

Answers to Final Exam Review (ID: 1)

1) C
5) C
9) A
13) B
17) B
21) C
25) B
29) B
33) C
37) B
41) D
45) C
49) A
53) D
57) A
61) C
65) C
69) A
73) A
77) C
81) B
85) D

2) C
6) A
10) C
14) C
18) B
22) B
26) B
30) D
34) D
38) C
42) A
46) B
50) A
54) A
58) B
62) C
66) D
70) D
74) C
78) A
82) B
86) D

3) D
7) D
11) C
15) C
19) B
23) D
27) D
31) D
35) B
39) A
43) B
47) B
51) C
55) A
59) A
63) A
67) C
71) A
75) C
79) A
83) A
87) A

4) A
8) D
12) A
16) A
20) C
24) B
28) B
32) D
36) B
40) B
44) B
48) D
52) D
56) D
60) A
64) D
68) B
72) D
76) B
80) A
84) D

Even more Review KEY

① Amp = $\frac{1}{2}$
period = $\frac{2\pi}{4} = \frac{\pi}{2}$ [B]

② amp = 3
period = $\frac{2\pi}{\frac{1}{4}} = 8\pi$ [D]

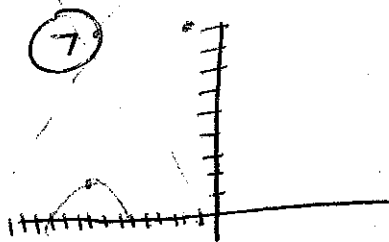
③ $\csc \frac{5\pi}{3} = \frac{1}{\sin \frac{5\pi}{3}} = \frac{1}{-\frac{\sqrt{3}}{2}} = -\frac{2}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$ [B]
 $\sin \frac{5\pi}{3} = -\frac{\sqrt{3}}{2}$ [D]

④ $\sec \frac{3\pi}{2} = \frac{1}{\cos \frac{3\pi}{2}} = \frac{1}{0}$ = undefined [A]

⑤ $\cos 2\theta = \cos^2\theta - \sin^2\theta$ OR $2\cos^2\theta - 1$ OR $1 - 2\sin^2\theta$

$1 - 2\left(\frac{3}{5}\right)^2 = 1 - 2\left(\frac{9}{25}\right) = \frac{25}{25} - \frac{18}{25} = \frac{7}{25}$ [D]

⑥ $\begin{bmatrix} -1 & -1 & -2 \\ -2 & 3 & -4 \end{bmatrix} + \begin{bmatrix} 6 & -1 & -5 \\ -5 & -1 & 2 \end{bmatrix} + \begin{bmatrix} 0 & +5 & +1 \\ -5 & -0 & -1 \end{bmatrix}$
 $= \begin{bmatrix} 5 & 3 & -6 \\ -2 & 2 & -3 \end{bmatrix}$ [C]

⑦ 
a = 8
b = 7
Center (-9, 9)
 $\frac{(x+9)^2}{64} - \frac{(y-9)^2}{49} = 1$ [D]

⑧ Center (4, -3)
rad: 4
 $(x-4)^2 + (y+3)^2 = 16$
[C]

$$\textcircled{9} \quad y = -2(x-6)^2 - 5$$

$$-\frac{1}{2}(y+5) = \frac{-2(x-6)^2}{-2}$$

$$(x-6)^2 = -\frac{1}{2}(y+5)$$

vertex $(6, -5)$

opens down

AOS: $x=6$ A

$$\textcircled{10} \quad \frac{(x-3)^2}{4} + \frac{(y-1)^2}{16} = 1 \quad \text{vertical}$$

$$a=4 \quad b=2$$

center $(3, 1)$ C

$$\textcircled{11} \quad \frac{4}{14} \cdot \frac{5}{13} \cdot \frac{5}{12} = \frac{100}{2184} = \frac{25}{546} \quad \text{A}$$

