x + k$ and $Q(x) = x + 1$. Find the value for k so that $Q(x)$ is a factor of $P(x)$.
 - 2
 - 4
 - 2
 - 4
- Simplify $\frac{a^2 - 2a - 15}{a^2 + 6a + 9} - \frac{6}{a+3}$
 - $\frac{a+11}{a+3}$
 - $\frac{a-11}{a+3}$
 - $\frac{a-11}{a-3}$
 - $\frac{-11}{3}$
- You need to buy some filing cabinets. You know that Cabinet X costs \$10 per unit, requires six square feet of floor space, and holds eight cubic feet of files. Cabinet Y costs \$20 per unit, requires eight square feet of floor space, and holds twelve cubic feet of files. You have been given \$140 for this purchase, though you don't have to spend that much. The office has room for no more than 72 square feet of cabinets. Write the objective function and constraints that would be used to maximize volume.
 - $V = 8x + 12y$
 $10x + 20y \leq 140$
 $6x + 8y \leq 72$
 - $V = 8x + 12y$
 $10x + 20y \geq 140$
 $6x + 8y \geq 72$
 - $V = x + y$
 $10x + 20y \leq 140$
 $6x + 8y \leq 72$
 - $V = 12x + 8y$
 $10x + 20y \leq 140$
 $6x + 8y \leq 72$
- Which of the following is the extraneous solution for the equation: $\frac{n}{n-3} + n = \frac{7n-18}{n-3}$
 - $n = 3$
 - $n = 6$
 - $n = 9$
 - $n = 1$

10. Solve, then check for extraneous solutions: $(x + 5)^{\frac{2}{3}} = 4$

- a. no solution b. $x=3, -13$ c. $x=3$ d. $x=\sqrt[3]{16} - 5$

11. Which of the following is the correct setup for solving $2x^2 - 5x - 4 = 0$ using the quadratic formula?

- a. $x = \frac{5 \pm \sqrt{57}}{4}$ b. $x = \frac{-5 \pm \sqrt{57}}{4}$ c. $x = \frac{5 \pm i\sqrt{7}}{4}$ d. $x = \frac{-5 \pm i\sqrt{7}}{4}$

12. Solve the following system: $\begin{cases} y = \ln x \\ x + y = 1 \end{cases}$

- a. (0,1) b. (0,0) c. (1,0) d. (-1, -1)

13. Suppose $P(x) = -16x^2 + 35x + 7$ models the height of a football after it is kicked. When does the football reach its maximum height?

- a. 1.09 seconds b. 26.1 seconds c. 2.4 seconds d. 7 seconds

14. Find the period of the following function and state the interval over which it is increasing where $0 \leq \theta \leq \pi$.

$$y = \cos(2x) - 2$$

- a. $\pi, 0 \leq x \leq \pi$ b. $2\pi, \pi \leq x \leq 2\pi$ c. $2\pi, \frac{\pi}{2} \leq x \leq \pi$ d. $\pi, \frac{\pi}{2} \leq x \leq \pi$

15. Find the sum of the first 8 terms in the sequence -5, 5, 15, 25, 35, ...

- a. 240 b. 230 c. 20 d. 50

16. Find the recursive formula for the following sequence. 2, -4, 8, -16, ...

- a. $-2n+4$ b. 2^n c. $-2a_{n-1}$ d. $-2 + a_n$

17. Which of the following is the translation of the function $f(x) = x^2$ right 3 units, down 5 units?

- a. $f(x) = (x+3)^2 - 5$ b. $f(x) = (x-5)^2 - 3$ c. $f(x) = (x+5)^2 - 3$ d. $f(x) = (x-3)^2 - 5$

