Precalculus Summer Assignment 2025

This summer assignment is designed to help you maintain your skills in preparation for Precalculus. Nothing on this assignment is new, and your mastery of these topics is essential for success in this course. It is imperative that you understand how to solve each problem on your own.

Only scientific calculators are allowed, so the reliance on any graphing calculator is strongly discouraged. When exact answers are called for, your solutions should not contain decimals.

You will have a quiz on this material shortly after school begins.

If additional help/review is needed, it is recommended that you go online to Khan Academy – Specifically Algebra 2, Algebra 1 and Geometry topics may be helpful (you can search for key words also).

Topic 1: Exponents and Polynomial Expressions

Simplify each expression. Write all answers with positive exponents and in standard form.	
1. $\left(\frac{8a^{-5}b^{4}}{12a^{-6}b^{-2}}\right)^{2}$	**2.** $\left(\frac{1}{4}x^{3}y^{-2}\right)^{-2}\left(-4x^{-1}y\right)^{-3}$
3. $(5k^{2}-7k+9)-(-2k+6k^{2}+11)$	**4.** $-5s^{4}t^{3}(3s^{5}t-7s)+4s^{3}\cdot 2s^{6}t^{4}$
5. $(-5g+11)(-5g-11)$	**6.** $(2r-5)^{3}$

Completely factor each expression.	
7. $12w^{3}+26w^{2}-10w$	**8.** $64c^{4}-121d^{6}$
9. $27r^{3}+216$	**10.** $32m-162m^{5}$
11. $x^{4}+9x^{2}-112$	**12.** $8v^{3}+20v^{2}-18v-45$

Topic 2: Rational Expressions

Simplify each expression.

13. $\dfrac{10m^3+20m^2}{15m^3+15m^2-30m}$

14. $\dfrac{8a^3+24a^2}{18a+54}\cdot\dfrac{5a^2+43a+24}{10a^2+6a}$

15. $\dfrac{7k^2-36k+5}{3k^2-12k-15}\cdot\dfrac{42k+6}{1-49k^2}$

16. $\dfrac{3p+1}{p^2-1}-\dfrac{1}{p+1}$

17. $\dfrac{3x}{2x-3}-\dfrac{3}{x+6}$

18. $\dfrac{\frac{1}{2}-\frac{r^2}{18}}{\frac{1}{3}-\frac{1}{r}}$

Topic 3: Radicals and Rational Exponents

Simplify each expression.

19. $\sqrt{294p^7}$

20. $2\sqrt[3]{-104x^6y^7}$

21. $-5\sqrt[4]{64m^{11}}$

22. $-4\sqrt{27}+6\sqrt{45}-\sqrt{75}$

23. $-2\sqrt[3]{2k^5}\cdot\sqrt[3]{-40k^2}$

24. $2\sqrt{5}(\sqrt{10}-\sqrt{20})$	**25.** $(3\sqrt{2}-7)^2$
26. $\dfrac{24\sqrt{112}}{16\sqrt{2}}$	**27.** $\dfrac{2+\sqrt{3}}{5+\sqrt{3}}$
28. Rewrite in exponential form; $\sqrt{2k^5}$	**29.** Rewrite in simplest radical form: $(24x^7)^{\frac{1}{3}}$
Simplify each expression. Write your answer in simplest radical form.	
30. $k^{\frac{1}{4}} \cdot k^{\frac{3}{2}}$	**31.** $\dfrac{u^{\frac{1}{3}} \cdot u^{-\frac{5}{6}}}{u^{-2}}$

Topic 4: Complex Numbers

Simplify each expression.	
32. i^{52}	**33.** $(-3i^7)^3 \cdot 2i^{12}$
34. $-i(5-i)+2(3-7i)$	**35.** $(-2+9i)^2$
36. $\dfrac{-6-10i}{9i}$	**37.** $\dfrac{-7-4i}{-8+i}$

Topic 5: Linear & Absolute Value Equations

Solve each equation.

