

No calculator. Show all work for full credit. Simplify answers (including all roots) as much as possible.

1. Factor the polynomials completely.

a. $2x^2 - 32$

b. $x^2 - x - 6$

c. $mn^5 - m^3n$

d. $3x^2 + 5x + 2$

e. $x^3 - 3x^2 + x - 3$

f. $3x^3 - 6x^2 - 4x + 8$

2. Simplify the roots.

a. $\sqrt{64}$

b. $\sqrt{75}$

c. $\sqrt{-81}$

d. $\sqrt{10000}$

e. $\sqrt{18}$

f. $\sqrt{225}$

g. $\sqrt[3]{120}$

h. $\sqrt[3]{-8}$ (careful!)

3. Solve the quadratic equation by factoring.

a. $x^2 + 10x + 16 = 0$

b. $x^2 - 2x = 8$

c. $x^3 - 16x = 0$

d. $x^3 - 2x^2 - 4x + 8 = 0$

4. Solve the quadratic equations by using square roots.

a. $x^2 - 150 = 0$

b. $2x^2 = 90$

c. $x^2 + 12 = 0$

d. $4x^2 - 16 = 0$

e. $49x^2 - 1 = 0$

f. $x^2 = 32$

5. Solve these equations any way you want.

a. $-5x^2 + 15x = -20$

b. $2x^5 - 2x^3 = 0$

6. The height of a diver above the water during a dive can be modeled by $h = -16t^2 + 32t + 48$, where h is the height in feet and t is the time in seconds. Find the time it takes for the diver to reach the water.

7. Review:

a. Solve:

$$|3x - 2| < 4$$

b. Find the equation of the line perpendicular to $2x - y = 4$ going through the point $(2, -4)$

c. Solve the system of equations.

$$\begin{aligned} 3x + y &= 9 \\ -2x - 5y &= 7 \end{aligned}$$

d. Simplify. No negative exponents:

$$\frac{4x^{-3}}{x^6}$$