$$\textcircled{12} \quad \arctan(-\sqrt{3}) = \boxed{-\frac{\pi}{3}}$$

$$\textcircled{13} \quad \arcsin(1) = \boxed{\frac{\pi}{2}}$$

$$\textcircled{14} \quad \tan(\arcsin \frac{-\sqrt{3}}{2})$$

$$\tan(-\frac{\pi}{3}) = \boxed{-\sqrt{3}}$$

$$\textcircled{15} \quad \sin(\arccos \frac{1}{2})$$

$$\sin(\frac{\pi}{3}) = \boxed{\frac{\sqrt{3}}{2}}$$

$$\textcircled{16} \quad \tan x = \frac{\sin x}{\cos x} = \frac{\frac{2}{3}}{\frac{\sqrt{17}}{3}} = \frac{2}{\sqrt{17}} = \frac{2\sqrt{17}}{17} \quad \text{A}$$

$$\textcircled{17} \quad 2\sin^2 x - 9\sin x = -4$$

$$2\sin^2 x - 9\sin x + 4 = 0$$

$$(2\sin x - 1)(\sin x - 4) = 0$$

$$2\sin x - 1 = 0 \quad \sin x - 4 = 0$$

$$2\sin x = 1 \quad \sin x = 4$$

$$\sin x = \frac{1}{2}$$

$$x = \frac{\pi}{6}, \frac{5\pi}{6} \quad \text{B}$$

$$\textcircled{18} \quad \sin 35^\circ \cos 25^\circ + \cos 35^\circ \sin 25^\circ$$

$$= \sin(35^\circ + 25^\circ) = \sin 60^\circ \quad \text{A}$$

$$\textcircled{19} \quad \cos 2A = 2\cos^2 A - 1$$

$$= 2\left(\frac{4}{5}\right)^2 - 1 = 2\left(\frac{16}{25}\right) - 1$$

$$= \frac{32}{25} - \frac{25}{25} = \boxed{\frac{7}{25}}$$

$$\textcircled{20} \quad \langle 10 \cos 0^\circ, 10 \sin 0^\circ \rangle + \langle 10 \cos 85^\circ, 10 \sin 85^\circ \rangle$$

$$= \langle 10, 0 \rangle + \langle .872, 9.962 \rangle$$

$$= \langle 10.872, 9.962 \rangle$$

$$\sqrt{(10.872)^2 + (9.962)^2} = \boxed{14.75} \quad \text{B}$$

$$\textcircled{21} \quad 2\langle -1, 3 \rangle - 3\langle 5, -2 \rangle$$

$$\langle -2, 6 \rangle + \langle -15, 6 \rangle$$

$$\boxed{\langle -17, 12 \rangle}$$

P/e-calc: Final Final Exam REVIEW

State the quadrant in which the terminal side of each angle lies.

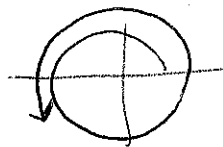
2) 395°

- A) II B) III
 C) I D) IV

$$\begin{array}{r} 395 \\ -360 \\ \hline 35 \end{array}$$

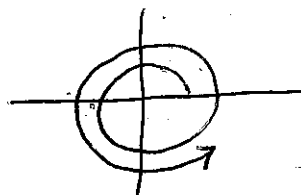
3) $\frac{13\pi}{4} = 3\frac{1}{4}\pi$

- A) I B) IV
 C) II D) III



53) Name the quadrant. $\frac{15\pi}{4} = 3\frac{3}{4}\pi$

IV



Convert each degree measure into radians or radian measure into degrees.

8) 135°

- A) $\frac{13\pi}{18}$ B) $\frac{11\pi}{18}$
 C) $\frac{7\pi}{9}$ D) $\frac{3\pi}{4}$

$$135 \cdot \frac{\pi}{180}$$

Rewrite in radians.

54) $420^\circ \cdot \frac{\pi}{180} = \frac{21\pi}{9} = \frac{7\pi}{3}$

$$\frac{27\pi}{36} = \frac{9\pi}{12} = \frac{3\pi}{4}$$

Find the exact value of each trigonometric function.

