Final Exam — Practice Test

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1 **The point (-2, 5) lies on the graph of y = f(x). The image of this point on the graph of y = f(x + 3) - 4 is**

- A (-5, 1)
- B (1, 1)
- C (-5, 9)
- D (1, 9)

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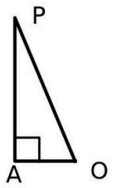
2 **The diagram shows a point P on the terminal arm of an angle θ in standard position. The horizontal side has length 5 and the vertical side has length 12. The exact value of sinθ + cosθ is**



A $\frac{17}{13}$

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

C $\frac{7}{13}$

D $\frac{5}{13}$

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3 **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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4 **A student must choose 4 courses from 12 elective courses. The number of different selections the student can make is**

A 11880

B 495

C 48

D 144

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5 **For the function $f(x) = -3x^4 + 2x^2 - x + 5$, the degree and leading coefficient are**

- **A** Degree 4, leading coefficient 3
- **B** Degree 5, leading coefficient -3
- **C** Degree 4, leading coefficient -3
- **D** Degree 2, leading coefficient -3

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

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

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7 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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8 Given $f(x) = x^2 + 3x$ and $g(x) = x - 2$, the value of $(f \circ g)(4)$ is

ANSWER _____

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9 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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10 **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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11 **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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12 **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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13 **The solution to the equation $\sqrt{x + 6} = \sqrt{3x - 2}$ is**

- **A** 2
- **B** -4
- **C** 6
- **D** 4

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14 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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15 The graph of $y = f(x)$, where $f(x) = (x - 1)^2 + 1$, is reflected in the line $y = x$. The number of invariant points is

- **A** 1
- **B** 3
- **C** 0
- **D** 2

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16 **The exact value of $\cos(\frac{7\pi}{6}) + \sin(\frac{2\pi}{3})$ is**

A 0

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

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

D 1

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17 **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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18 **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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19 **A cubic polynomial function has zeros of -1, 2, and 4. If P(0) = 16, then the value of P(3) is**

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20 **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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21 **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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22 **The range of y = f(x) is -2 ≤ y ≤ 6. If g(x) = -f(x) + 3, then the maximum value of g(x) is**

ANSWER

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23 **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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24 **If $\log_2 3 = a$ and $\log_2 5 = b$, then $\log_2(\frac{45}{8})$ 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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25 **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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26 The solutions to the equation $x^3 - 4x^2 - 11x + 30 = 0$ are

A -2, 3, 5

B -3, -2, 5

C -3, 2, 5

D 2, 3, -5

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27 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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28 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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29 Given f(x) = x + 3 and g(x) = x - 2, an expression for (fg)(x) is

- **A** $x^2 + 5x - 6$
- **B** $x^2 + x + 6$
- **C** $x^2 - 5x - 6$
- **D** $x^2 + x - 6$

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30 **The graph below shows a sinusoidal function. The maximum value of the function is**

- **A** 4
- **B** 3
- **C** 2
- **D** 5

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31 **The value of $\log_3 27 - \log_3 3$ is**

- **A** 1
- **B** 2
- **C** 3
- **D** 9

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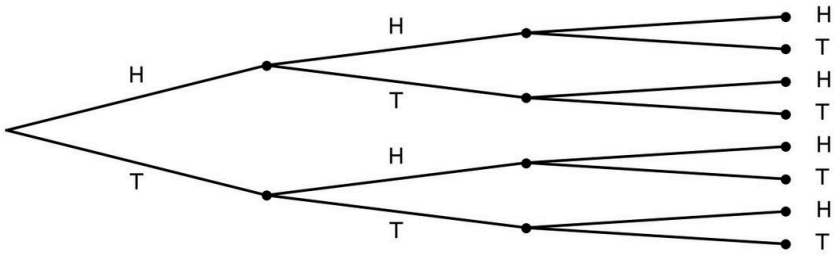
32 **A coin is tossed 3 times. The tree diagram below shows all the possible outcomes. The number of outcomes with exactly 2 heads is**



A 2

B 3

C 4

D 8

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33 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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34 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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35 **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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36 **Given $f(x) = 4x + 1$ and $g(x) = x^2$, the value of $(g \circ f)(1)$ is**

ANSWER _____

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37 The exact value of $\sec\left(\frac{3\pi}{4}\right)$ is

A $\sqrt{2}$

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

C $-\sqrt{2}$

D 2

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38 The solution to the equation $\log_5(2x) - \log_5(x - 1) = 1$ is

A $x = 5$

B $x = \frac{3}{5}$

C $x = \frac{5}{3}$

D $x = 2$

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39 **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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40 **The graph below shows a polynomial function. Which of the following statements about the graph at x = -3 is true?**

- A The graph crosses the x-axis at x = -3 with multiplicity 2
- B The graph touches the x-axis and turns around at x = -3
- C The graph crosses the x-axis with a point of inflection at x = -3
- D The graph has a vertical asymptote at x = -3

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41 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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42 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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43 Given $f(x) = 2x + 5$, the value of $f^{-1}(11)$ is

- A 27
- B -3
- C 6
- D 3

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44 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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45 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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46 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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47 **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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48 **The solution to the equation $\sqrt{2x + 7} = x + 2$ is**

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49 **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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50 **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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ANSWER KEY

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

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