

Standard 1.01 - KEY

①  $f(x) = x^2 - 4x$

- A) vertical stretch by 2
  - B) horizontal shrink by 1/2
  - C) reflect y-axis
  - D) reflect x-axis
  - E) left 2
  - F) down 4
  - G) reflect x-axis
  - F) left 4
- Domain restricted  $[0, 4]$       Domain restricted  $(-\infty, 0]$

② Every point will be twice the distance from the x-axis

③  $x^2 + y^2 - 6x + 4y - 36 = 0$

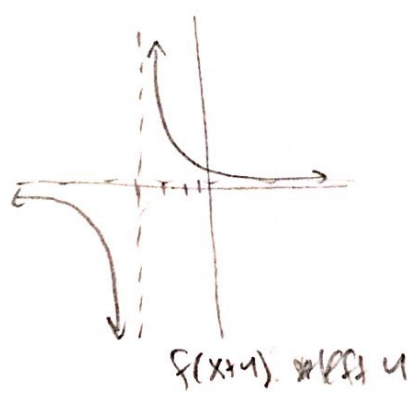
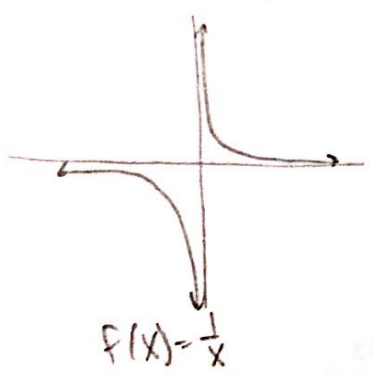
$(x^2 - 6x + 9) + (y^2 + 4y + 4) = 36 + 9 + 4$

$(x-3)^2 + (y+2)^2 = 49$

right 3, down 2

④  $f(x) = \frac{1}{x}$      $f(x+4)$

A)



- B) D:  $(-\infty, 0) \cup (0, \infty)$
- R:  $(-\infty, 0) \cup (0, \infty)$
- Asym:  $y=0$   $x=0$

- D:  $(-\infty, -4) \cup (-4, \infty)$
- R:  $(-\infty, 0) \cup (0, \infty)$
- Asym:  $y=0$   $x=-4$

C)  $f^{-1}(x)$  is the same!

$y = \frac{1}{x+4}$   
 $x = \frac{1}{y+4}$   
 $x(y+4) = 1$

$y = \frac{1}{x} - 4$   
 \*down 4 for  $f^{-1}(x+4)$

- D:  $(-\infty, 0) \cup (0, \infty)$
- R:  $(-\infty, -4) \cup (-4, \infty)$
- Asym:  $x=-4$   $y=0$

