Final Exam — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **If $\log_2 3 = a$ and $\log_2 5 = b$, then $\log_2\left(\frac{45}{8}\right)$ expressed in terms of a and b is**

- **A** 2a + b - 3
- **B** 2a + b + 3
- **C** a + 2b - 3
- **D** ab - 3

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2 **A security code consists of 4 digits, and digits may be repeated. If the code cannot begin with 0, the number of different codes is**

- A 9000
- B 10000
- C 6561
- D 5040

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3 **When $P(x) = 2x^3 - 5x^2 + 3x - 7$ is divided by $(x - 2)$, the remainder is**

- A 3
- B -13
- C 11
- D -5

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4 The solution to the equation $\sqrt{x + 7} = 4$ is

- **A** 3
- **B** 23
- **C** 9
- **D** 11

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5 The graph of $y = \frac{5x - 2}{3x + 7}$ has a horizontal asymptote with equation $y = \frac{a}{b}$, where $\frac{a}{b}$ is in lowest terms. The value of $a + b$ is

ANSWER _____

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6 **Compared to the graph of y = f(x), the graph of $y = -\frac{1}{2}f(x)$ has been**

A reflected in the y-axis and vertically stretched by a factor of $\frac{1}{2}$

B reflected in the x-axis and vertically stretched by a factor of 2

C reflected in the x-axis and vertically stretched by a factor of $\frac{1}{2}$

D reflected in the y-axis and vertically stretched by a factor of 2

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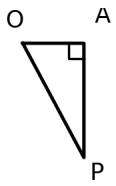
7 **The diagram shows a point P on the terminal arm of an angle θ in standard position. The horizontal side has length 5 and the vertical side has length 12. The exact value of sinθ + cosθ is**



A $\frac{17}{13}$

B $-\frac{7}{13}$

C $\frac{7}{13}$

D $\frac{5}{13}$

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8 **The logarithmic form of the equation $4^{3/2} = 8$ is**

A $\log_4 8 = \frac{3}{2}$

B $\log_8 4 = \frac{3}{2}$

C $\log_4 \frac{3}{2} = 8$

D $\log_8 \frac{3}{2} = 4$

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9 **Five friends are seated in a row for a photograph. Aisha and Ben must sit next to each other. The number of different seating arrangements is**

A 120

B 48

C 24

D 72

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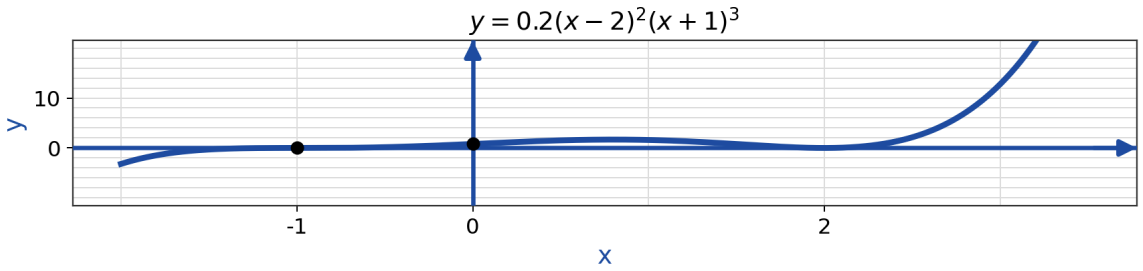
10 **The graph below shows a polynomial function. Which statement about the graph at x = 2 is true?**



A The graph crosses the x-axis at x = 2

B The graph touches the x-axis and turns around at x = 2

C The graph crosses the x-axis with a point of inflection at x = 2

D The graph has a vertical asymptote at x = 2

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11 **The solution to the equation $\sqrt{x+6} = \sqrt{3x-2}$ is**

A 2

B -4

C 6

D 4

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12 The equation of the oblique asymptote of the graph of $y = \frac{x^2 + 2x + 3}{x + 1}$ is

- **A** $y = x + 2$
- **B** $y = x + 1$
- **C** $y = x$
- **D** $y = x + 3$

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13 The point (4, 6) lies on the graph of y = f(x). The image of this point on the graph of y = -f(2x) is

