The Summer Before Calculus AB Study Guide

Grade: x/79

Solve these equations.

1. $2x + 6 = -10$	$x = -8$ •
2. $x^2 + 5x - 6 = 0$	$x = -6$ • $x = 1$ •
3. $2x^2 + 5x - 12 = 0$	$x = -4$ • $x = \frac{3}{2}$ •
4. $4x^2 + 20x + 25 = 0$	$x = -\frac{5}{2}$ •
5. $2x^3 - 7x^2 + 9 = 0$	$x = -1$ • $x = \frac{3}{2}$ • $x = 3$ •

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Solve these equations.

6. $x^4 + x^3 - 3x^2 - x + 2 = 0$	$x = -2$ • $x = -1$ • $x = 1$ •
7. $\sqrt{x-1} = x - 7$	$x = 10$ •
8. $3^{2x} = 27^4$	$x = 6$ •
9. $\ln x = 2$	$x = e^2$ •
10. $e^x = 7$	$x = \ln 7$ •

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Factor completely.

11. $x^3 + 27$ $(x+3)(x^2 - 3x + 9)$	
12. $(x+2)^3(x-3)^5 + (x-3)^6(x+2)^2$ $(x+2)^2(x-3)^5(2x-1)$	
13. $3(x-2)^{\frac{3}{2}}(x+1)^2 + 6(x-2)^{\frac{5}{2}}(x+1)^3$ $3(x-2)^{3/2}(x+1)^2(2x^2 - 2x - 3)$	
14. $x^3 - 64$ $(x-4)(x^2 + 4x + 16)$	
15. $5x^2(x+4)^5(x+3)^2 - 10x^3(x+4)^4(x+3)^3$ $5x^2(x+4)^4(x+3)^2(-2x^2 - 5x + 4)$	

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Write the equation of the line.

16. Write the equation of the line that goes through the point (-2, 3) with a slope of ½.	$y = \frac{1}{2}x + 4$ •
17. Write the equation of the line parallel to $y = 3x - 7$ that goes through the point (0, -4).	$y = 3x - 4$ •
18. Write the equation of the line that is perpendicular to $y = \frac{3}{2}x + 4$ and goes through the point (3, -2).	$y = \frac{-2}{3}x$ •
19. Write the equation of the line that goes through the points (5, -1) and (4, 6).	$y = -7x + 34$ •
20. If a line is drawn so that it forms a 30° angle with the x-axis, what is its slope?	$\frac{\sqrt{3}}{3} = .577$ •

Need Help? Look at this website:
http://www.coolmath.com/precalculus-review-calculus-intro/precalculus-algebra/02-graphing-equations-of-lines-01
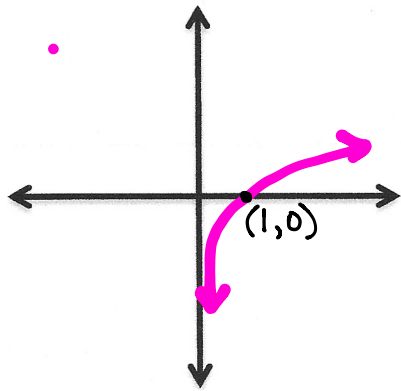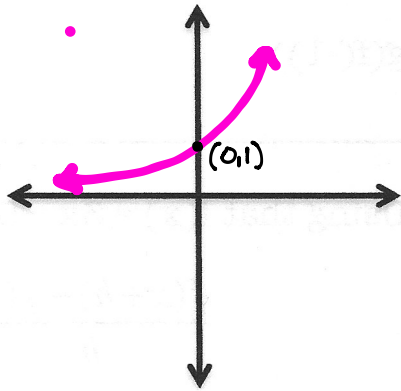
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Miscellaneous. Follow the directions in each box.

21. Evaluate without a calculator. A) $9^{\frac{3}{2}}$ B) $32^{\frac{2}{5}}$	A) 27 • B) 4 •
22. If $f(x) = 2x - 3$ and $g(x) = x^2$, find: A) $f(g(2))$ B) $g(f(-1))$	A) 5 • B) 25 •
23. Using that $f(x) = 3x - 5$, find: $$\frac{f(x+h) - f(x)}{h}$$	3 •
24. Solve the system of equations. $$2x + 3y = 12$$ $$-x + 2y = 10$$	$x = -\frac{6}{7}$ • $y = \frac{32}{7}$ •
25. If y varies directly as x when x = 2 then y = 5. What is the value of y when x = 7?	$x = \frac{14}{5}$ •

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Remember the natural log and exponential functions?

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26. Evaluate:

A) $\ln 1 =$
B) $\ln e =$
C) $e^0 =$
D) What is the approximate value of e?

A) 0
B) 1
C) 1
D) 2.71828

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27. Draw the natural log function. Label the points where the function intersects the x or y axis.

(1,0)

28. Draw the exponential function. Label the points where the function intersects the x or y axis.

(0,1)

29.

A) What is the domain of the natural log function?

B) What is the domain of the exponential function?

A) $(0, \infty)$

B) $(-\infty, \infty)$

30.

A) What is the range of the natural log function?

B) What is the range of the exponential function?

A) $(-\infty, \infty)$

B) $(0, \infty)$

Do you wonder what you might use calculus for? Watch this Ted Talk:
https://youtu.be/_Idra8rVS1I

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Simplify.

31. $$\frac{1}{x+2}+\frac{3}{x-3}$$	$\dfrac{4x+3}{(x-3)(x+2)}$ •
32. $$2\ln(x+5)-\ln(x+2)$$	$\ln\left(\dfrac{(x+5)^2 •}{(x+2) •}\right)$
33. $$\frac{x^2+7x+12}{x-3}\div\frac{x^2-16}{x^2-9}$$	$\dfrac{(x+3)^2 •}{(x-4)}$ •
34. $$\frac{\dfrac{1}{x+2}}{\dfrac{3}{x^2-4}}$$	$\dfrac{x-2}{3}$ • •
35. Word Problem Fun. You are driving across a flat area. In the distance directly in front of you, you notice a mountain. The angle of elevation to the peak is 4°. After you drive 13 miles closer to the mountain, the angle of elevation is 10°. How tall is the mountain?	1.51 • miles

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You should know all of the special values of trig functions from memory. Use these for practice.

A) $\sin\dfrac{\pi}{4}$	B) $\cos\dfrac{\pi}{3}$	C) $\tan\pi$	A) $\sqrt{2}/2$ • B) $\frac{1}{2}$ • C) 0 •
D) $\sec\dfrac{\pi}{6}$	E) $\tan\dfrac{5\pi}{4}$	F) $\sin\dfrac{7\pi}{6}$	D) $2/\sqrt{3}$ • E) 1 • F) $-1/2$ •
G) $\cot\dfrac{\pi}{2}$	H) $\csc\dfrac{5\pi}{3}$	I) $\cos\dfrac{\pi}{6}$	G) 0 • H) $-2/\sqrt{3}$ • I) $\sqrt{3}/2$ •
J) $\sin\dfrac{3\pi}{2}$	K) $\sec\dfrac{7\pi}{4}$	L) $\sin\dfrac{2\pi}{3}$	J) -1 • K) $\frac{2}{\sqrt{2}}$ • L) $\sqrt{3}/2$ •
M) $\cos\dfrac{5\pi}{6}$	N) $\cot\dfrac{7\pi}{3}$	O) $\cos\dfrac{4\pi}{3}$	M) $-\sqrt{3}/2$ • N) $\sqrt{3}/3$ • O) $-1/2$ •

Trig is Terrific ☺