26) $\cos -2\pi$

- A) -1 B) 1
 C) Undefined D) 0

27) $\cos 180^\circ$

- A) $-\frac{\sqrt{3}}{3}$ B) $-\frac{\sqrt{2}}{2}$
 C) 0 D) -1

Find each of the following exactly. Leave answers in simplest radical form.

57. $\csc 90^\circ$ |

58. $\sin 240^\circ = -\frac{\sqrt{3}}{2}$

59. $\tan 390^\circ$

60. $\sec \frac{4\pi}{3}$

★ 3) $\csc \frac{5\pi}{3} = \frac{-2}{\frac{\sqrt{3}}{3}} = -\frac{2\sqrt{3}}{3}$

★ 4) $\sec \frac{3\pi}{2}$

$\cos \frac{3\pi}{2} = 0$ flip

- A) 2 B) $-\frac{\sqrt{3}}{2}$

- A) Undefined B) $\frac{\sqrt{3}}{3}$

- C) $\sqrt{2}$ D) $-\frac{2\sqrt{3}}{3}$

- C) 1 D) $\sqrt{3}$

Find a positive and a negative coterminal angle for each given angle.

12) $\frac{7\pi}{12}$

$$\frac{7\pi}{12} \pm 2\pi = \frac{7\pi}{12} \pm \frac{24\pi}{12}$$

- A) $\frac{31\pi}{12}$ and $-\frac{17\pi}{12}$

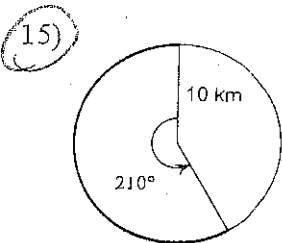
- C) $\frac{43\pi}{12}$ and $-\frac{5\pi}{12}$

$$= \frac{31\pi}{12}; -\frac{17\pi}{12}$$

- B) $\frac{25\pi}{12}$ and $-\frac{5\pi}{12}$

- D) $\frac{31\pi}{12}$ and $-\frac{23\pi}{12}$

6) Find the length of each arc.



$$S = r\theta$$

$$= 10 \left(210 \cdot \frac{\pi}{180} \right)$$

$$= \frac{210\pi}{18} = \frac{35\pi}{3}$$

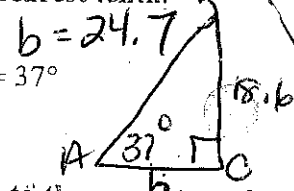
- A) $\frac{27\pi}{2}$ km B) 200π km
 C) $\frac{35\pi}{3}$ km D) $\frac{39\pi}{2}$ km

7) In each problem, angle C is a right angle.

Find the side indicated to the nearest tenth.

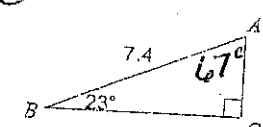
23) Find b if $a = 18.6$, $m\angle A = 37^\circ$

$$\tan 37^\circ = \frac{18.6}{b}$$



Solve each triangle. Round answers to the nearest tenth.

25)



- A) $m\angle A = 67^\circ$, $b = 2.9$, $a = 5.6$
 B) $m\angle A = 67^\circ$, $b = 2.9$, $a = 6.8$
 C) $m\angle A = 67^\circ$, $b = 2.9$, $a = 6.1$
 D) $m\angle A = 67^\circ$, $b = 2.3$, $a = 6.8$

$$\sin 23^\circ = \frac{b}{7.4}$$

$$b = 2.9 \quad a = 6.8$$

9) Convert each decimal degree measure into degrees-minutes-seconds.

- 10) 47.455°
- A) $47^\circ 31' 30''$ B) $47^\circ 22' 39''$
 C) $47^\circ 27' 18''$ D) $47^\circ 10' 3''$

9) Find the amplitude of each function.

- 38) $y = 8\sin\left(\theta + \frac{3\pi}{4}\right) + 4$
- A) $\frac{1}{5}$ B) $\frac{1}{7}$
 C) 8 D) None

Find the amplitude and period of the function.