- **A** (4, -6)
- **B** (8, -6)
- **C** (2, -6)
- **D** (2, 6)

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14 If $\sin\theta = \frac{3}{5}$ and θ is in Quadrant II, then the exact value of $\cos\theta$ is

A $\frac{4}{5}$

B $-\frac{3}{4}$

C $\frac{4}{3}$

D $-\frac{4}{5}$

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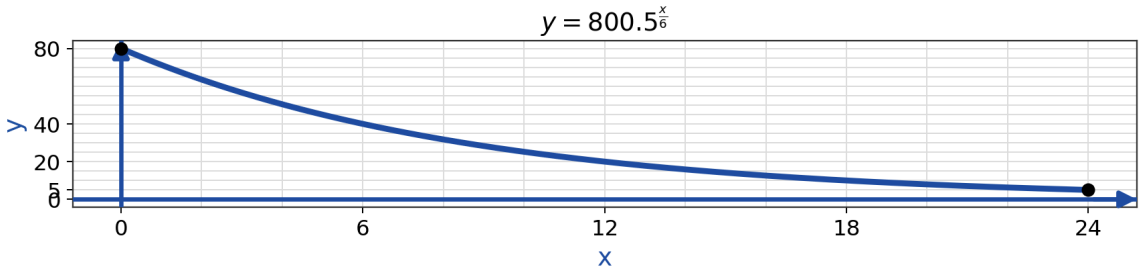
15 The graph below shows the mass of a radioactive substance over time. The mass, in milligrams, remaining after 24 days is



ANSWER

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16 **The middle term in the expansion of $(x^2 - 2)^6$, written in descending powers of x, is**

A $160x^6$

B $-160x^6$

C $-20x^6$

D $60x^8$

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17 **A cubic polynomial function has zeros of -1, 2, and 4. If P(0) = 16, then the value of P(3) is**

ANSWER _____

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18 **When solved algebraically, the equation that produces an extraneous root of x = 2 is**

A $\sqrt{x - 2} = x - 4$

B $\sqrt{2x + 3} = x$

C $\sqrt{x + 7} = x + 1$

D $\sqrt{x - 1} = x - 3$

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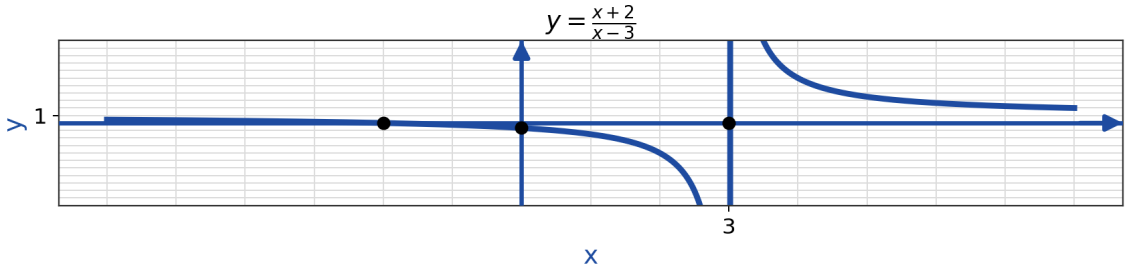
19 **The graph below shows a rational function. The vertical asymptote and the horizontal asymptote are shown in row**



A Vertical asymptote: x = 3 Horizontal asymptote: y = 1

B Vertical asymptote: x = -3 Horizontal asymptote: y = 1

C Vertical asymptote: x = 3 Horizontal asymptote: y = -1

D Vertical asymptote: x = -3 Horizontal asymptote: y = -1

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20 **Given $f(x) = x^2 + 4x - 1$ and $g(x) = 2x^2 - 3$, an expression for $(f - g)(x)$ is**

A $3x^2 + 4x - 4$

B $-x^2 + 4x - 4$

C $-x^2 + 4x + 2$

D $x^2 - 4x - 2$

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21 **A sector of a circle with radius 10 cm has a central angle of 1.2 radians. The area of the sector is**

- **A** 30 cm^2
- **B** 60 cm^2
- **C** 120 cm^2
- **D** 50 cm^2

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22 **The graph of $y = \log_2 x$ is transformed to the graph of $y = -\log_2(x - 1) + 3$. The x-intercept of the transformed graph is**

