

# Classroom Voting Questions: Precalculus

## Lines and Parabolas

1. For what value or values of  $a$  is the line described by  $y - (-1) = a(x - 2)$  parallel to the line described by  $3x - 2y + 6 = 0$ ?
  - (a)  $a = 2$ .
  - (b)  $a = 3$ .
  - (c)  $a = 2/3$ .
  - (d)  $a = 3/2$ .
  - (e) There are more than one possible values for  $a$ .
  
2. For what value or values of  $a$  is the line described by  $y - 6 = a(x + 1)$  perpendicular to the line described by  $x - 3y + 6 = 0$ ?
  - (a)  $a = 1$ .
  - (b)  $a = -1$ .
  - (c)  $a = 3$ .
  - (d)  $a = -3$ .
  - (e) There are more than one possible values for  $a$ .
  
3. What are the slope,  $m$ , and the y-intercept of the line with the equation  $y = 2x + 4$ ?
  - (a)  $m = 4$  and y-intercept  $(0, 2)$
  - (b)  $m = 2$  and y-intercept  $(0, 4)$
  - (c)  $m = 2$  and y-intercept  $(4, 0)$
  - (d)  $m = 4$  and y-intercept  $(2, 0)$
  
4. What is the slope of the line with the equation  $2x + 3y = 6$ ?
  - (a) 6
  - (b)  $\frac{2}{3}$
  - (c)  $-\frac{2}{3}$
  - (d) 0

5. What is the slope of the line  $y = 3$ ?

- (a) 3
- (b) 0
- (c) 1
- (d) It has no slope.

6. Which of the following is the equation of a parabola with vertex  $(-3, 0)$ ?

- (a)  $y = (x - 3)^2$
- (b)  $y = x^2 - 3$
- (c)  $y = (x + 3)^2$
- (d)  $y = x^2 + 3$

7. Find the maximum value of  $f(x) = -4(x - 5)^2 - 3$ .

- (a) 5
- (b) -5
- (c) 3
- (d) -3

8. Find the minimum value of  $y = 3x^2 + 6x - 8$ .

- (a) -8
- (b) -11
- (c) -1
- (d) -6

9. What is the minimum value of  $f(x) = 2x^2 - 8x + 11$ ?

- (a) 11
- (b) 3
- (c) 2
- (d) -1

10. Find the minimum value of  $f(x) = 2(x + 3)^2 + 7$ .

- (a) 2
- (b) 3
- (c) -3
- (d) 7

11. Is  $y = 11$  a maximum or a minimum value for  $f(x) = -\frac{1}{2}(x + 1)^2 + 11$ ?

- (a) Maximum, and I am very confident.
- (b) Maximum, and I am not very confident.
- (c) Minimum, and I am not very confident.
- (d) Minimum, and I am very confident.

12. A parabola has vertex  $(3, -5)$  and passes through the point  $(1, -3)$ . Write the standard form of the quadratic function that satisfies these conditions.

- (a)  $f(x) = \frac{1}{2}(x - 3)^2 - 5$
- (b)  $f(x) = -\frac{3}{4}(x - 1)^2 - 3$
- (c)  $f(x) = 2(x + 3)^2 + 5$
- (d)  $f(x) = 2(x - 3)^2 - 5$

13. What is the y-intercept of the line with the equation  $2x + 3y = 6$ ?

- (a)  $(0, 6)$
- (b)  $(6, 0)$
- (c)  $(2, 0)$
- (d)  $(0, 2)$

14. Find the slope of the line that passes through the points  $(1, 1)$  and  $(2, 4)$ .

- (a) 3
- (b)  $\frac{1}{3}$
- (c)  $\frac{5}{3}$
- (d)  $\frac{3}{5}$

15. Find the equation of the line that passes through the points  $(1, 1)$  and  $(2, 4)$ .

- (a)  $y = 3x$
  - (b)  $y = 3x + 1$
  - (c)  $y = 3x - 2$
  - (d)  $y = 3x + 4$
16. Find the point-slope form for the equation of the line that passes through the points  $(1, 1)$  and  $(2, 4)$ .
- (a)  $y - 1 = 3(x - 1)$
  - (b)  $y - 4 = 3(x - 2)$
  - (c)  $y - 1 = 3x - 1$
  - (d)  $y - 4 = 3x - 2$
  - (e) more than one of the above
17. True or False: Given two points which determine a line, there is a unique point-slope form of the equation for the line.
- (a) True, and I am very confident.
  - (b) True, but I am not very confident.
  - (c) False, but I am not very confident.
  - (d) False, and I am very confident.
18. What is the slope of the line perpendicular to the line  $2x + 3y = 6$ ?
- (a)  $\frac{2}{3}$
  - (b)  $\frac{3}{2}$
  - (c)  $-\frac{2}{3}$
  - (d) 0
19. The net sales for Amazon were approximately \$10.72 billion in 2006 and \$19.15 billion in 2008. Using only this information, write a linear equation  $S(t)$  for the net sales in any year, where  $S$  is net sales in billions of dollars and  $t$  is the year. (*source: Amazon.com quarterly reports*)
- (a)  $S(t) = 10.72 + 8.43(t - 2006)$
  - (b)  $S(t) = 4.215t + 2006$
  - (c)  $S(t) = 10.72 + 4.215(t - 2006)$