42. $y = \frac{2}{3}\sin(\theta) + 1$ amp: $\frac{2}{3}$ per: 2π
 43. $y = -\frac{3}{8}\cos(\theta) + 3$ amp: $\frac{3}{8}$ per: 2π
 44. $y = \sin\left(\frac{2}{3}\theta\right) - \frac{1}{3}$ amp: 1 per: $\frac{2\pi}{3}$
 45. $y = \sin\left(3\theta + \frac{\pi}{2}\right) + \frac{2}{3}$ amp: 1 per: $\frac{2\pi}{3}$

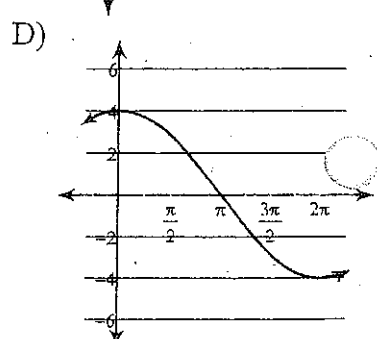
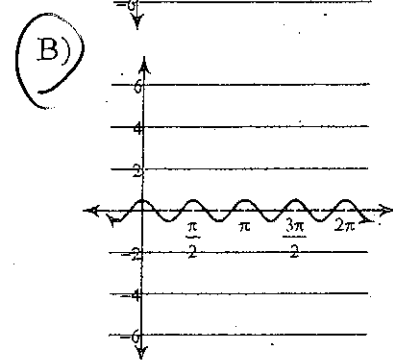
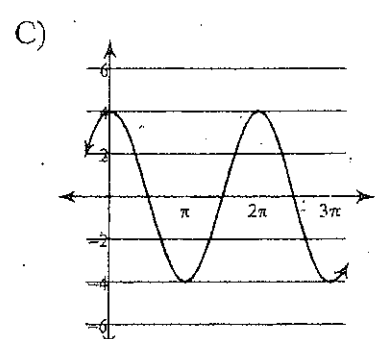
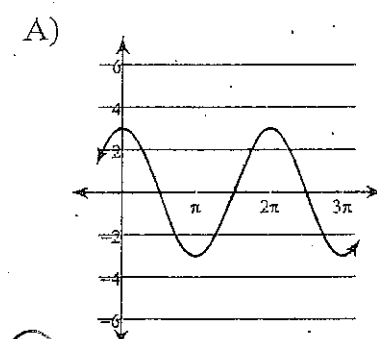
Using radians, find the period of each function.

- 40) $y = 6\sec\left(2\theta + \frac{2\pi}{3}\right) - 3$
- A) 4π B) π
 C) 14π D) 12π

$$\frac{2\pi}{2} = \pi$$

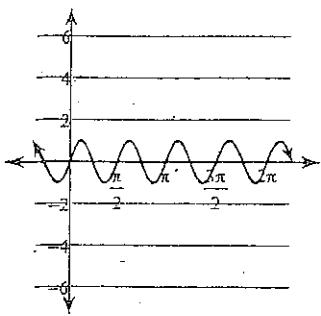
11) Graph each function using radians.

1) $y = \frac{1}{2} \cdot \cos 4\theta$

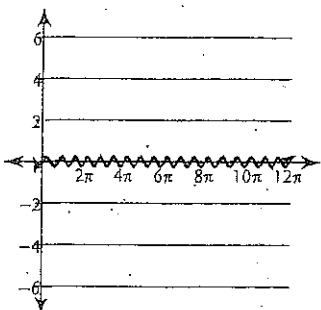


continued

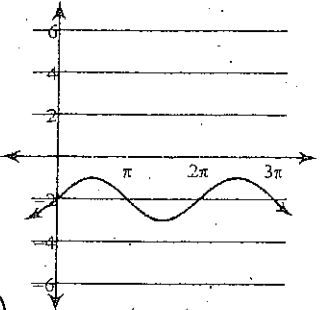
2) $y = 3 \sin \frac{\theta}{4}$



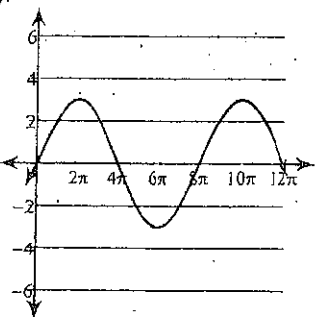
B)



C)



D)



12) 50) Which of the following is a solution of $\arcsin\left(-\frac{\sqrt{3}}{2}\right)$?