ANSWER _____

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23 **Twelve students are divided into three groups of 4, and the groups are assigned to three different work stations. The number of ways this can be done is**

ANSWER _____

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24 If $(x - 3)$ is a factor of $x^3 - 5x^2 + 2x + k$, then the value of k is

- A -12
- B 8
- C -8
- D 12

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25 If the point (7, 4) is on the graph of $y = f(x)$, then a corresponding point on the graph of $y = \sqrt{f(x)}$ is

- A (7, 16)
- B (49, 2)
- C $(\sqrt{7}, 4)$
- D (7, 2)

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26 **The average cost, in dollars, for a company producing x units is modelled by $C(x) = \frac{12x + 400}{x}$. As the number of units produced increases, the average cost approaches**

A 400 dollars

B 0 dollars

C 12 dollars

D 412 dollars

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27 **The domain of y = f(x) is $-1 \le x \le 7$. The domain of y = f(-2x - 4) is**

A $\frac{3}{2} \le x \le \frac{11}{2}$

B $-\frac{3}{2} \le x \le \frac{11}{2}$

C $-\frac{11}{2} \le x \le -\frac{3}{2}$

D $-\frac{11}{2} \le x \le \frac{3}{2}$

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28 The exact value of $\sin(\frac{11\pi}{6})\cos(\frac{11\pi}{6})$ is

A $\frac{\sqrt{3}}{4}$

B $-\frac{\sqrt{3}}{2}$

C $-\frac{\sqrt{3}}{4}$

D $\frac{1}{4}$

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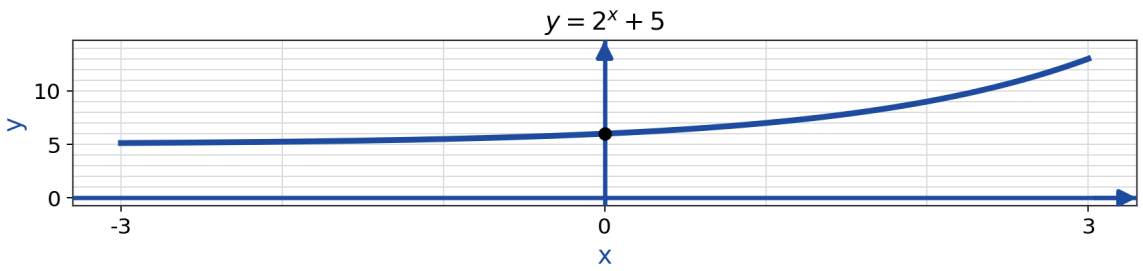
29 **The graph below shows an exponential function. The equation of the horizontal asymptote of the graph is**



A y = 1

B y = 3

C y = 0

D x = 3

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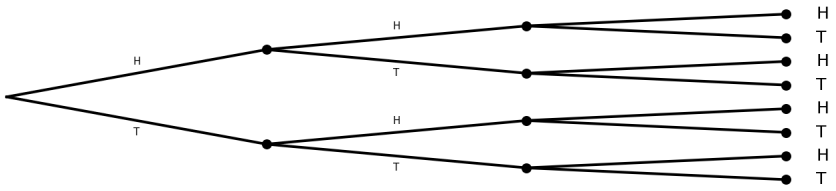
30 **A coin is tossed 3 times. The tree diagram below shows all the possible outcomes. The number of outcomes with exactly 2 heads is**



A 2

B 3

C 4

D 8

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31 **When $P(x) = 3x^3 + 2x^2 - 4x + 1$ is divided by $(x + 1)$, the remainder is**

