

Show all necessary steps Clearly, Neatly, and Systematically to receive full credit. Any incorrect statement will be penalized.

1. Simplify: $\left(\frac{27x^{-12}y^{\frac{3}{2}}}{64x^{18}y^6}\right)^{-\frac{2}{3}}$.

2. Divide: $\frac{\sqrt{25} - \sqrt{-49}}{\sqrt{16} + \sqrt{-81}}$.

3. Let $3x^2 = 5x - 8$.

(i) Use the discriminant to determine the number and type of solutions.

(ii) Use quadratic formula to solve the equation.

4. Solve: $\sqrt{5x+6} + \sqrt{3x+4} = 2$.

5. Rationalize the denominator: $\frac{5 - \sqrt{3x}}{\sqrt{2x} + \sqrt{3y}}$ and simplify.

6. Solve: $x^{\frac{2}{3}} - 9x^{\frac{1}{3}} + 20 = 0$.

7. Graph $f(x) = \sqrt{x-2}$. State domain and range.

8. Solve: $4x^2 + 1 = -6x$ by completing square method.

9. Perform indicated operation: $5\sqrt[4]{32a^9} + 3a\sqrt[4]{162a^5} - 2a^2\sqrt[4]{512a}$.

10. Solve: $\sqrt{4a+1} - a = -1$.

11. Solve: $(y^2 + 1)^2 - 8(y^2 + 1) - 9 = 0$.

12. Let $f(x) = 2x^2 + 12x + 17$. **(i)** $f(x) = a(x-h)^2 + k$, **(ii)** vertex, **(iii)** axis of symmetry, **(iv)** max or min function value, **(v)** domain and range, **(vi)** sketch.

13. Suppose that a catapult in the Punkin Chunkin contest releases a pumpkin 8 feet above the ground at an angle of 45 to the horizontal with an initial speed of 220 feet per second. The model

$$s(t) = -16t^2 + 155t + 8$$

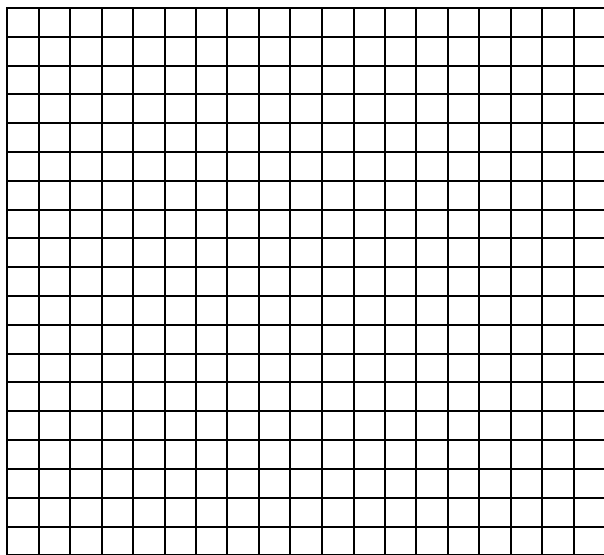
can be used to estimate the height s of a pumpkin after t seconds.

(i) When will the pumpkin reach the maximum height?

(ii) Find the maximum height of the pumpkin.

(iii) After how long will the pumpkin strike the ground?

7.



12.