- a) $-\frac{\pi}{3}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{3}$ d) $\frac{\pi}{2}$ e) π

51) Which of the following is a solution of $\arccos\left(-\frac{\sqrt{2}}{2}\right)$?

- a) $-\frac{3\pi}{2}$ b) $\frac{3\pi}{4}$ c) $\frac{2\pi}{3}$ d) π e) $\frac{11\pi}{8}$

★ 12) Evaluate: $\arctan(-\sqrt{3})$ $-\frac{\pi}{3}$

★ 13) Evaluate: $\arcsin(1)$ $\frac{\pi}{2}$

B)

★ 14) Evaluate: $\tan\left(\arcsin-\frac{\sqrt{3}}{2}\right)$ $-\sqrt{3}$

★ 15) Evaluate: $\sin\left(\arccos\frac{1}{2}\right)$ $\frac{\sqrt{3}}{2}$

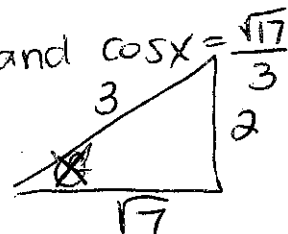
Simplify.

36) $\frac{\sin^2 \theta + \cos^2 \theta}{\cos^2 \theta} = \frac{1}{\cos^2 \theta} = \sec^2 \theta$

14)

15)

★ 16) Given $\sin x = \frac{2}{3}$ and $\cos x = \frac{\sqrt{17}}{3}$, find $\tan x = \frac{2}{\sqrt{17}} = \frac{2\sqrt{17}}{17}$



16)

★ 17) Find all solutions in the interval $[0, 2\pi)$:
 $2\sin^2 x - 9\sin x = -4$ $2x^2 - 9x + 4 = 0$
 $(2x - 1)(x - 4) = 0$
 a) $\frac{\pi}{6}, \frac{11\pi}{6}$ b) $\frac{\pi}{6}, \frac{5\pi}{6}$ c) $\frac{\pi}{3}, \frac{5\pi}{3}$ d) $\frac{\pi}{3}, \frac{2\pi}{3}$
 $\sin x = \frac{1}{2}$

17) $\sin 35^\circ \cos 25^\circ + \cos 35^\circ \sin 25^\circ =$

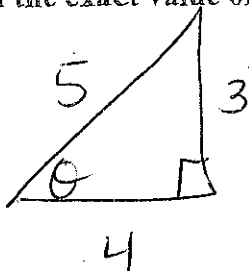
- a) $\sin 60^\circ$ b) $\cos 60^\circ$ c) $\sin 10^\circ$ d) $\cos 10^\circ$ e) NONE of these

Use a double-angle identity to find the exact value of each expression.

18) $\sin \theta = \frac{3}{5}$ and $0^\circ < \theta < 90^\circ$

Find $\cos 2\theta$

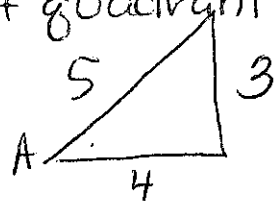
- A) $-\frac{25}{24}$ B) $\frac{17}{8}$
 C) $\frac{25}{24}$ D) $\frac{7}{25}$



$$\begin{aligned} \cos 2\theta &= \cos^2 \theta - \sin^2 \theta \\ &= \left(\frac{4}{5}\right)^2 - \left(\frac{3}{5}\right)^2 \\ &= \frac{16}{25} - \frac{9}{25} = \frac{7}{25} \end{aligned}$$

19) Angles A and B are both in the first quadrant.

