Spring 2013 North Carolina Measures of Student Learning: NC's Common Exams





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- What are the approximate rectangular coordinates for the point with polar coordinates (5, 30°)?
 - A (2.5, 2.89)
 - B (2.5, 4.33)
 - C (2.89, 4.33)
 - D (4.33, 2.5)
- A quadratic function, f, has zeros P and Q, such that P+Q=5 and $\frac{1}{P}+\frac{1}{Q}=8$. Which choice describes f?

A
$$f(x) = 8x^2 - 40x + 5$$

B
$$f(x) = 8x^2 - 40x - 5$$

C
$$f(x) = 2x^2 - 10x + 5$$

D
$$f(x) = 2x^2 - 10x - 5$$

- 4 Lucy invested \$6,000 into an account that earns 6% interest compounded continuously. **Approximately** how long will it take for Lucy's investment to be valued at \$25,000?
 - A 52.7 years
 - B 46.9 years
 - C 24.5 years
 - D 23.8 years
- A lamppost is located 418 feet from a building. The angle of elevation from the base of the lamppost to the top of the building is 32.3°. **Approximately** how tall is the building?
 - A 223 feet
 - B 264 feet
 - C 510 feet
 - D 661 feet
- 6 Two functions are shown below.

$$T(x) = -x$$

$$P(x) = 10x + 2$$

What is the value of P(T(3)) - T(P(3))?

- A 8
- B 4
- C 0
- D -4
- 7 A piecewise function is shown below.

$$f(x) = \begin{cases} cx + 1, & x \le 2 \\ cx^2 - 1, & x > 2 \end{cases}$$

For what value of c does $\lim_{x \to \infty} f(x)$ exist?

- A -2
- B -1
- C 1
- D 4

- 8 What are the polar coordinates of (4, 9)?
 - A (√97, 66°)
 - B (√97, 114°)
 - c (√13, 66°)
 - D (√13, 114°)
- What is the distance between y-intercepts of the graph of $x + 8 = 2(y + 3)^2$?
 - A 4
 - B 6
 - C 11
 - D 15
- 14 Which is a solution set to $x + \frac{3x}{x-1} = \frac{x+2}{x-1}$?
 - A {-1}
 - B {-2}
 - C {-2, 1}
 - D {2, -1}
- 15 What is the range of the inverse of $y = \tan x$?
 - $A \qquad \frac{-\pi}{2} < y < \frac{\pi}{2}$
 - $B \qquad \frac{-\pi}{2} \le y \le \frac{\pi}{2}$
 - C $0 < y < \pi$
 - D $0 \le y \le \pi$

- 16 James is standing 10 meters away from Samantha.
 - A bird is located in the sky at a point between where James and Samantha are standing.
 - James is looking up at the bird at an angle of elevation of 74°.
 - Samantha is looking up at the bird at an angle of elevation of 47°.

Approximately how far is the bird from Samantha?

- A 7.6 meters
- B 8.5 meters
- C 11.2 meters
- D 13.1 meters
- 17 What is the inverse function of $f(x) = \log_5(2x 1)$?
 - A $f^{-1}(x) = 5^x 1$
 - B $f^{-1}(x) = \frac{5^x + 1}{2}$
 - C $f^{-1}(x) = \log_2(5x 1)$
 - D $f^{-1}(x) = \log_5 \frac{5x + 1}{2}$
- 19 What type of conic section is represented by $r = \frac{8}{16 + 125 \sin \theta}$?
 - A circle
 - B ellipse
 - C hyperbola
 - D parabola

21 Which expression is equivalent to $(\sec \theta) \left(\frac{\sin \theta}{\tan \theta} \right)$?

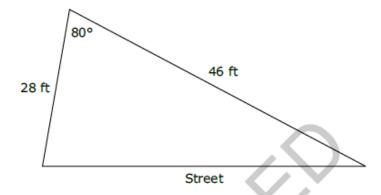
A
$$\cos^2 \theta - \sin^2 \theta$$

B
$$\sin^2 \theta - \cos^2 \theta$$

C
$$\cot^2 \theta - \csc^2 \theta$$

D
$$\csc^2 \theta - \cot^2 \theta$$

22 Suppose that for each foot of land along the street, the annual tax is \$25 per foot. The diagram below shows a plot of land.



About how much is the annual tax for the plot?

The function $C(x) = \frac{2.50x + 1.00}{x}$ models the cost per item for a company to produce x items after the first item is made. What is the inverse function of C(x)?

A
$$C^{-1}(x) = \frac{1.00}{x - 2.50}$$

B
$$C^{-1}(x) = \frac{x - 2.50}{1.00}$$

C
$$C^{-1}(x) = \frac{x - 1.00}{2.50}$$

D
$$C^{-1}(x) = \frac{2.50}{x - 1.00}$$

24 A computer rental company charges \$50 to rent a computer for one week. The table below shows the daily late fees the company charges if a computer is returned late.

Days Late	Daily Late Fee
days 1 through 10	\$5
days 11 through 20	\$8
days 21 through 30	\$10

What would be the total cost of renting a computer for one week and returning it 15 days late?

- A \$120
- B \$125
- C \$140
- D \$170
- 25 From a point 100 feet from the base of a building, Angie looks up at a 40° angle to the top of a building. She walks 20 feet closer to the building. At *approximately* what angle must Angie now look up to see the top of the building?
 - A 32°
 - B 46°
 - C 60°
 - D 77°

SOLUTIONS

1. D	5. B	8. A	16. C	21. D	24. C
3. A	6. B	14. B	17. B	22. A	25. B
4. D	7. C	15. A	19. C	23. A	