



TSIA2 Mathematics Practice Test 2

Total Questions: 20

About This Test

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1. What is the equation of the line passing through the point $(-3, 1)$ that is perpendicular to the line $2x + y = 0$?

A. $y = -2x - 5$

B. $y = \frac{1}{2}x + 4$

C. $y = -2x + 4$

D. $y = \frac{1}{2}x + \frac{5}{2}$

2. Which of these arrangements of real numbers is listed from least to greatest?

A. $3, \sqrt{7}, \sqrt{11}, \frac{17}{4}$

B. $\sqrt{7}, \sqrt{11}, 3, \frac{17}{4}$

C. $\frac{17}{4}, \sqrt{11}, 3, \sqrt{7}$

D. $\sqrt{7}, 3, \sqrt{11}, \frac{17}{4}$

3. Which of the following expressions is equivalent to $2x(3 - x + 4x^2)$?

A. $6x^3 + x^2 + 5x$

B. $8x^3 - 2x^2 + 6x$

C. $2x^2 + 6x$

D. $4x^2 + 5x$

4. A magazine advertises that a subscription price of \$24.99 (for 12 issues) represents a savings of 70% from the newsstand price. Which of the following expressions represents the cost of a single issue at the newsstand?

A. $\frac{10}{7} \times \frac{24.99}{12}$ dollars

B. $\frac{10}{3} \times 24.99$ dollars

C. $\frac{24.99}{12}$ dollars

D. $\frac{10}{3} \times \frac{24.99}{12}$ dollars

5. The volume, V , of a pyramid with base areas B and height H is given by $V = \frac{1}{3}BH$. Which of the following equations can be used to solve for H ?

A. $H = \frac{3V}{B}$

B. $H = \frac{V}{3B}$

C. $H = 3V - B$

D. $H = \frac{B}{3V}$

6. The following table shows the number of tornadoes reported each month of 2015 in Kansas:

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
0	0	31	57	319	317	131	47	27	44	8	0

Which of these is the median number of tornadoes reported for these data?

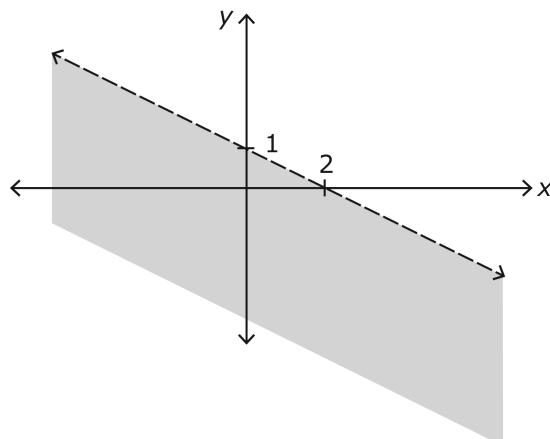
A. 0

B. 37.50

C. 81

D. 81.75

7. For which inequality is this the solution set?



A. $y > -\frac{1}{2}x + 1$

B. $y < -\frac{1}{2}x + 1$

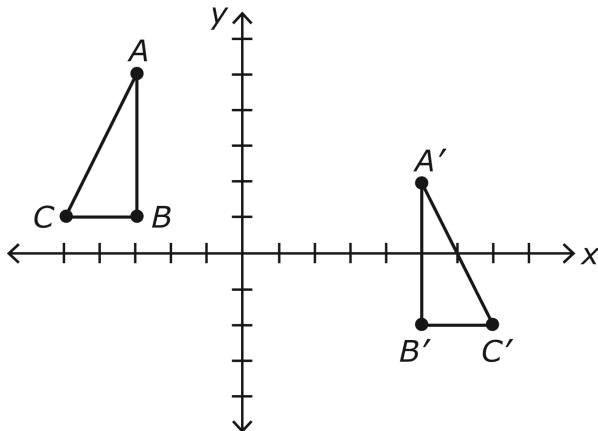
C. $y \geq \frac{1}{2}x + 1$

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

8. Patrick invested some money in an account that earns 3% interest and \$1,500 more than that amount in a CD that earns 2.3% interest. His total yearly interest was \$428. Which of these equations can be used to determine the amount Patrick invested in each account? Let x represent the amount he invests in the account that earns 3% interest.

