

Name Key
 Period _____

Semester 2 Multiple Choice Review

Precalculus

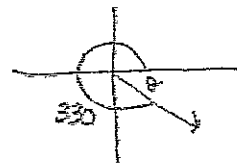
1) Find the reference angle for 330° .

A) 60°

B) 30°

C) 45°

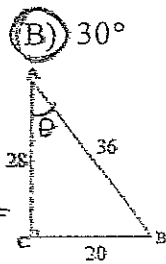
D) -30°



$360 - 330 = 30$

2) Find $\cot A$:

$$\cot A = \frac{\text{adj}}{\text{opp}} = \frac{28}{20}$$



A) $\frac{7}{5}$

B) $\frac{5}{7}$

C) $\frac{5}{9}$

D) $\frac{7}{9}$

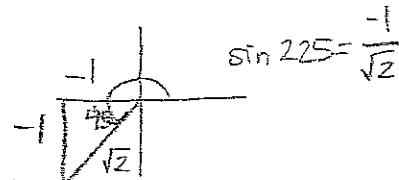
3) Find the value of $\sin 225^\circ$.

A) $-\frac{1}{2}$

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

C) $\frac{\sqrt{2}}{2}$

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



$\sin 225 = -\frac{1}{\sqrt{2}}$

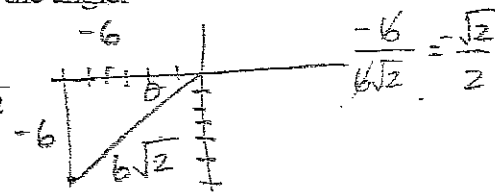
4) Find the value of $\cos \theta$ if the point $(-6, -6)$ lies on the terminal side of the angle.

A) $6\sqrt{2}$

B) -1

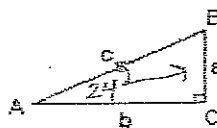
C) $-\frac{\sqrt{2}}{2}$

D) $-\sqrt{2}$



$\frac{-6}{6\sqrt{2}} = -\frac{\sqrt{2}}{2}$

5) Solve for c if $A = 24^\circ, a = 19$.



$a \sin A = c \sin A \Rightarrow 19 \sin 24 = c \sin 24$

A) 0.02

B) 467

C) 208

$\frac{19 \sin 24}{\sin 24} = \frac{19}{0.05} = 380$

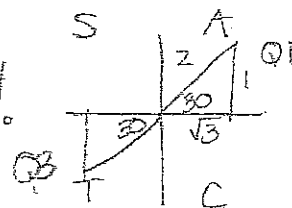
6) Solve for x on the interval $0^\circ \leq x \leq 360^\circ$: $\tan x = \frac{\sqrt{3}}{3}$

A) $30^\circ, 210^\circ$

B) $30^\circ, 150^\circ$

C) $150^\circ, 330^\circ$

D) $210^\circ, 330^\circ$



7) Given: $A = 65^\circ, C = 27^\circ, c = 13$, find a .

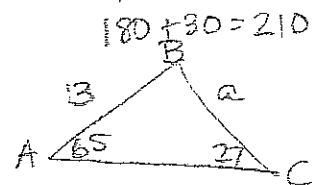
Law of Sines

A) 0.04

B) 316

C) 260

D) 650



$$\frac{\sin 65}{a} = \frac{\sin 27}{13} \Rightarrow \frac{13 \sin 65}{\sin 27} = a$$

Law of Cosines

$$B^2 = 18^2 + 7^2 - 2(18)(7) \cos B$$

A

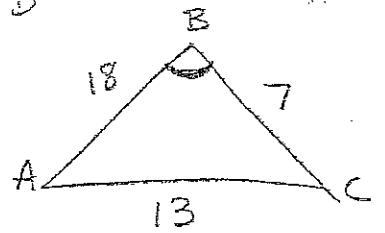
8) Given: $a = 7, b = 13, c = 18$, find B .

A) 360°

B) 184°

C) 125.6°

~~D) 144°~~



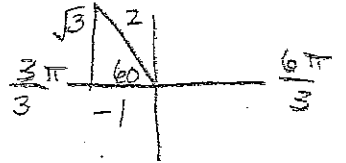
9) Evaluate $\sin \frac{2\pi}{3}$.