- **A** -4
- **B** 10
- **C** -2
- **D** 4

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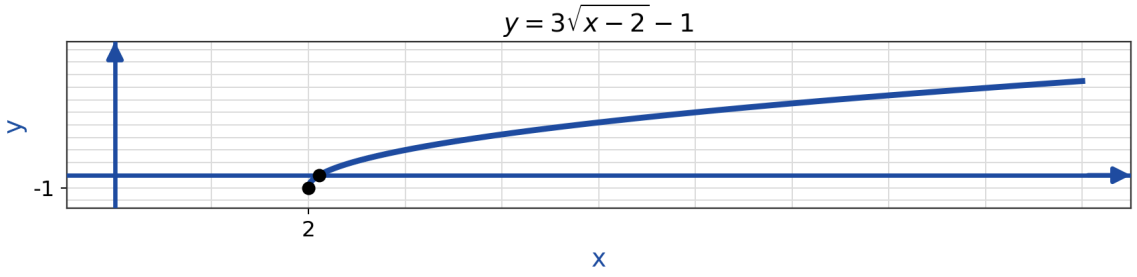
32 **The diagram below shows a radical function. The starting point (endpoint) of the graph is**



- **A** (-2, -1)
- **B** (2, -1)
- **C** (2, 1)
- **D** (-2, 1)

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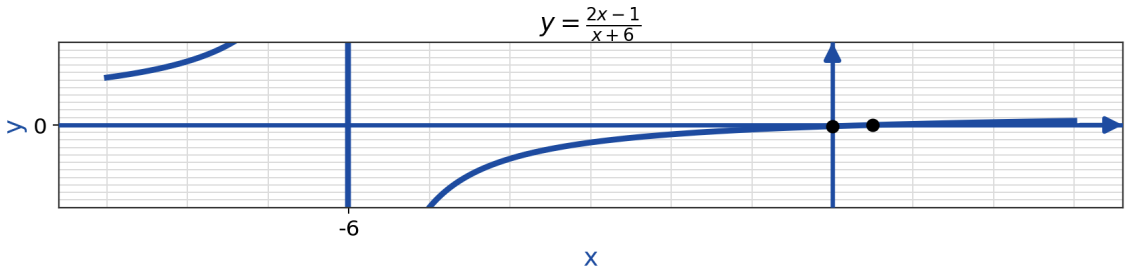
33 **The diagram below shows a rational function. Its non-permissible value is**



A $x \neq 6$

B $x \neq -6$

C $x \neq \frac{1}{2}$

D no restrictions

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34 The point (3, -7) lies on the graph of y = f(x). The image of this point on the graph of y = f(x - 2) + 5 is

A (5, -2)

B (1, -2)

C (5, -12)

D (1, -12)

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35 The exact value of $\tan(\frac{5\pi}{4})$ is

A -1

B 1

C $\sqrt{3}$

D $-\frac{\sqrt{3}}{3}$

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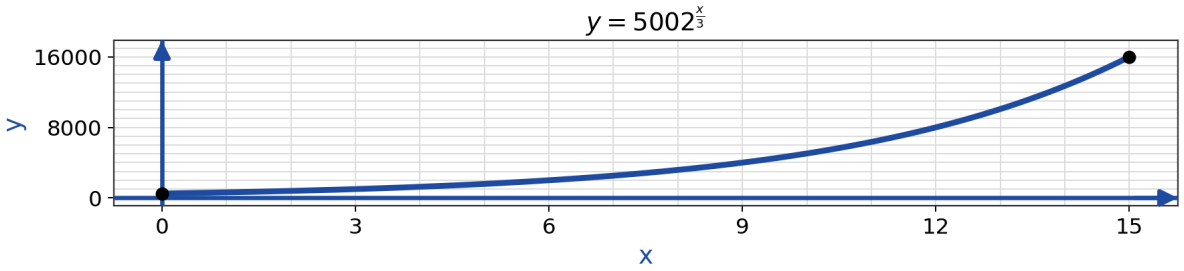
36 **The graph below shows the number of bacteria in a culture over time. The number of bacteria after 15 hours is**



A 16 000

B 8 000

C 2 500

D 32 000

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37 A committee of 6 is to be chosen from 8 juniors and 6 seniors. The number of committees that contain at least one senior is

- **A** 3003
- **B** 2775
- **C** 2925
- **D** 2975

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38 In the process of factoring the polynomial $P(x) = x^3 + 2x^2 - 5x - 6$, a student determines that $(x + 3)$ is a factor. The remaining factor is

- **A** $x^2 + x - 2$
- **B** $x^2 - x + 2$
- **C** $x^2 + 2x - 2$
- **D** $x^2 - x - 2$