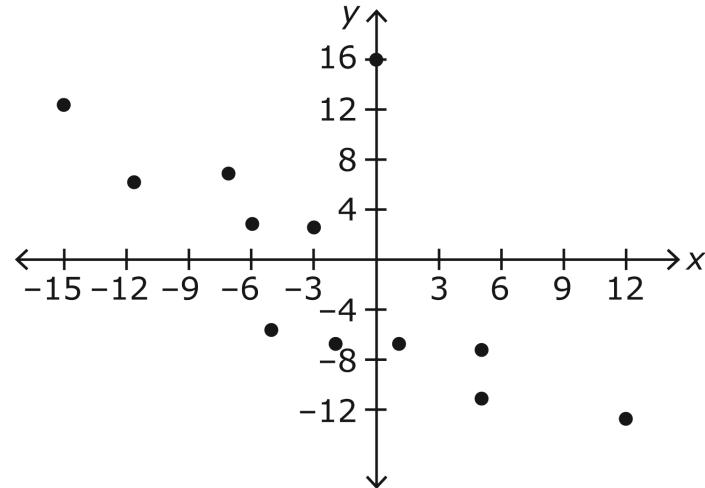
- A. $0.03x + 0.023(x + 1,500) = 0.053(428)$
- B. $0.03x + 0.023(x + 1,500) = 428$
- C. $0.03x + 0.023(1,500) = 428$
- D. $0.023x + 0.03(x + 1,500) = 428$

9. Which sequence of transformations maps triangle ABC onto $A'B'C'$?



- A. Rotate ABC 180° clockwise, with the center of rotation being the origin.
- B. Apply the translation $(x, y) \mapsto (x + 2, y - 3)$, and then reflect that over the line $x = 2$.
- C. Reflect ABC over the line $y = x$.
- D. Apply the translation $(x, y) \mapsto (x - 2, y + 3)$ and then reflect that over the line $x = 2$.

10. Which of the following is the best choice for the equation of the line of best fit for the data shown in this scatterplot?



A. $y = -1.1x + 16$
B. $y = 0.72x - 2.1$
C. $y = -0.8x - 1.3$
D. $y = -2$

11. Which of the following expression is equivalent to $\frac{2x^3 - x^2 + 6x - 3}{2x - 1}$?

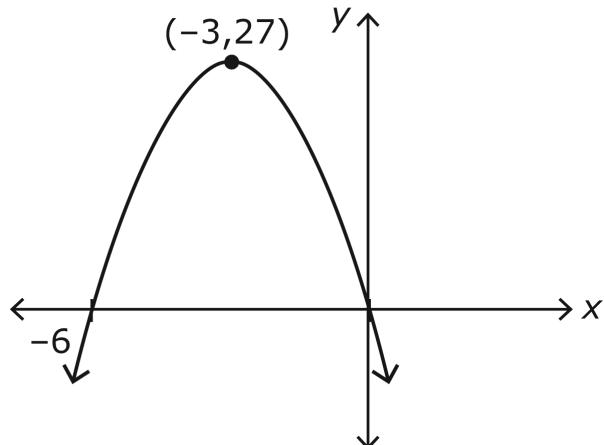
A. $x^2 + 3$
B. $x^2 - x + \frac{5}{2} - \frac{1/2}{2x-1}$
C. $2x^3 - x^2 + 3$
D. $x^2 - 3 - \frac{6}{2x-1}$

12. A 90-foot piece of rope is cut into three pieces. The second piece must be 1 foot shorter in length than twice the first piece, and the third piece must be 13 feet longer than three times the length of the second piece. How long should the middle-length piece be?