A) $\frac{1}{2}$

B) $-\frac{1}{2}$

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

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



10) Find the value of $\cos 19\pi$.

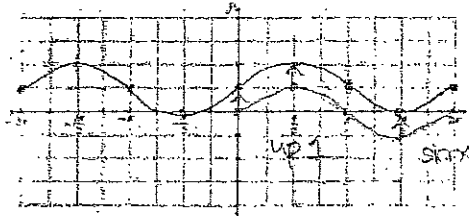
A) 1

B) -1

C) 0

D) $\frac{\pi}{2}$

11) Name the function of the graph:



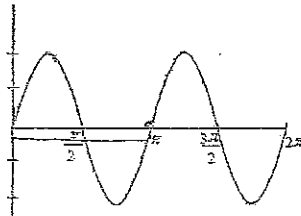
A) $f(x) = \cos x + 1$

B) $f(x) = \sin(x - 1)$

C) $f(x) = \cos(x - 1)$

D) $f(x) = \sin x + 1$

12) Find the period of the function:



A) $\frac{3\pi}{2}$

B) $\frac{\pi}{2}$

C) 2π

D) π

13) What direction will the graph, $f(x) = -2 \tan\left(x - \frac{\pi}{4}\right)$, be shifted from the parent function $f(x) = \tan x$?

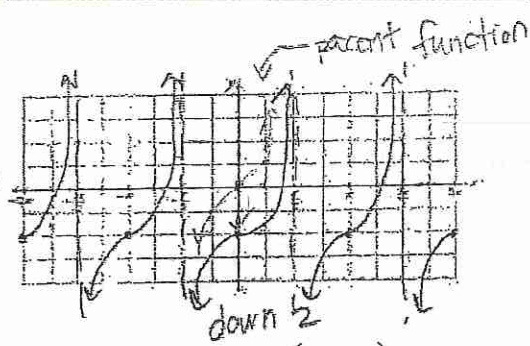
A) up 2 units

B) down 2 units

C) right $\frac{\pi}{4}$ units

D) left $\frac{\pi}{4}$ units

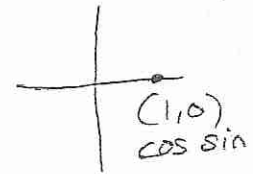
14) Write the function of the graph:



- A) $f(x) = \tan x - 2$ B) $f(x) = \tan x + 2$ C) $f(x) = \tan\left(x - \frac{\pi}{2}\right)$ D) $f(x) = \tan(x - \pi)$

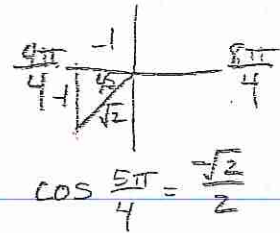
15) Find the value of $\sec 8\pi$.

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



B 16) Find the value of $\sin^{-1}\left(\cos \frac{5\pi}{4}\right)$.

$\sin^{-1}\left(-\frac{\sqrt{2}}{2}\right)$



- ~~A) $\frac{\pi}{4}$~~ B) $\frac{\pi}{4}$ C) $-\frac{\pi}{3}$ D) $\frac{\pi}{6}$

17) Simplify $3 \sec x + \frac{\csc x}{\cot x}$.

- A) $4 \sec x$ B) $4 \sec x + \cos x$ C) $4 \cos x$ D) $3 \sec x + 1$

$$3 \sec x + \frac{\csc x}{\cot x}$$

$$3 \frac{1}{\cos x} + \frac{1}{\sin x} \cdot \frac{\sin x}{\cos x}$$

18) Simplify $\csc x \tan x = 7$. $\frac{1}{\sin x} \cdot \frac{\sin x}{\cos x} = \frac{1}{\cos x} = 7$

$$\frac{3}{\cos x} + \frac{1}{\cos x} = \frac{4}{\cos x}$$

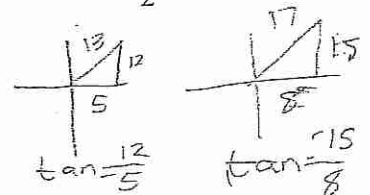
$$= 4 \sec x$$

- A) $\csc x = 7$ B) $\sin x = 7$ C) $\sec x = 7$ D) $\cos x = 7$

19) Find the exact value of $\tan(x - y)$ if $\sin x = \frac{12}{13}$, $0 < x < \frac{\pi}{2}$, and $\cos y = \frac{8}{17}$, $0 < y < \frac{\pi}{2}$.