$$5) A) y = -2(x+11)^2 - 49$$

Quadratic

- reflect x-axis
- v. stretch by 2
- left 11
- down 49

$$b) y = \frac{1}{2} \sqrt{x-9}$$

cube root

- v. shrink by  $1/2$
- right 9

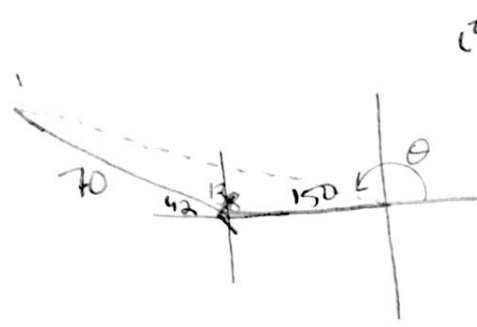
$$6) f(x) = -(x+5)^3$$

$$7) f(x) = 5\sqrt{x-2} + 6$$

$$8) f(x) = \frac{1}{x+3} - 8$$

Standard 1.03 - Ken

①



$$c^2 = 150^2 + 70^2 - 2(150)(70)\cos 138^\circ$$

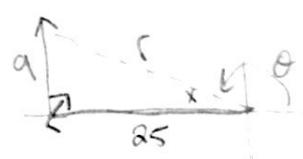
$$c = 207.38 \text{ miles}$$

$$\frac{\sin x}{70} = \frac{\sin 138}{207.38}$$

$$x = 13.1^\circ \quad \theta = 180 - 13.1$$

$$\theta = 166.9^\circ$$

②



$$c^2 = a^2 + b^2$$

$$c^2 = 25^2 + 9^2$$

$$c = 26.57 \text{ miles/hr}$$

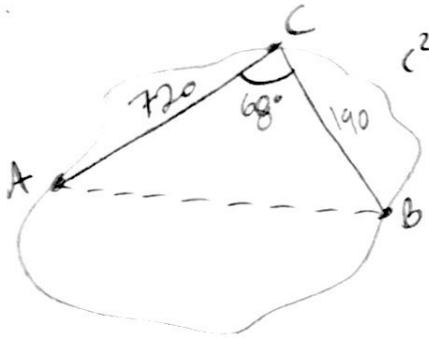
$$\tan x = \frac{9}{25}$$

$$x = \tan^{-1}\left(\frac{9}{25}\right)$$

$$x = 19.8$$

$$\theta = 180 - 19.8 = 160.2^\circ$$

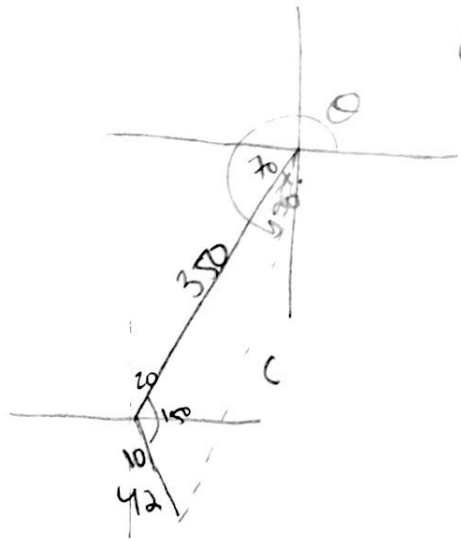
③



$$c^2 = 720^2 + 140^2 - 2(720)(140)\cos 68^\circ$$

$$c = 672.32 \text{ feet}$$

④



$$c^2 = 350^2 + 42^2 - 2(350)(42)\cos 150$$

$$c = 386.94 \text{ km/hr}$$

$$\frac{\sin x}{42} = \frac{\sin 150}{386.94}$$

$$x = 3.11$$

$$\theta = 180 + 70 + 3.11$$

$$\theta = 253.11^\circ$$

⑤ A)  $P = (-11, 4)$   $Q = (3, -8)$

$$\vec{v} = \langle 3 - (-11), -8 - 4 \rangle$$

$$\vec{v} = \langle 14, -12 \rangle$$

$$14\vec{i} - 12\vec{j}$$

B)  $P = (0, 13)$   $Q = (7, -1)$

$$\vec{v} = \langle 7 - 0, -1 - 13 \rangle$$

$$\vec{v} = \langle 7, -14 \rangle$$

$$7\vec{i} - 14\vec{j}$$

⑥  $V = -3i + 8j$   $W = 6i - 4j$   $Z = 7j$

A)  $4V - W$

$$4\langle -3, 8 \rangle - \langle 6, -4 \rangle$$

$$\langle -12, 32 \rangle - \langle 6, -4 \rangle$$

$$\langle -18, 36 \rangle$$

B)  $3W + 7Z$

$$3\langle 6, -4 \rangle + 7\langle 0, 7 \rangle$$

$$\langle 18, -12 \rangle + \langle 0, 49 \rangle$$

$$\langle 18, 37 \rangle$$

C)  $\|V\| + \|W\|$

$$\sqrt{(-3)^2 + (8)^2} + \sqrt{6^2 + (-4)^2}$$

$$\sqrt{73} + \sqrt{52}$$

D)  $\|V + W\|$

$$\|\langle -3, 8 \rangle + \langle 6, -4 \rangle\|$$

$$\|\langle 3, 4 \rangle\|$$

$$\sqrt{3^2 + 4^2} = \sqrt{25}$$

E)  $V \cdot W$

$$\langle -3, 8 \rangle \cdot \langle 6, -4 \rangle$$

$$(-3)(6) + (8)(-4)$$

$$-18 - 32$$

$$-50$$

F)  $V \cdot Z$

$$\langle -3, 8 \rangle \cdot \langle 0, 7 \rangle$$

$$(-3)(0) + (8)(7)$$

$$0 + 56$$

$$56$$

G)  $\vec{u} = \frac{\vec{v}}{\|\vec{v}\|}$

$$= \frac{\langle -3, 8 \rangle}{\sqrt{(-3)^2 + 8^2}} = \frac{\langle -3, 8 \rangle}{\sqrt{73}}$$

$$\left\langle \frac{-3}{\sqrt{73}}, \frac{8}{\sqrt{73}} \right\rangle$$

$$\left\langle \frac{-3\sqrt{73}}{73}, \frac{8\sqrt{73}}{73} \right\rangle$$

H)  $\cos \theta = \frac{V \cdot W}{\|V\| \|W\|} = \frac{(-3)(6) + (8)(-4)}{\sqrt{(-3)^2 + (8)^2} \cdot \sqrt{6^2 + (-4)^2}} = \frac{-18 - 32}{\sqrt{73} \cdot \sqrt{52}}$

$$\cos \theta = \frac{-50}{\sqrt{3796}}$$

$$\theta = \cos^{-1}\left(\frac{-50}{\sqrt{3796}}\right)$$

$$\theta = 144.25^\circ$$