38. $8-4(n-1)=-2n+18$

39. $\frac{15}{4}\left(12x-\frac{8}{3}\right)=9(2+5x)$

40. $\frac{5p+q^2}{7}=8$ (solve for q)

41. $4a-7b=ab+3$ (solve for a)

Topic 6: Quadratic Equations

Solve each equation. Simplify all irrational and complex solutions.

46. $2w^2+3w-5=0$

47. $r^2+9r+65=-r$

48. $36c^2+8=4$

49. $4y^2-28=8y$

50. Janell is standing on a set of bleachers and throws a ball into the air at an initial velocity of 35 ft/s. The height of the ball, h, at t seconds is modeled by the equation $\boldsymbol{h = -16t^2 + 35t + 6}$. How many seconds will it take the ball to reach the ground?

Topic 7: Rational Equations

Solve each equation. Be sure to check for extraneous solutions.

51. $\dfrac{k+6}{4-k} = \dfrac{2}{k-4}$

52. $\dfrac{1}{2k^2} - \dfrac{3}{k} = \dfrac{1}{k^2}$

53. $u + 3 = \dfrac{u^2 + 3u - 4}{u-2} + \dfrac{3}{u-2}$

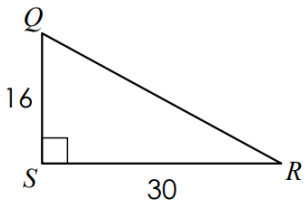
54. $\dfrac{y+3}{y-5} + \dfrac{y^2 - 8y + 12}{y^2 - 4y - 5} = \dfrac{6y-6}{y+1}$

Topic 5: Right Triangle Trigonometry

For Sine, Cosine, and Tangent, remember: _____

Directions: Find each trigonometric ratio. Give your answer as a fraction in simplest form.

26.



- sin Q = _____
- sin R = _____
- cos Q = _____
- cos R = _____
- tan Q = _____
- tan R = _____

Directions: Solve for x. Round your answer to the nearest tenth.

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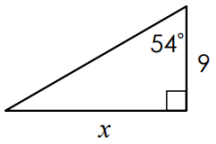

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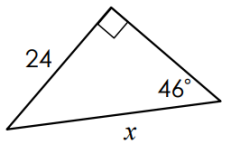

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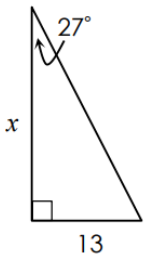

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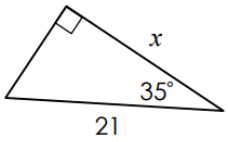

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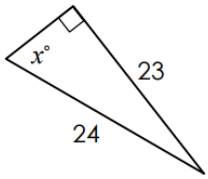

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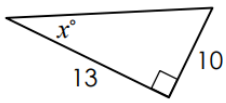

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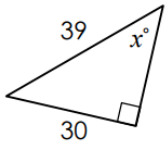

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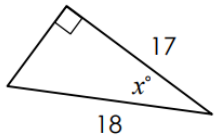

Topic 6: Angle of Elevation & Angle of Depression

Directions: Use a picture to help solve the problem. Round your answer to the nearest tenth.

35. The town park does an outdoor movie night every Saturday during the summer on a large screen. Kate is sitting 36 feet from the base of the screen, watching a movie with her family. If the angle of elevation from Kate to the top of the screen is 24°, how tall is the movie screen?

36. Elijah is looking up to the top of the Washington Monument. If the monument is 555 feet tall and the angle of elevation from the point on the ground where Elijah is standing to the top is 74°, how far is he standing from the base of the monument?

37. While parasailing, Ryan spots a dolphin on the water below. If Ryan is 228 feet above the water and the angle of depression to the dolphin is 15°, what is the horizontal distance between Ryan and the dolphin?

38. The angle of depression from an airplane to the top of an air traffic control tower is 56°. If the tower is 320 feet tall and the the airplane is flying at an altitude of 7,450 feet, how far away is the airplane from the control tower?