- A) $-\frac{171}{140}$ B) $\frac{21}{220}$ C) $\frac{171}{220}$ D) $-\frac{21}{140}$

$$\frac{\frac{12}{13} - \frac{15}{17}}{1 + \frac{12}{13} \cdot \frac{15}{17}} = \frac{2/40}{11/22} = \frac{2}{11}$$



20) Use the sum and difference identities to find the exact value of $\sin 75^\circ$. $\sin(45+30) =$

- A) $\frac{\sqrt{6} + \sqrt{2}}{4}$ B) $\frac{\sqrt{6} - \sqrt{2}}{4}$ C) $\frac{-\sqrt{6} - \sqrt{2}}{2}$ D) $\frac{\sqrt{2} - \sqrt{6}}{2}$

$$\sin 45 \cos 30 + \cos 45 \sin 30$$

$$\left(\frac{\sqrt{2}}{2}\right)\left(\frac{\sqrt{3}}{2}\right) + \left(\frac{\sqrt{2}}{2}\right)\left(\frac{1}{2}\right)$$

$$\frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4}$$

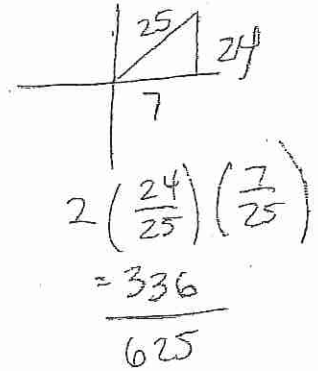
21) Find $\sin 2\theta$ given $\sec \theta = \frac{25}{7}$, $0^\circ < \theta < 90^\circ$.

A) $\frac{336}{25}$

B) $\frac{527}{625}$

C) $\frac{527}{625}$

D) $\frac{336}{625}$



22) Solve $\tan^2 x + \frac{\sec x}{\csc x} = 0$.

A) $\frac{3\pi}{4}, \frac{7\pi}{4}$

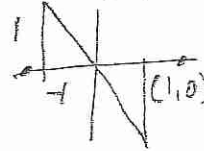
B) $\frac{\pi}{4}, \frac{5\pi}{4}$

C) $0, \pi, \frac{3\pi}{4}, \frac{7\pi}{4}$

D) $0, \pi$

$\tan^2 x + \frac{1}{\cos x} \cdot \frac{\sin x}{1}$
 $\tan^2 x + \tan x = 0$

$\tan x (\tan x + 1) = 0$
 $\tan x = 0$ $\tan x = -1$



23) Solve $\sin x \sec x = \sqrt{3}$ for $0^\circ \leq x \leq 360^\circ$.

A) $30^\circ, 210^\circ$

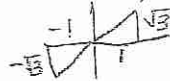
B) $60^\circ, 240^\circ$

C) $45^\circ, 225^\circ$

D) $120^\circ, 300^\circ$

$\sin x \cdot \frac{1}{\cos x} = \sqrt{3}$

$\tan x = \sqrt{3}$



24) Solve $2 \sin^2 x + \sin x - 1 = 0$ for principal values.

A) $30^\circ, -90^\circ$

B) $60^\circ, -90^\circ$

C) $30^\circ, 180^\circ$

D) $30^\circ, 90^\circ$

$2x^2 + 2x - x - 1$ $2 \sin x - 1 = 0$
 $2x(x+1) - 1(x+1)$ $\sin x = \frac{1}{2}$
 $\sin x + 1 = 0$
 $\sin x = -1$

25) Find the ordered triple that represents \overrightarrow{AB} given $A(-7, 0, -1)$ and $B(-2, 1, -3)$.

A) $\langle -9, 1, -4 \rangle$

B) $\langle 5, -1, 2 \rangle$

C) $\langle 5, 1, -2 \rangle$

D) $\langle 14, 0, 3 \rangle$

$\langle -2 - (-7), 1 - 0, -3 - (-1) \rangle$
 $\langle 5, 1, -2 \rangle$

26) Find the magnitude of $\langle -1, 6 \rangle$.

