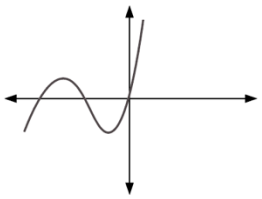
Polynomial Factors and Graphs Practice

1. Given the polynomial function P defined by $P(t) = 2t^3 - 32t$, what are its zeros? *(no calculator)*
   A) $\{2, -4, 4\}$
   B) $\{16, 0, 2\}$
   C) $\{-4, 4\}$
   D) $\{-4, 0, 4\}$

2. Which of the following functions could represent the graph below? *(no calculator)*



   A) $f(x) = x^2 + 5x + 6$
   B) $f(x) = x^3 + 5x^2 + 6x$
   C) $f(x) = x^2 - 5x^2 + 6x$
   D) $f(x) = x^3 - 5x^2 + 6x$

3. A polynomial has zeros at -2, 8, and 0. Which of the following could be the polynomial? *(no calculator)*
   A) $x^2 - 6x + 16$
   B) $x^3 - 6x^2 - 16x$
   C) $x^3 - 6x^2 - 16x + 9$
   D) $x^3 - 6x^2 + 16x + 9$

4. Given the following polynomial
   $$(x + 9)(2x - 8)(8x + 2)$$
   , what are its roots? *(no calculator)*
   A) $\left\{9,\ 4, -\frac{1}{4}\right\}$
   B) $\left\{-9, -4, -\frac{1}{4}\right\}$
   C) $\left\{-9,\ 4, -\frac{1}{4}\right\}$
   D) $\left\{-9,\ 4, \frac{1}{4}\right\}$

5. Given the following polynomial, $3(x + 18)(3x - 27)$, what are its zeros? *(no calculator)*
   A) $x = 3, x = -18,\ x = 9$
   B) $x = 3, x = -18,\ x = \frac{1}{3}$
   C) $x = -18,\ x = -9$
   D) $x = -18,\ x = 9$

6. In the following, a is an integer.
   $$6x^2 + ax - 27$$
   If (2x+3) is a factor of the expression above, what is the value of a? *(no calculator)*
   A) -9
   B) 9
   C) -18
   D) $-\frac{3}{2}$

7. If $f(x) = 3x^2 - 5$ and $f(x + a) = 3x^2 + 24x + 43$, what is the value of a? *(no calculator)*
   A) -40
   B) -4
   C) 4
   D) 40

8. In the following equation, $a,\ b,\ c,$ and d are constants. If the equation has roots $-2,\ -4,$ and 6, which of the following is a factor of $ax^3 + bx^2 + cx + d$? *(no calculator)*
   A) $x + 6$
   B) $x - 6$
   C) $x - 2$
   D) $x - 4$

9. For what real value of x is the following equation true? $x^3 - 3x^2 + 4x - 12 = 0$ *(no calculator)*
   A) 2
   B) -2
   C) 3
   D) -3

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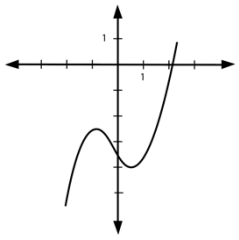
10. The function $f(x) = x^3 + x^2 - x - \frac{13}{4}$ is graphed below. If k is a constant such that the equation $f(x) = k$ has three real solutions, which of the following could be the value of k? *(no calculator)*



A) -2
B) 0
C) -1
D) -3