$\cos A = \frac{4}{5}$ $\sin B = \frac{5}{13}$

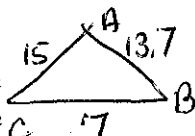


Find $\cos 2A = \cos^2 A - \sin^2 A$
 $= \left(\frac{4}{5}\right)^2 - \left(\frac{3}{5}\right)^2 = \frac{16}{25} - \frac{9}{25} = \frac{7}{25}$

Find the area of each triangle to the nearest tenth.

34) In $\triangle CAB$, $b = 15$, $a = 7$, $c = 13.7$

- A) 47.1 units² B) 51.9 units²
 C) 41.3 units² D) 47.9 units²



29) Find the area. $a = 15$, $b = 30$, $c = 25$

$s = \frac{15+30+25}{2} = 35$

$A = \sqrt{35(35-15)(35-30)(35-20)}$

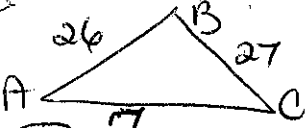
21) same as #20 but says "Find the measure of the largest angle..."

$s = 17.85$

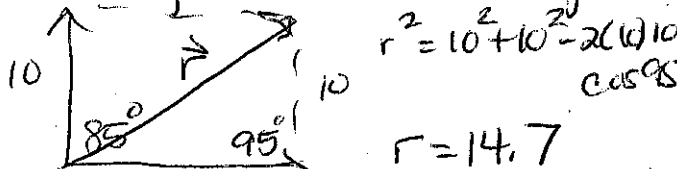
Find $\angle A$ for each...

33) $b = 7$ m, $a = 27$ m, $c = 26$ m

32) $a = 2.3$, $b = 6.1$, $c = 4$



20) Find the magnitude of the resultant vector of two 10 pound forces that act on an object with an angle of 85° between them.



$r^2 = 10^2 + 10^2 - 2(10)(10) \cos 85^\circ$
 $r = 14.7$

21) Given: $\vec{u} = \langle -1, 3 \rangle$ and $\vec{v} = \langle 5, -2 \rangle$, find $2\vec{u} - 3\vec{v}$.

$\langle -2, 6 \rangle + \langle -15, 6 \rangle$
 $\langle -17, 12 \rangle$

Simplify. Write "undefined" for expressions that are undefined.

4) \star (6) $\begin{bmatrix} -1 & -1 & -2 \\ -2 & 3 & -4 \end{bmatrix} + \begin{bmatrix} 6 & -1 & -5 \\ -5 & -1 & 2 \end{bmatrix} - \begin{bmatrix} 0 & -5 & -1 \\ 5 & 0 & 1 \end{bmatrix}$

A) $\begin{bmatrix} 5 & 5 & 2 \\ -12 & 4 & -3 \end{bmatrix}$

B) $\begin{bmatrix} -5 & 3 & -6 \\ -2 & 4 & -3 \end{bmatrix}$

(C) $\begin{bmatrix} 5 & 3 & -6 \\ -12 & 2 & -3 \end{bmatrix}$

D) $\begin{bmatrix} 5 & 3 & -6 \\ -8 & 2 & -3 \end{bmatrix}$

25) Evaluate each determinant.

(51) $\begin{vmatrix} -5 & -1 \\ 3 & -1 \end{vmatrix} = 5 - 3$

- A) 2 B) 3
 (C) 8 D) -2

Solve each equation

26) (55) $\begin{bmatrix} 6 & -6 \\ -18 & -2 \end{bmatrix} = \begin{bmatrix} -2 & 2 \\ 10 & -6 \end{bmatrix} X$

- (A) $\begin{bmatrix} 0 & -5 \\ 3 & -8 \end{bmatrix}$ B) $\begin{bmatrix} -5 & 0 \\ 3 & -8 \end{bmatrix}$
 C) $\begin{bmatrix} 0 & 3 \\ -4 & -8 \end{bmatrix}$ D) $\begin{bmatrix} 3 & -5 \\ 0 & -8 \end{bmatrix}$

28) {see next page}

29) Simplify. Write "undefined" for expressions that are undefined.