A) $\sqrt{35}$

B) $\sqrt{37}$

C) 7

D) 6

$\sqrt{(-1)^2 + 6^2} = \sqrt{1+36}$

27) Find $5\vec{a} - 3\vec{b}$ if $\vec{a} = \langle 2, -3 \rangle$ and $\vec{b} = \langle -1, 8 \rangle$.

A) $\langle 13, -39 \rangle$

B) $\langle 7, 9 \rangle$

~~C) $\langle 13, 9 \rangle$~~

D) $\langle 7, -39 \rangle$

$5\langle 2, -3 \rangle - 3\langle -1, 8 \rangle$
 $\langle 10, -15 \rangle + \langle 3, -24 \rangle$
 $\langle 13, -39 \rangle$

28) Find the dot product: $\langle 4, 9 \rangle \cdot \langle 6, -2 \rangle$.

A) -432

B) 70

C) 6

D) 42

$4 \cdot 6 + 9 \cdot (-2) = 24 + (-18)$

29) Find the cross product: $\langle 0, -2, 4 \rangle \times \langle 3, -5, 1 \rangle$.

A) $\langle -22, 12, -6 \rangle$

B) $\langle -22, -12, 6 \rangle$

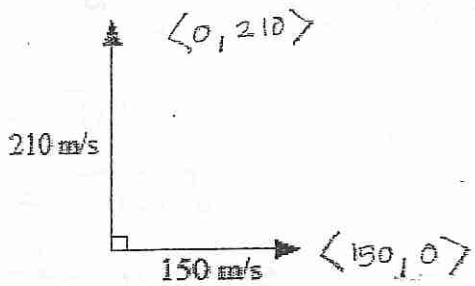
C) $\langle 18, 12, 6 \rangle$

D) $\langle 18, -12, 6 \rangle$

$\begin{vmatrix} i & j & k \\ 0 & -2 & 4 \\ 3 & -5 & 1 \end{vmatrix} = (-2 \cdot 1 - 20) i - (0 - 12) j + (0 - 6) k$
 $18i + 12j + 6k$

$i - j + k$

30) Find the magnitude of the resultant vector.



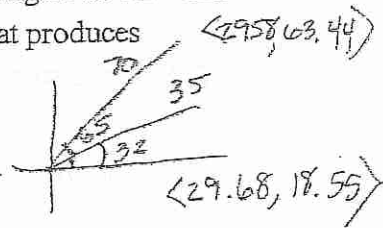
Resultant:
 $\langle 150, 210 \rangle$
 $m = \sqrt{150^2 + 210^2}$

- A) 360 m/s B) 60 m/s C) 147 m/s D) 258.1 m/s

31) Two forces with magnitudes of 35 newtons and 70 newtons act on an object at angles of 32° and 65° , respectively, with the positive x -axis. Find the direction of the third vector that produces equilibrium.

- A) 35.9° B) 234.1° C) 54.1° D) 215.9°

$\langle 59.26, 81.99 \rangle$ $\tan^{-1}\left(\frac{81.99}{59.26}\right)$



32) Name the relationship between the graph of f and g . Consider the amplitude, period and shifts.

$f(x) = \cos x$

$g(x) = 5\cos x - 7$

- A) g is a vertical compression of f by a factor of 5 and a horizontal shift left 7.
 B) g is a vertical stretch of f by a factor of 5 and a horizontal shift right 7.
 C) g is a vertical stretch of f by a factor of 5 and a vertical shift down 7.
 D) g is a vertical compression of f by a factor of 5 and a vertical shift up 7.

33) Use a sketch to find the exact value of the expression.

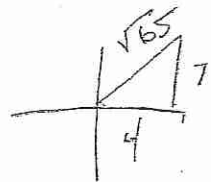
$\sin\left(\tan^{-1}\frac{7}{4}\right)$

A) $\frac{7}{4}$

B) $\frac{\sqrt{65}}{4}$

C) $\frac{7\sqrt{65}}{65}$

D) $\frac{4\sqrt{65}}{65}$



34) Write the polar equation $5r \sin \theta - r^2 = 0$ in rectangular form.

