Indicate the answer choice that best completes the statement or answers the question.

Write radian measure in degrees.

 $1.\frac{3\pi}{4}$ a. 135° b. 270° c. 423.9° d.  $\frac{135^{\circ}}{\pi}$ 

2. Solve  $e^{-5_x} = 7.4$  for *x* correct to four decimal places.

a. –0.4003	b. 0.4003
c. 0.8692	d0.8692

3. Use a sign chart to solve  $(2x + 3)(x + 8) \ge 0$ .

a. 
$$(-8, -\frac{3}{2})$$
  
b.  $(-\infty, -8]$  or  $[-\frac{3}{2}, \infty)$   
c.  $(-\infty, -8)$  or  $(-\frac{3}{2}, \infty)$   
d.  $[-8, -\frac{3}{2}]$ 

4. Graph  $f(x) = 2\sqrt{x+4}$ .



# 5. Use the end behavior of the graph to solve $3x^3 + 9x^2 - 12x < 0$ .

a. 
$$(0, 1)$$
 b.  $(-4, 0)$ 

 c.  $(-4, 0)$  or  $(1, \infty)$ 
 d.  $(-\infty, -4)$  or  $(0, 1)$ 

6. Solve.

 $\sqrt{5x - 4} + 1 = 11$ a.  $\frac{104}{5}$  b.  $\frac{124}{5}$ c. 25 d.  $\frac{14}{5}$ 

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### Find each f(c) using synthetic substitution.

7. 
$$f(x) = 2x^5 + 10x^4 + 4x^3 - x^2 - 2x + 6$$
;  $c = -5$   
a. 121 b. 11,991  
c. -509 d. 12,971

8. Graph  $f(x) = \frac{x(x-2)(x+3)}{x^2 - 5x + 6}$ 



9. Graph 
$$g(x) = \frac{1}{2}x^2$$
.



10. Graph 
$$f(x) = \frac{x(x+2)(x+4)}{x^2+3x+2}$$



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11. Which is a graph of  $f(x) = \frac{6x-3}{x-1}$ , with any vertical or horizontal asymptotes indicated by dashed lines?



a. vertical: $x = -6$ , $x = -3$	b. vertical: $x = 6$ , $x = 3$
slant: $y = 5x + 4$	slant: $y = 5x - 4$
c. vertical: $x = -6$ , $x = 3$	d. horizontal: $y = 0$
horizontal: $y = 0$	slant: $y = 5x + 4$

13. Determine which consecutive integers do *not* have a real zero of  $f(x) = x^3 + 9x^2 + 8x - 5$  between them.

a. (-8, -7) b. (4, 5) d. (−2, −1) c. (0, 1)

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- 14. Find the domain of and the equations of any vertical or horizontal asymptotes for  $g(x) = \frac{x^2 3x + 2}{x 1}$ .
  - a. D = { $x | x \neq 1, x \in P$ }; vertical asymptote: x = 2
  - b. D = { $x \mid x \neq -1, x \in P$ }; vertical asymptote: x = 2
  - c. D = { $x | x \neq -1, x \in P$ }; vertical asymptote: x = -2
  - d. D = { $x | x \neq 1, x \in P$ }; vertical asymptote: x = -2

Find the exact values of the six trigonometric functions of  $\theta$ .



#### Describe the possible real zeros of each function.

16.  $f(x) = 4x^3 - 9x^2 + 4x - 6$ 

a. 2 or 0 positive zeros and 1 negative zero

- b. O positive zeros and 1 negative zero
- c. 4, 2, or 0 positive zeros and 0 negative zeros
- d. 4, 2, or 0 positive zeros and 1 negative zero

17. Graph 
$$f(x) = \frac{1}{2}(x-6)^4 - 5$$
.





19. In the first week of its release, the latest blockbuster movie sold \$16.3 million dollars in tickets. The movie's producers use the formula  $P_t = P_0 e^{-0.4t}$ , to predict the number of ticket sales *t* weeks after a movie's release, where  $P_0$  is the first week's ticket sales. What are the predicted ticket sales to the nearest \$0.1 million for the sixth week of this movie's release? (Note: t = 0 for the *first* week.)

a. \$0.2 million	b. \$1.5 million
c. \$13.3 million	d. \$2.2 million

20. Graph 
$$g(x) = \frac{1}{4}x^4$$
.



21. Solve.

 $\frac{x+3}{x-5} = \frac{x+7}{x-9}$ 

a. 1 b. 8 c. -5 d. 2

22. Use the end behavior of the graph to solve  $x^3 - x^2 - 2x > 0$ .

a. 
$$(-\infty, -1)$$
 or  $(0, 2)$  b.  $(-1, 0)$   
c.  $(-1, 0)$  or  $(2, \infty)$  d.  $(0, 2)$ 

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23. Find the vertical, horizontal, and oblique asymptotes, if any, for  $f(x) = \frac{4x^3 - 39x^2 + 55x + 9}{x^2 - 10x + 16}$ .

a. vertical: x = 8, x = 2b. vertical: x = 8, x = -2slant: y = 4x + 1b. vertical: x = 8, x = -2c. vertical: x = -8, x = -2d. horizontal: y = 0slant: y = 4x - 1slant: y = 4x + 1

Write each decimal degree measure in DMS form and each DMS measure in decimal degree form to the nearest thousandth.

24. 32 28' 10" a. 32.469°

b. 32.281°

- c. 32.1651°
- d. 32°

25. Find the domain of and the equations of any vertical or horizontal asymptotes for  $g(x) = \frac{x^2 - x - 6}{x - 3}$ .

a. D = { $x \mid x \neq 3, x \in P$ }; vertical asymptote: x = -2b. D = { $x \mid x \neq -3, x \in P$ }; vertical asymptote: x = -2c. D = { $x \mid x \neq -3, x \in P$ }; vertical asymptote: x = 2d. D = { $x \mid x \neq 3, x \in P$ }; vertical asymptote: x = 2

26. Graph  $f(x) = 4\sqrt{x+3}$ .



27. State the number of possible real zeros and turning points of  $f(x) = x^3 + 2x^2 - 8x$ . Then determine all of the real zeros by factoring.

- a. 3 real zeros and 2 turning points; 0, -4, and 2
- b. 3 real zeros and 2 turning points; 0, 4, and -2
- c. 3 real zeros and 3 turning points; 0, 4, and -2
- d. 3 real zeros and 3 turning points; 0, -4, and 2

28. List all of the possible rational zeros of  $f(x) = -3x^4 - 9x^3 - 6x^2 - 8x + 14$ .

a. 
$$\pm 1$$
,  $\pm 2$ ,  $\pm 7$ ,  $\pm 14$   
b.  $\pm 1$ ,  $\pm 2$ ,  $\pm 7$ ,  $\pm 14$ ,  $\pm \frac{1}{3}$ ,  $\pm \frac{2}{3}$ ,  $\pm \frac{7}{3}$ ,  $\pm \frac{14}{3}$   
c.  $\pm \frac{1}{3}$ ,  $\pm \frac{2}{3}$ ,  $\pm \frac{7}{3}$ ,  $\pm \frac{14}{3}$   
d.  $\pm 1$ ,  $\pm 2$ ,  $\pm 7$ ,  $\pm \frac{1}{3}$ ,  $\pm \frac{2}{3}$ ,  $\pm \frac{7}{3}$ 

29. Graph  $f(x) = 3\sqrt{x+3}$ .



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Find the measure of angle  $\boldsymbol{\theta}$ . Round to the nearest degree, if necessary.



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