(49) $\begin{bmatrix} 2 & 2 \\ 6 & 5 \end{bmatrix} \cdot \begin{bmatrix} -5 & -5 \\ -5 & 1 \\ -5 & 5 \end{bmatrix} = -107$

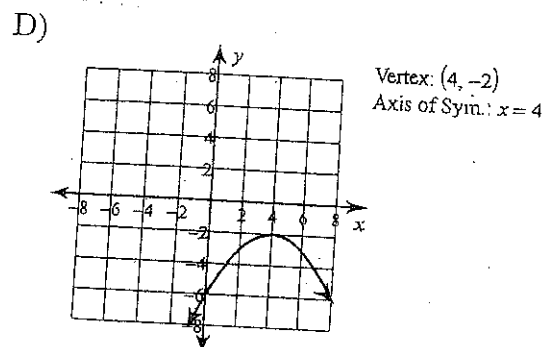
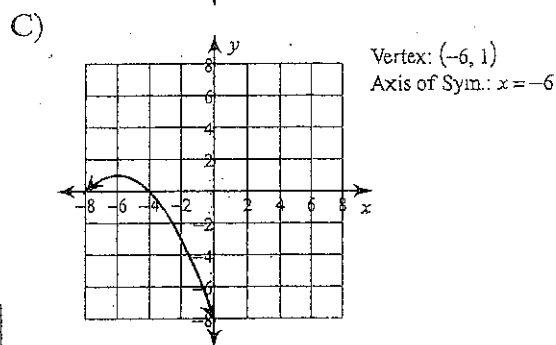
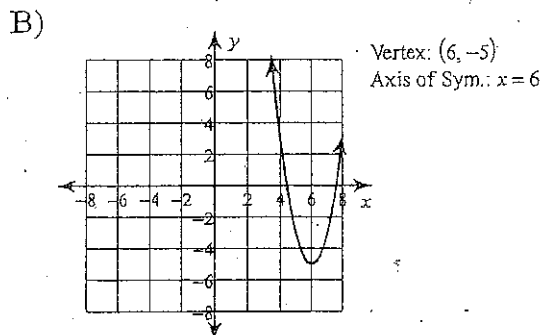
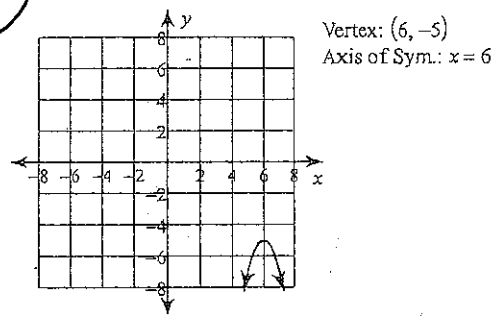
- (A) Undefined B) $\begin{bmatrix} 2 & 15 \\ 6 & 2 \end{bmatrix}$
 C) $\begin{bmatrix} 2 & 6 \\ 2 & 2 \end{bmatrix}$ D) $\begin{bmatrix} 6 & 6 \\ 2 & 5 \end{bmatrix}$

(50) $\begin{bmatrix} -5 & 1 & 0 \\ -4 & -6 & -2 \end{bmatrix} \cdot \begin{bmatrix} 1 & 3 \\ -3 & 6 \\ -6 & 4 \end{bmatrix}$

- (A) $\begin{bmatrix} -8 & -9 \\ 26 & -56 \end{bmatrix}$ $-5 + -3 + 0$
 B) $\begin{bmatrix} 2 & 21 \\ 26 & -56 \end{bmatrix}$ $-15 + 6 + 0$
 C) $\begin{bmatrix} -2 & -9 \\ -10 & -56 \end{bmatrix}$
 D) $\begin{bmatrix} -8 & 21 \\ 26 & -32 \end{bmatrix}$

Identify the vertex and axis of symmetry of each. Then sketch the graph.