A) $5y - x^2 + y^2 = 0$

C) $5x - x^2 + y^2 = 0$

B) $5y - x^2 - y^2 = 0$

D) $5x - x^2 - y^2 = 0$

$5r \sin \theta - r^2 = 0$
 $5y - (x^2 + y^2) = 0$
 $5y - x^2 - y^2 = 0$

Q3

35) Find the polar coordinates of the point given in rectangular form. $(-5\sqrt{3}, -5) \rightarrow (r, \theta)$

- A) $(10, \frac{\pi}{6})$ **B) $(10, \frac{7\pi}{6})$** C) $(10, \frac{\pi}{3})$ D) $(10, \frac{4\pi}{3})$

$$r = \sqrt{(-5\sqrt{3})^2 + (-5)^2} =$$

$$\sqrt{75 + 25} = 10$$

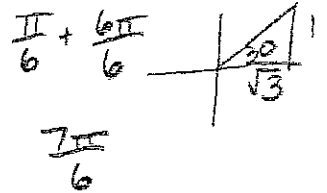
$$\theta = \tan^{-1} \frac{-5}{-5\sqrt{3}} = \frac{1}{\sqrt{3}}$$

36) Simplify $(6-2i)^2$

- A) $32-24i$** B) $36-4i$ C) 40 D) $40-24i$

$$(6-2i)(6-2i) = 36 - 12i - 12i + 4i^2$$

$$= 36 - 24i - 4 = 32 - 24i$$



37) Find the sum $\sum_{b=3}^8 (6-4b)$.

- a) -70 b) -90 **c) -96** d) -48

38) Express $6\left(\cos \frac{\pi}{6} + i \sin \frac{\pi}{6}\right)$ in rectangular form.

- A) $3\sqrt{3}-3i$ **B) $3\sqrt{3}+3i$** C) $3-3\sqrt{3}i$ D) $3+3\sqrt{3}i$

$$6\left(\frac{\sqrt{3}}{2} + i\frac{1}{2}\right) = 3\frac{\sqrt{3}}{2} + i\frac{6}{2}$$

39) Write in rectangular form: $12\left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4}\right) \cdot \frac{1}{4}\left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4}\right)$.

- A) 48 B) 3 **C) -3** D) 3i

$$3\left(\cos\left(\frac{\pi}{4} + \frac{3\pi}{4}\right) + i \sin\left(\frac{\pi}{4} + \frac{3\pi}{4}\right)\right)$$

$$3(\cos \pi + i \sin \pi)$$

$$3(-1) + i(0)$$

40) Simplify $(3-\sqrt{7}i)^6$ and express in rectangular form.

- A) $0.367+0.93i$ **B) $-1504+3809.9i$** C) $3072-2073.4i$ D) $737.28+327.68i$

$$r = \sqrt{3^2 + (\sqrt{7})^2} = \sqrt{9+7} = \sqrt{16} = 4$$

$$\theta = \tan^{-1}\left(\frac{-\sqrt{7}}{3}\right) = -41.4$$

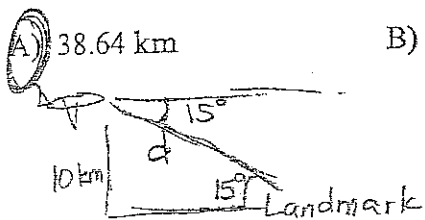
$$4^6 \left(\cos(6 \cdot -41.4) + i \sin(6 \cdot -41.4)\right)$$

$$4096(-.368 + i .93)$$

$$-1507.8 + 3808.36i$$

41) A plane is flying 10 km above ground. During a flight, the pilot looks down at a landmark on the ground that is some distance away. Assume that the plane is headed in the direction of the landmark. When initially spotted, the angle of depression is 15 degrees. What is the distance from the pilot to the landmark?

- A) 38.64 km B) 10.35 km C) 37.32 km D) 35.10



$$\sin 15^\circ = \frac{10}{d}$$

$$d \sin 15^\circ = 10$$

42) Given the function $g(x) = -5 \cos(3x) + 7$, what is amplitude?

- A) 3 B) -5 C) 7 D) 5

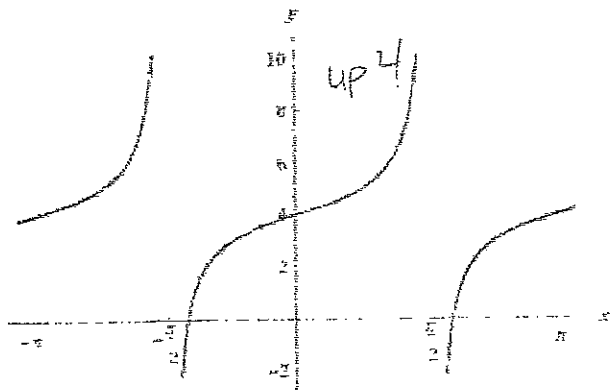
43) Given the function $g(x) = -5 \cos(3x) + 7$, what is the period?