18. Evaluate: $\log_3 9 + 2\log_3 6 - \log_3 4$

- a. 1.91 b. 5.25 c. 5.52 d. 4

19. Find the length of a radius for a circular arc with length 20π inches and an angle measure of $\frac{2\pi}{3}$.

- a. 10 in b. 3 in c. 5 in d. 30 in

20. What is the period in the following equation? $y = 3\sin 3\left(x - \frac{\pi}{3}\right) - 1$

- a. 3π b. π c. $\frac{\pi}{3}$ d. $\frac{2\pi}{3}$

21. If $\sin \theta = \frac{3}{5}$, what is the $\cos \theta$?

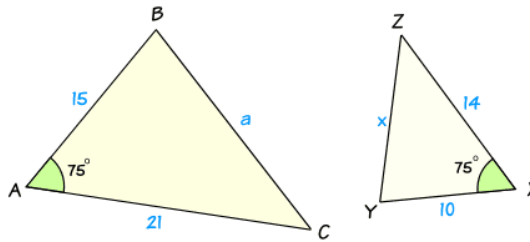
- a. $\frac{5}{3}$ b. $\frac{3}{4}$ c. $\frac{4}{5}$ d. $\frac{\sqrt{34}}{5}$

22. Simplify: $\tan(x)\cos(x)$

- a. 1 b. $\sin x$ c. $\cos x$ d. $\tan x$

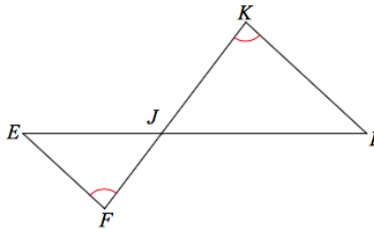
23. Find the ratio of a to x given $\Delta ABC \sim \Delta XYZ$.

- a. $\frac{15}{14}$ b. $\frac{21}{10}$ c. $\frac{2}{3}$ d. $\frac{3}{2}$



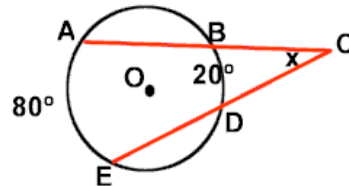
24. State whether the following triangles are similar. If so, state how you know they are similar.

- a. Similar; SSS similarity
 b. Similar; SAS similarity
 c. Similar; AA similarity
 d. Not similar



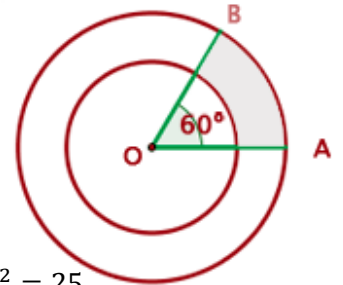
25. Find x in the following picture.

- a. 60° b. 30° c. 160° d. 50°



26. Find the area of the shaded region where the outer circle has radius 8 cm and the inner circle has radius 5 cm. Round to the nearest tenth.

- a. 20.4 cm^2 b. 33.5 cm^2 c. 13.1 cm^2 d. 46.6 cm^2



27. State the center and radius of the circle with the following equation. $(x - 3)^2 + y^2 = 25$

- a. $(3, 3), 5$ b. $(3, 0), 25$ c. $(3, 0), 5$ d. $(0, 3), 5$

28. Find the equation for the parabola with a focus $(3, 2)$ and a directrix at $y = 6$.

- a. $Y = \frac{1}{8}(x - 4)^2 + 3$ b. $y = -\frac{1}{8}(x - 3)^2 + 4$ c. $y = -\frac{1}{4}(x - 3)^2 + 4$ d. $y = -\frac{1}{2}(x - 3)^2 - 4$

29. At a bottling company, a machine pours soda into plastic bottles. The machine is calibrated to fill the bottles so that the amount of soda in the bottles is normally distributed with a mean of 20 ounces of soda and standard deviation of 0.3 ounces. If the machine fills 10,000 bottles per week, approximately how many bottles will have between 19.4 and 20.6 ounces?

- a. 68% b. 95% c. 99.7% d. 100%

30. A research group surveyed a sample of citizens in North Carolina about how many hours they volunteer per month and found that their survey had a margin of error of $\pm 5\%$, with a 95% level of confidence. Approximately how many people did they survey?

- a. 95 people b. 100 people c. 200 people d. 400 people

Answers:

1. B
2. A
3. C
4. C
5. B
6. B
7. B
8. A
9. A
10. B
11. A
12. C
13. A
14. D
15. A
16. C
17. D
18. D
19. D
20. D
21. C
22. B
23. D
24. C
25. B
26. A
27. C
28. B
29. B
30. D