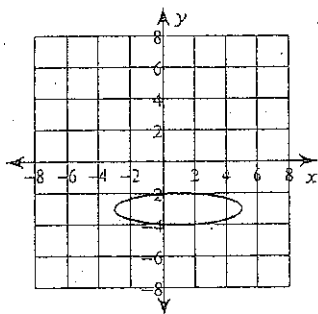
(9) $y = -2(x - 6)^2 - 5$



Identify the vertices of each. Then sketch the graph.

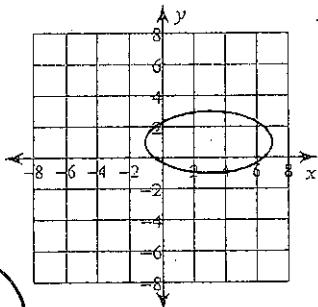
10) $\frac{(x-3)^2}{4} + \frac{(y-1)^2}{16} = 1$

A)



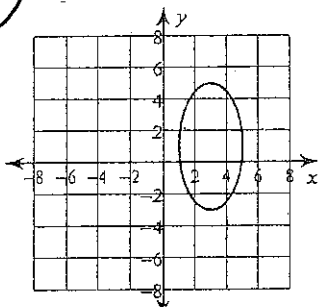
Vertices: (5, -3)
(-3, -3)

B)



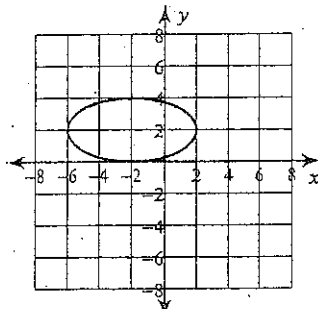
Vertices: (7, 1)
(-1, 1)

C)



Vertices: (3, 5)
(3, -3)

D)



Vertices: (2, 2)
(-6, 2)

Find the probability.

11) There are four nickels, five dimes, and five quarters in your pocket. You randomly pick three coins and place them on a counter. The first coin is a nickel, the second is a dime, and the third is a quarter.

A) $\frac{25}{546} \approx 0.046$ B) $\frac{200}{2197} \approx 0.091$

C) $\frac{1}{22} \approx 0.045$ D) $\frac{1}{12} \approx 0.033$

$\frac{4}{14} \cdot \frac{5}{13} \cdot \frac{5}{12}$

standard form equation of each hyperbola.

7) Vertices: (-1, 9), (-17, 9)

Endpoints of Conjugate Axis: (-9, 16)
(-9, 2)

A) $\frac{(x-9)^2}{64} - \frac{(y-9)^2}{49} = 1$

B) $\frac{(y-9)^2}{49} - \frac{(x+9)^2}{64} = 1$

C) $\frac{(x+9)^2}{49} - \frac{(y-9)^2}{64} = 1$

D) $\frac{(x+9)^2}{64} - \frac{(y-9)^2}{49} = 1$

Solve each system of equations.

31) 75) $3x^2 - y^2 - 18x = 0$
 $2x - y = 3$

A) (0, -2) B) (-3, -9), (4, 3)

C) (-3, -9) D) (4, 3)

Use the information provided to write the standard form equation of each circle.

32) 8) Center: (4, -3)
Radius: 4

A) $(x-3)^2 + (y-2)^2 = 16$

B) $(x+4)^2 + (y+3)^2 = 16$

C) $(x-4)^2 + (y+3)^2 = 16$

D) $(x-3)^2 + (y-3)^2 = 16$

Find the probability.

33) 82) You flip a coin and then roll a fair six-sided die. The coin lands heads-up and the die shows a six.

A) $\frac{5}{26} \approx 0.192$

B) $\frac{1}{12} \approx 0.083$

C) $\frac{3}{11} \approx 0.273$

D) $\frac{1}{4} = 0.25$

$\frac{1}{2} \cdot \frac{1}{6}$

34) 84) A basket contains four apples, three peaches, and four pears. You randomly select a piece of fruit. It is an apple or a peach.

A) $\frac{8}{13} \approx 0.615$

B) $\frac{10}{13} \approx 0.769$

C) $\frac{9}{10} = 0.9$

D) $\frac{7}{11} \approx 0.636$

$\frac{4}{11} + \frac{3}{11}$