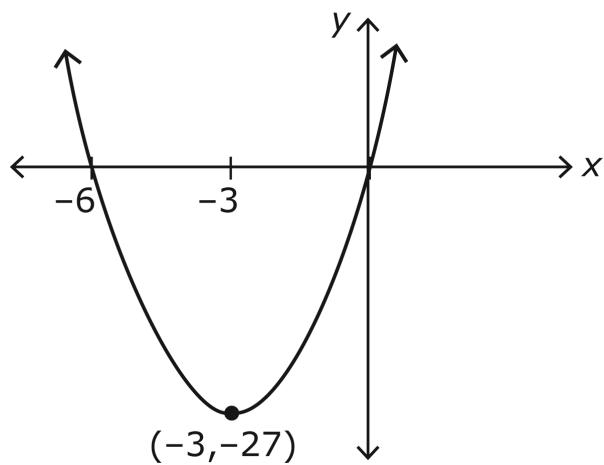
- A. 9 feet
- B. 17 feet
- C. 51 feet
- D. 64 feet

13. Which of these is the graph of the function $f(x) = -x^2 + 6x$?

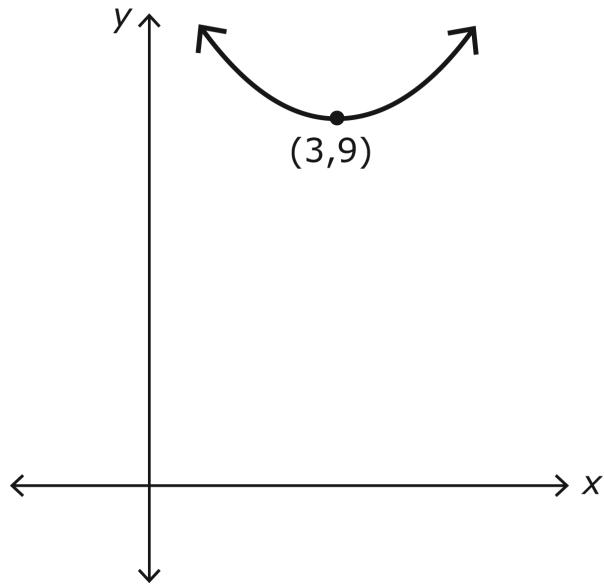
A.



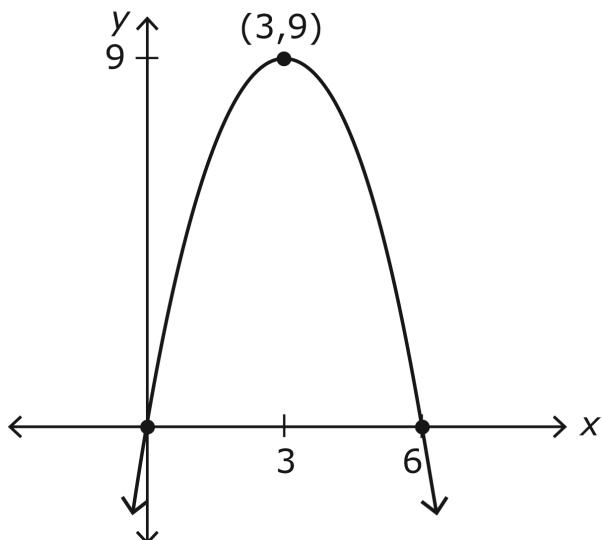
B.



C.



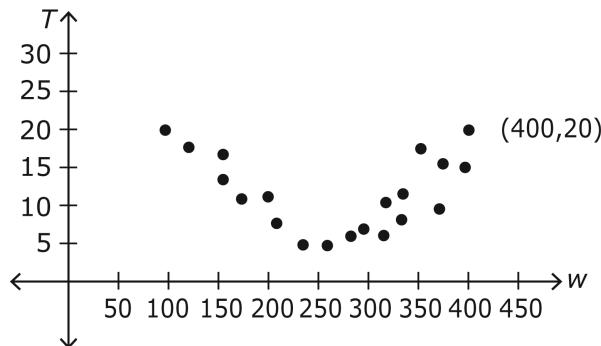
D.