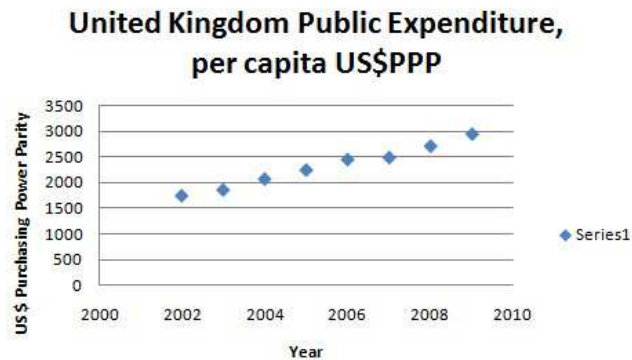
(d)  $S(t) = 10.72 + 4.215(t + 2006)$

20. The linear model from the previous problem predicts that Amazon's net sales will be \$23.37 billion in 2009 and \$27.58 billion in 2010. Amazon's actual net sales for 2009 and 2010 were \$24.52 billion and \$34.21 billion, respectively. Do you think a linear model is appropriate for extrapolation? (*source: Amazon.com quarterly reports*)

- (a) Yes
- (b) No

21. According to the OECD (Organization of Economic Cooperation and Development), the per capita public expenditure on health in the United Kingdom (in US dollars with purchasing power parity) was the following:

Year	2002	2003	2004	2005	2006	2007	2008	2009
US \$ (PPP)	1742.8	1854.7	2066.3	2239.1	2442.8	2481.3	2701.6	2934.6



(*source: <http://www.oecd.org/>*)

Which of the following would be an appropriate linear model for health expenditure  $H$  as a function of the year  $t$ ?

- (a)  $H(t) = 1742.8 + 111.9(t - 2002)$
- (b)  $H(t) = 1742.8 + 170.28(t - 2002)$
- (c)  $H(t) = 2701.6 + 233(t - 2008)$
- (d) Two of the above.
- (e) All of the above.

22. True or False: The graph of a quadratic is always either concave up or concave down.
- (a) True, and I am very confident.
  - (b) True, but I am not very confident.
  - (c) False, but I am not very confident.
  - (d) False, and I am very confident.
23. Put the quadratic  $f(x) = x^2 - 6x + 10$  into vertex form by completing the square. Where is the vertex?
- (a)  $f(x) = (x - 3)^2 + 1$  with vertex at  $(-3, 1)$
  - (b)  $f(x) = (x + 3)^2 + 1$  with vertex at  $(-3, -1)$
  - (c)  $f(x) = (x - 3)^2 + 1$  with vertex at  $(3, 1)$
  - (d)  $f(x) = (x + 3)^2 + 1$  with vertex at  $(-3, 1)$
24. For  $t$  in seconds, the height of a baseball in feet is given by the function  $f(t) = -16t^2 + 32t + 5$ . Find the maximum height reached by the baseball.
- (a) 5 feet
  - (b) 21 feet
  - (c) 5001 feet
  - (d) 16 feet
25. True or False: If  $f(x) = (x + 3)(x + 5)$ , then the zeros of  $f$  are  $x = -3$  and  $x = -5$ .
- (a) True, and I am very confident.
  - (b) True, but I am not very confident.
  - (c) False, but I am not very confident.
  - (d) False, and I am very confident.
26. True or False: Every quadratic function has two real zeros.
- (a) True, and I am very confident.
  - (b) True, but I am not very confident.
  - (c) False, but I am not very confident.
  - (d) False, and I am very confident.

27. True or False: There is a unique parabola with  $x$ -intercepts at  $x = 1$  and  $x = 4$ .
- (a) True, and I am very confident.
  - (b) True, but I am not very confident.
  - (c) False, but I am not very confident.
  - (d) False, and I am very confident.
28. True or False: If a parabola is concave up, its vertex is its minimum point.
- (a) True, and I am very confident.
  - (b) True, but I am not very confident.
  - (c) False, but I am not very confident.
  - (d) False, and I am very confident.
29. True or False: The quadratic  $f(x) = ax^2 + bx + c$  opens downward if  $a > 0$ .
- (a) True, and I am very confident.
  - (b) True, but I am not very confident.
  - (c) False, but I am not very confident.
  - (d) False, and I am very confident.