

Your Name:

ID #:

Solutions

# Worksheet: Graphs of Power Functions

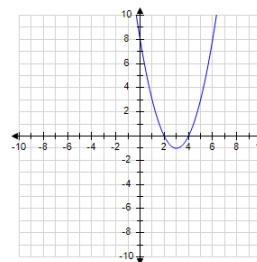
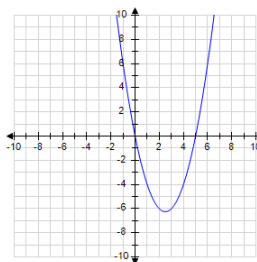
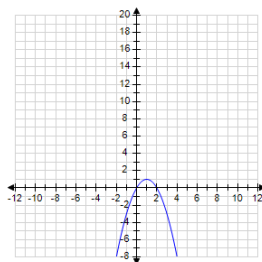
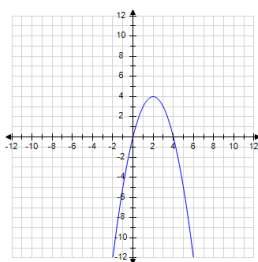
1. Match the graphs (I) ~ (IV) with the functions (A) ~ (D).

(I) A

(II) D

(III) B

(IV) C



(A).  $f(x) = -x^2 + 4x$

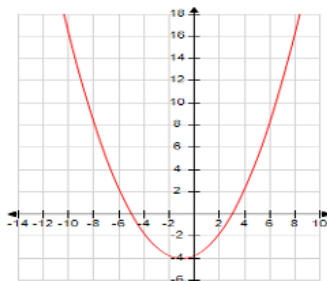
(B).  $f(x) = x^2 - 5x$

(C).  $f(x) = x^2 - 6x + 8$

(D).  $f(x) = -x^2 + 2x$

2. Find a quadratic function  $f(x)$  whose graph is shown below.

$a(x-h)^2 + k$



opens up  $\Rightarrow a > 0$

$h = -1$

$k = -4$

passes  $(-3, 0)$   
and  $(1, 0)$

(A).  $f(x) = \frac{1}{4}(x+1)^2 - 4$

B.  $f(x) = -\frac{1}{4}(x+1)^2 - 4$

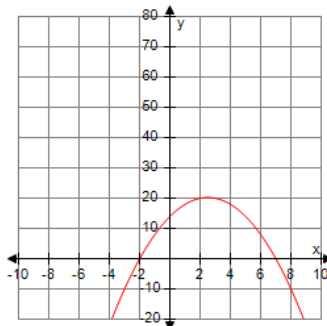
C.  $f(x) = -(x+1)^2 - 4$

D.  $f(x) = (x+1)^2 - 4$

E.  $f(x) = 4(x+1)^2 - 4$

3. Find the equation that represents the function graphed below.

$a(x-h)^2 + k$



opens down  $\Rightarrow a < 0$

$x=0 \Rightarrow y \in (10, 20)$

passes  $(-2, 0)$

A.  $f(x) = x^2 + 9x + 14$

(B).  $f(x) = -x^2 + 5x + 14 = -(x - \frac{5}{2})^2 + \frac{81}{4}$

C.  $f(x) = -x^2 - x - 5$

D.  $f(x) = -x^2 - 2x + 7$

E.  $f(x) = x^2 - 5x + 14$

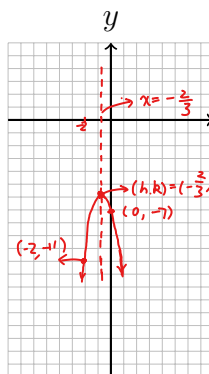
4. Graph  $f(x) = -3x^2 - 4x - 7$   
on the given coordinates

S1:  $a = -3 < 0$ . opens down

S2: Symmetric axis

$x = -\frac{b}{2a} = -\frac{-4}{-6} = -\frac{2}{3}$

S3: Vertex:  $(h, k) = (-\frac{b}{2a}, f(-\frac{b}{2a}))$



$(h, k) = (-\frac{2}{3}, f(-\frac{2}{3}))$   
 $= (-\frac{2}{3}, -\frac{17}{3})$

S4: i) x-intercepts

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$(b^2 - 4ac < 0 \Rightarrow \text{no x-intercept})$

ii) y-intercept:  $(0, -7)$

One more point  $(-2, -11)$

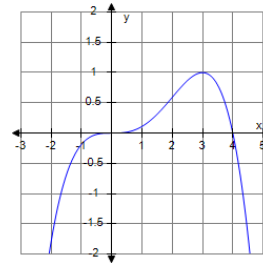
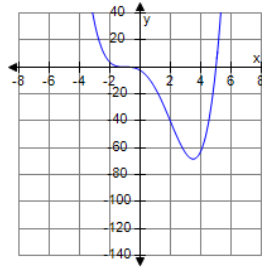
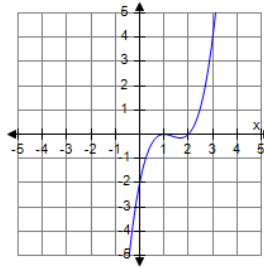
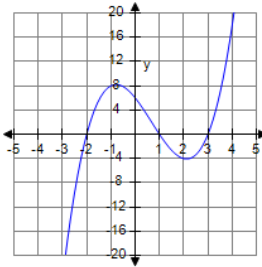
5. Match the graphs (I) ~ (IV) with the functions (A) ~ (D).