14. A 25-foot telephone pole casts an 11-foot shadow onto the ground. In the same sunlight, what would the height of a telephone pole need to be to cast a shadow 16 feet long?

- A. 80 feet
- B. $\frac{275}{16}$ feet
- C. $\frac{400}{11}$ feet
- D. $\frac{176}{25}$ feet

15. Athletes on a football team build strength by squatting with weighted barbells. At the end of a 2-month training cycle, data was collected relating the maximum weight an athlete could squat to the time it took them to sprint 100 meters. The data is summarized in the following scatterplot:

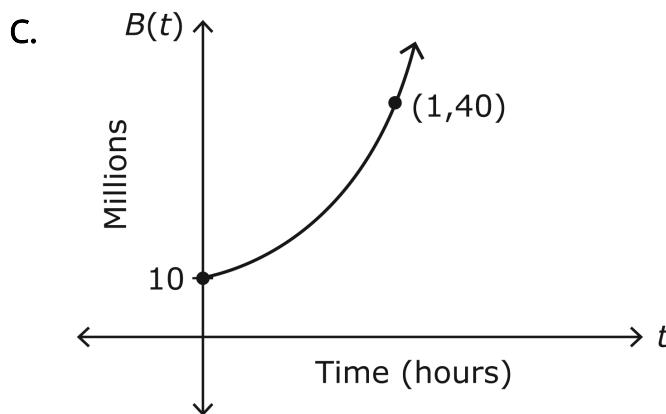
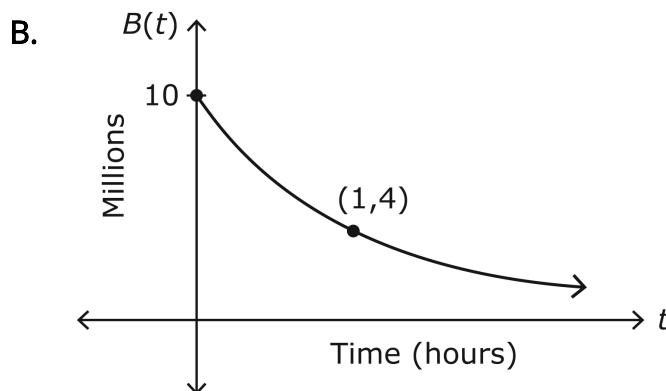
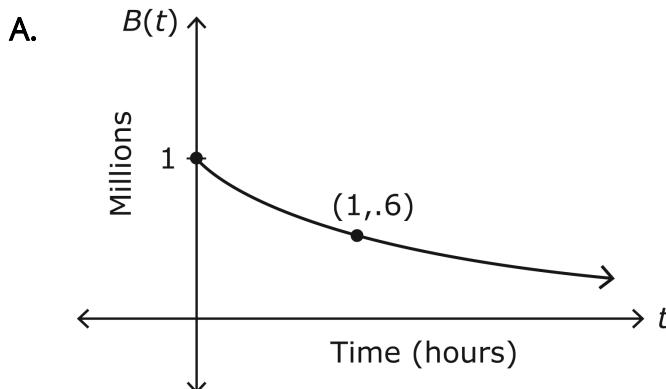