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39 The solution to the equation $\sqrt{x + 5} - \sqrt{x - 3} = 2$ is

A 4

B 13

C 8

D 21

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40 The point of discontinuity on the graph of $f(x) = \frac{x^2 - 4x + 3}{x - 1}$ is at

A (1, 2)

B (1, -2)

C (3, 0)

D (-1, -4)

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41 **The point (-3, 8) lies on the graph of y = f(x). On the graph of y = f(3x), the x-coordinate of the image of this point is**

ANSWER _____

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42 **The exact value of $\sec(\frac{3\pi}{4})$ is**

A $\sqrt{2}$

B $-\frac{2\sqrt{3}}{3}$

C $-\sqrt{2}$

D 2

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43 The loudness of a sound, in decibels, is given by $L = 10\log\left(\frac{I}{10^{-12}}\right)$, where I is the intensity of the sound in W/m². The loudness of a sound with an intensity of 10^{-3} W/m² is

A 90 dB

B 30 dB

C 9 dB

D 120 dB

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44 The sum of the coefficients of the terms in the expansion of $(3x - 2)^5$ is

A 3125

B -32

C 25

D 1

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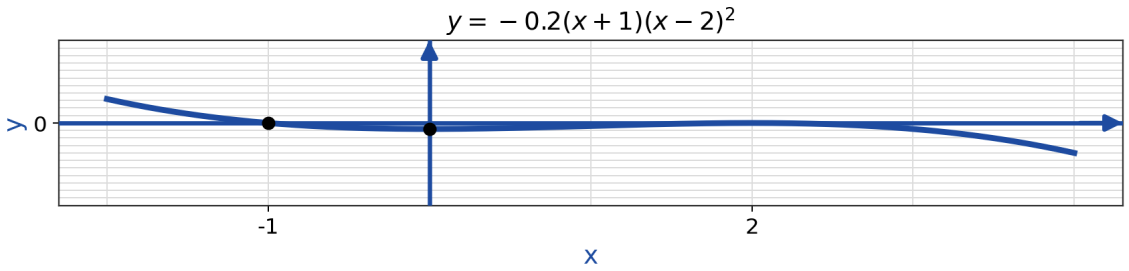
45 **The graph below shows a polynomial function. The x-intercept with multiplicity 2 is i, and the y-intercept is ii.**



A i: x = -1 ii: the y-intercept is positive

B i: x = 2 ii: the y-intercept is negative

C i: x = 2 ii: the y-intercept is positive

D i: x = -2 ii: the y-intercept is negative

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46 **The solution to the equation $\sqrt{2x + 7} = x + 2$ is**

ANSWER _____

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47 **Which of the following statements about the graph of $y = \frac{x - 2}{x^2 - 3x + 2}$ is true?**

A The vertical asymptote is x = 2

B The horizontal asymptote is y = 1

C There is a point of discontinuity at (2, 1)

D The x-intercept is 2

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48 **The point (10, -3) lies on the graph of y = f(x) and is mapped to a new point using the mapping notation $(x, y) \rightarrow (\frac{x - 4}{3}, 2y - 1)$. The product of the coordinates of the image point is**

ANSWER _____

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49 An expression equivalent to $\frac{\sec x}{\tan x + \cot x}$ is

- **A** cos x
- **B** tan x
- **C** sin x
- **D** sec x

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50 The value of $\log_9 27$ is

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

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ANSWER KEY

1.	A	**18.**	D	**35.**	B
2.	A	**19.**	A	**36.**	A
3.	D	**20.**	C	**37.**	D
4.	C	**21.**	B	**38.**	D
5.	8	**22.**	9	**39.**	A
6.	C	**23.**	34650	**40.**	B
7.	C	**24.**	D	**41.**	-1
8.	A	**25.**	D	**42.**	C
9.	B	**26.**	C	**43.**	A
10.	B	**27.**	C	**44.**	D
11.	D	**28.**	C	**45.**	B
12.	B	**29.**	A	**46.**	1
13.	C	**30.**	B	**47.**	C
14.	D	**31.**	D	**48.**	-14
15.	5	**32.**	B	**49.**	C
16.	B	**33.**	B	**50.**	A
17.	-8	**34.**	A		

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