(I) (A)

(II) (D)

(III) (B)

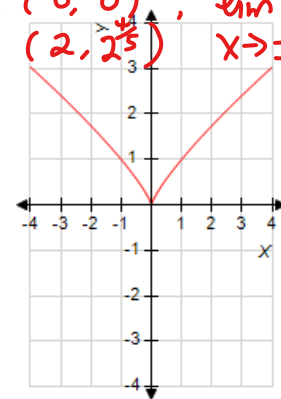
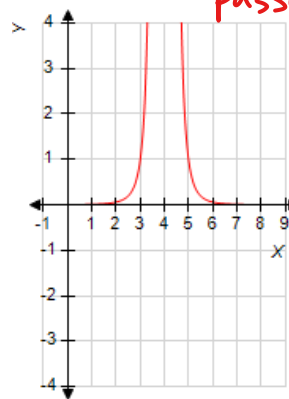
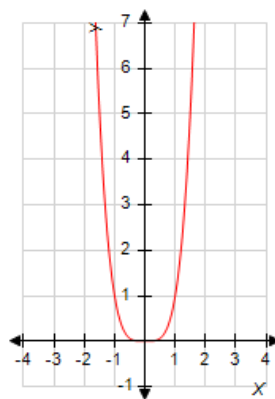
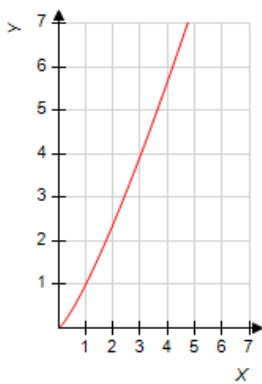
(IV) (C)



- (A).  $f(x) = (x-1)(x+2)(x-3)$  (B).  $f(x) = \frac{1}{2}(x+1)^3(x-5)$  (C).  $f(x) = -\frac{1}{27}x^4 + \frac{4}{27}x^3$   
 (D).  $f(x) = (x-1)^2(x-2)$

6. Which one of the following is the graph of  $f(x) = \sqrt[5]{x^4}$

Domain =  $(-\infty, \infty)$ , Range  $[0, \infty)$   
 passes  $(0, 0)$ ,  $\lim_{x \rightarrow \pm\infty} f(x) = \infty$   
 $(2, 2^{4/5})$



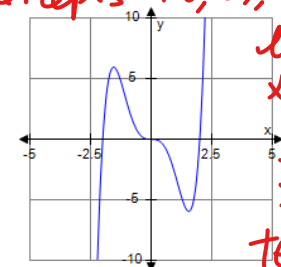
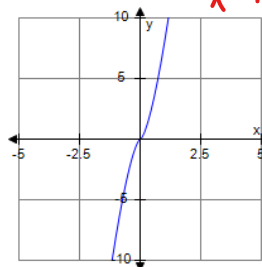
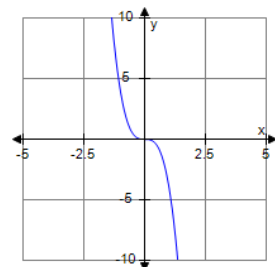
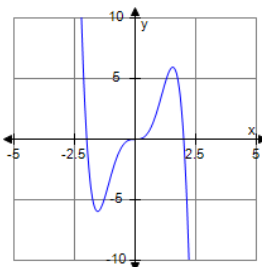
(A)

(B)

(C)

(D)

7. Which one of the following is the graph of  $f(x) = x^5 - 4x^3 = x^3(x^2 - 4) = x^3(x+2)(x-2)$   
 $x$ -intercepts:  $(0, 0)$ ,  $(\pm 2, 0)$



$\lim_{x \rightarrow \infty} f(x) = \infty$   
 $\lim_{x \rightarrow -\infty} f(x) = -\infty$

test:  $x = 1$   
 $f(1) = -3 < 0$

(A)

(B)

(C)

(D)

8. Determine the end behavior of the graphs of the functions.

(a)  $y = 8x^3 - 7x^2 + 3x + 7$

(a)  $\lim_{x \rightarrow \infty} y(x) = \infty$

(b)  $\lim_{x \rightarrow \infty} y(x) = -\infty$

(b)  $y = -4x^3 - 5x^2 + 9x + 9$

$\lim_{x \rightarrow -\infty} y(x) = -\infty$

$\lim_{x \rightarrow -\infty} y(x) = +\infty$