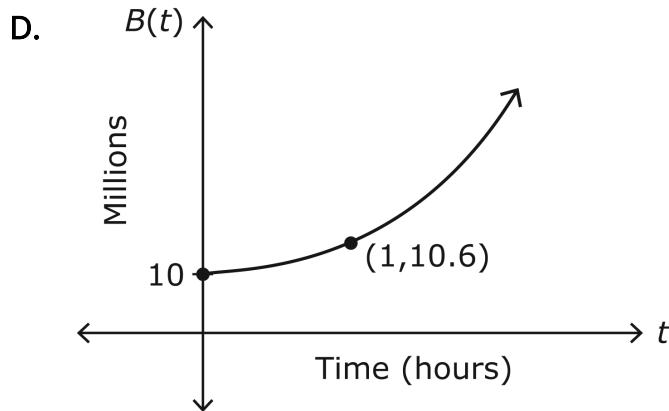
The best fit curve for this data is the quadratic function $T = 0.0008(w - 225)^2 + 7.5$, where w is the weight squatted and T is the time (in seconds) to complete a 100-meter sprint.

According to this model, what is the heaviest weight an athlete should squat if they want to complete the sprint in exactly 20 seconds?

- A. 100 pounds
- B. 225 pounds
- C. 350 pounds
- D. 400 pounds

16. Biologists discovered a compound that can kill off 40% of a bacterial population every hour. If a population consists of 10 million bacteria at the moment the compound is administered, which of these graphs correctly models the number of bacteria, $B(t)$, remaining at time t hours after the compound is administered?





17. Melissa went on a nature walk. She walked three-fourths of a mile in two-thirds of an hour. What is her walking speed in miles per minute?

A. $\frac{1}{120}$

B. $\frac{2}{135}$

C. $\frac{9}{480}$

D. $\frac{9}{8}$

18. The surface area, S , of a right circular cylinder with height h and base radius r is given by the equation $S = 2\pi(r^2 + rh)$. Which of these equations is correctly solved for h ?

A. $h = \frac{S}{2\pi r} - r$

B. $h = \frac{S}{2\pi} - r$

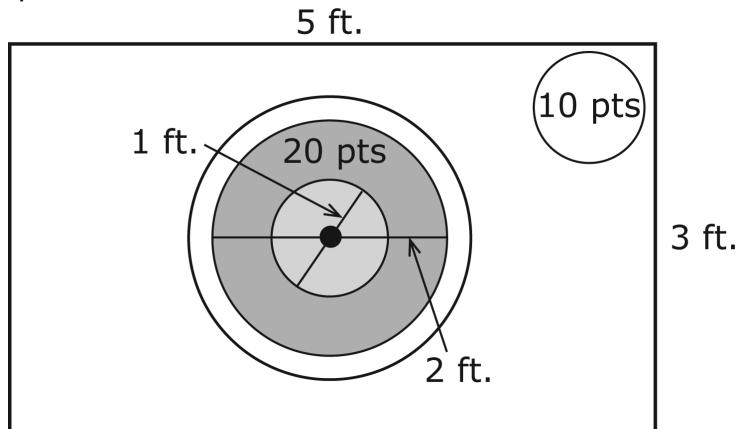
C. $h = \frac{S - 2\pi - r^2}{r}$

D. $h = \frac{S}{2\pi} - r^2 - r$

19. The graph of which of these quadratic functions passes through the points $(0, -3)$, $(1, 0)$, and $(3, 12)$?

- A. $f(x) = x^2 + 2x + 3$
- B. $f(x) = -x^2 - 2x - 3$
- C. $f(x) = x^2 + 2x - 3$
- D. $f(x) = -x^2 - 2x + 3$

20. A novice archer is shooting at a target. Hitting different parts of the target results in different amounts of points, as indicated:



Since the archer is just learning, there is an equal chance of his hitting the target anywhere. What is the probability that he hits the rectangle outside the circles?

- A. $\frac{\pi}{60}$
- B. $\frac{3\pi}{5}$
- C. $\frac{15 - 36\pi}{15}$
- D. $\frac{15 - 9\pi}{15}$

Answer Key

1. D 5. A 9. B 13. D 17. C

2. D 6. B 10. C 14. C 18. A

3. B 7. B 11. A 15. C 19. C

4. D 8. B 12. B 16. B 20. D