- A) 2π B) $\frac{2\pi}{3}$ C) $\frac{3}{2}$ D) π

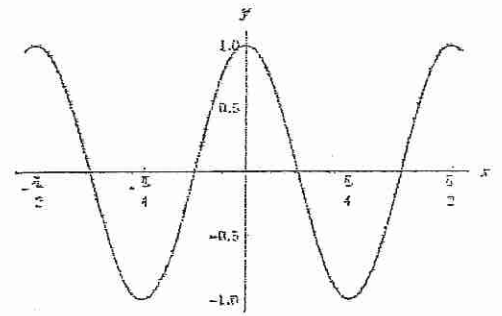
$$\text{Per} = \frac{2\pi}{b} = \frac{2\pi}{3}$$

44) Which formula defines the function f illustrated in the figure?

- A) $f(x) = \tan x - 4$
 B) $f(x) = \tan x + 4$
 C) $f(x) = \tan x - \frac{\pi}{2}$
 D) $f(x) = \tan x - \frac{\pi}{2}$



45) Which formula defines the function f illustrated in the figure?



- A) $f(x) = \cos 2\pi x$ $per = \frac{\pi}{2}$
 B) $f(x) = \cos \frac{\pi}{4} x$ $(b) \frac{\pi}{2} = \frac{2\pi}{b} (b)$
 C) $f(x) = \cos 4x$
 D) $f(x) = \cos \frac{\pi}{2} x$ $(\frac{2}{\pi}) b \frac{\pi}{2} = 2 \frac{1}{\pi} (\frac{2}{\pi})$

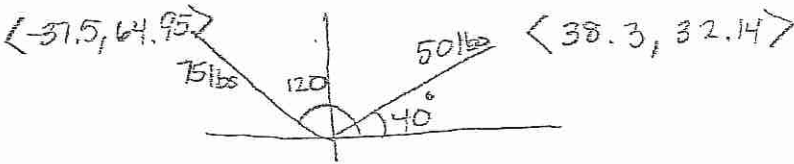
46) Simplify $\cos x + \sin x \tan x$ $b = 4$

- A) $\cos x$ B) $\sec x$ C) $\csc x$ D) $\cot x$

$$\left(\frac{\cos x}{\cos x}\right) \cos x + \sin x \cdot \frac{\sin x}{\cos x} \Rightarrow \frac{\cos^2 x + \sin^2 x}{\cos x} = \frac{1}{\cos x} = \sec x$$

47) Two forces with magnitudes of 50 pounds and 75 pounds act on an object at angles of 40° and 120° , respectively, with the positive x -axis. Find the direction of the resultant.

- A. 0.47° B. 89.5° C. 97.1° D. 269.5°



Resultant:

$$\langle .8, 97.09 \rangle$$

$$\theta = \tan^{-1} \left(\frac{97.09}{.8} \right)$$

48) Find the common ratio for the geometric sequence. t^8, t^5, t^2, \dots

- a) t b) t^3 c) t^{-3} d) -3

49) Eight people are boarding an aircraft. Two have tickets for first class and board before those in economy class. In how many ways can the eight people board the aircraft?

- a) 8 b) 1440 c) 40320 d) 16

$$\frac{2 \cdot 1}{1^{st} \text{ class}} \cdot \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{\text{economy class}} = (2P_2) \cdot (6P_6)$$

50) Find the probability of tossing a six-sided die twice and getting a sum that is at least 8.

at least 8

- | | | |
|-----|-----|------------------|
| 2,6 | 3,6 | a) $\frac{2}{3}$ |
| 3,5 | 4,5 | |
| 4,4 | 5,4 | 4,6 |
| 5,3 | 6,3 | 5,5 |
| | | 6,4 |

6,6 > 15 ways

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

c) $\frac{1}{2}$

d) $\frac{5}{12}$

$$\frac{15}{36} = \frac{5}{12}$$